FINAL Revision 4

SITE SPECIFIC WORK PLAN FOR REMEDIAL DESIGN/REMEDIAL ACTION AT 4825 GLENBROOK ROAD

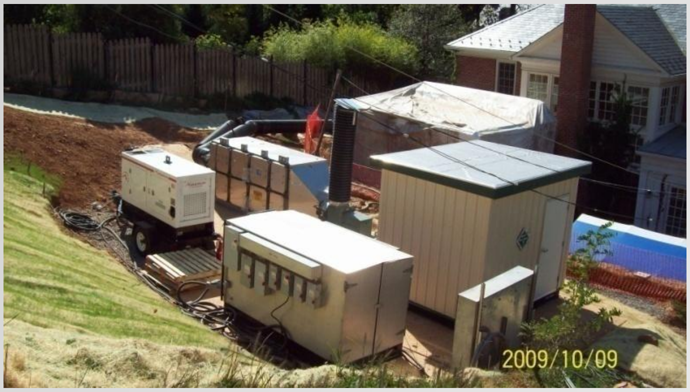
SPRING VALLEY FORMERLY USED DEFENSE SITE (SVFUDS), OPERABLE UNIT 3, WASHINGTON D.C.

CONTRACT NO. W912DY-09-D-0062 DO 0006
FUDS MEC/CWM PROJECT NO. C03DC091801 AND FUDS HTRW PROJECT NO. C03DC091802

Prepared For:

U.S. ARMY ENGINEERING AND SUPPORT CENTER, HUNTSVILLE

U.S. ARMY CORPS OF ENGINEERS, BALTIMORE DISTRICT



Prepared by:
PARSONS
Washington DC

December 28, 2015

SITE-SPECIFIC WORK PLAN FOR REMEDIAL DESIGN AND REMEDIAL ACTION AT 4825 GLENBROOK ROAD
SPRING VALLEY FORMERLY USED DEFENSE SITE, OPERABLE UNIT 3
SPRING VALLEY, WASHINGTON, D.C.

Prepared for:

U.S. Army Engineering and Support Center, Huntsville

and

Baltimore District
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ACRONYMS AND ABBREVIATIONS

Acronym	**Definition**
ABP	Agent Breakdown Product
AEGL	Acute Exposure Guideline Level
APG	Aberdeen Proving Ground
APP	Accident Prevention Plan
ARARs	Applicable, Relevant and Appropriate Requirements
$AsCl_3$	arsenic trichloride
ASTM	American Society for Testing and Materials
AU	American University
AUES	American University Experiment Station
CA	Chemical Agent
CACM	Chemical Agent Contaminated Material
CAFS	Chemical Agent Filtration System
CARA	CBRNE analytical remediation activity
CBRNE	Chemical Biological Radiological Nuclear and Explosives
CENAB	U.S. Army Corps of Engineers, Baltimore District
CSS	Chemical Safety Submission
CVAA	chlorovinylarsenious acid
CVAO	chlorovinylarsenious oxide
CWM	Chemical Warfare Materiel
DAAMS	Depot Area Air Monitoring System
DCMR	District of Columbia Municipal Regulation
DD	Decision Document
DDOE	District of Columbia Department of the Environment
DERP	Defense Environmental Restoration Program
DID	Data Item Description
DMM	Discarded Military Munitions
DoD	Department of Defense
DOE	Department of Energy
DQCR	Daily Quality Control Report
DQO	Data Quality Objective
DSI	Demolition Services, Inc.
ECBC	Edgewood Chemical Biological Center
ECS	Engineering Control Structure
EOD	Explosive Ordnance Disposal
EPP	Environmental Protection Plan
ERT	Earth Resources Technology
EZ	Exclusion Zone
FUDS	Formerly Used Defense Site
GIS	Global Information System
HA	Hazard Assessment
HCl	hydrogen chloride
HCN	hydrogen cyanide
HHRA	Human Health Risk Assessment

Acronym	Definition
HI	Hazard Index
HTW	Hazardous and Toxic Waste
IAW	In Accordance With
IHF	Interim Holding Facility
LUC	Land Use Control
MAP	Mobile Analytical Platform
MCE	Maximum Credible Event
MD	Munitions Debris
MDEH	Material Documented as an Explosive Hazard
MEC	Munitions and Explosives of Concern
MGFD	Munition with the Greatest Fragmentation Distance
MPDS	Multiple Power Distribution System
MINICAMS	Miniature Continuous Air Monitoring System
MPPEH	Material Potentially Presenting an Explosive Hazard
MSD	Minimum Separation Distance
NAD	North American Datum
NCR	Non-conformance Report
OPSEC	Operations Security
OU	Operable Unit
PDS	Personnel Decontamination Station
PDT	Project Delivery Team
PM	Project Manager
PMNSCM	Product Manager for Non-Stockpile Chemical Materiel
PP	Proposed Plan
PPE	Personal Protective Equipment
PPP	Public Protection Plan
PSHM	Project Safety and Health Manager
PSR	Project Status Report
PWS	Performance Work Statement
QA	Quality Assurance
QAM	Quality Assurance Manual
QAPP	Quality Assurance Project Plan
QC	Quality Control
QCM	Quality Control Manager
QCP	Quality Control Plan
QSM	Quality System Manual
RA	Remedial Action
RAM	Random Access Memory
RACR	Remedial Action Closeout Report
RCRA	Resource Conservation and Recovery Act
RCWM	Recovered Chemical Warfare Materiel
RDW	Remedial Action Derived Waste
RI/FS	Remedial Investigation/Feasibility Study
ROE	Right-of-Entry
SAP	Sampling and Analysis Plan

Acronym	**Definition**
SOP	Standard Operating Procedure
SOW	Scope of Work
SSHP	Site Safety and Health Plan
SSHO	Site Safety and Health Officer
SSWP	Site-Specific Work Plan
SUXOS	Senior UXO Supervisor
SVFUDS	Spring Valley Formerly Used Defense Site
SVOC	Semivolatile Organic Compound
TD	Technical Director
TE	U.S. Army 22nd Chemical Battalion (Technical Escort)
TEEL	Temporary Emergency Exposure Limit
TP	Test Pit
TPP	Technical Project Planning
UCL	Upper Confidence Level
UFP	Uniform Federal Policy
USACE	U.S. Army Corps of Engineers
USAESCH	U.S. Army Engineering and Support Center, Huntsville
USEPA	U.S. Environmental Protection Agency
UU/UE	Unrestricted Use/Unlimited Exposure
UXO	Unexploded Ordnance
UXOQCS	UXO QC Specialist
UXOSO	UXO Safety Officer
VOCs	Volatile Organic Compounds
WERS	Worldwide Environmental Remediation Services
WP	Work Plan

CHAPTER 1
INTRODUCTION

1.1 PROJECT AUTHORIZATION

1.1.1.1 Under Contract No. W912DY-09-D-0062, Delivery Order 0006, Parsons is serving as the prime contractor to the U.S. Army Engineering and Support Center, Huntsville (USAESCH) for removal of Munitions and Explosives of Concern (MEC), Material Potentially Presenting an Explosive Hazard (MPPEH), Explosive Hazards, Industrial chemical hazards, and Chemical Warfare Materiel (CWM) as well as residence demolition at 4825 Glenbrook Road located in the Spring Valley Formerly Used Defense Site (SVFUDS), Operable Unit 3 (OU-3) in Washington, D.C (Figures 1-1 and 1-2). This project falls under the Defense Environmental Restoration Program/Formerly Used Defense Sites (DERP/FUDS). The Project Team consists of Parsons, USAESCH, and the U.S. Army Corps of Engineers (USACE), Baltimore District (CENAB), as well as other government and non-government agencies with specific expertise for implementation of specialized components of the field operations. For purposes of this Site-Specific Work Plan (SSWP), USAESCH and CENAB are referred to jointly as “USACE.”

1.1.1.2 During World War I, the U.S. Government established the American University Experiment Station (AUES) to investigate the testing, production, and effects of noxious gases, antidotes, and protective masks. The AUES was located on the grounds of the current American University (AU) and used additional property in the vicinity to conduct this research and development of CWM, including mustard agent and lewisite, as well as adamsite, irritants, and smokes. After the war, these activities were transferred to other locations and the site was returned to the owners.

1.1.1.3 This SSWP applies to the remedial action (RA) activities specified in the Decision Document (DD) for the 4825 Glenbrook Road property (USACE 2012b) and is not intended to be a standalone document. Details common to all SVFUDS activities are described in the *Site-Wide Work Plan (Site-Wide WP) for the Spring Valley Formerly Used Defense Site, Spring Valley, Washington, D.C.*, prepared by Parsons for USACE (USACE 2007), hereafter referred to as the Site-Wide Work Plan (Site-Wide WP).

1.1.1.4 This SSWP is prepared consistent with the CERCLA, National Oil and Hazardous Substances Pollution Contingency Plan (NCP), DID WERS-001, WERS 006.01, and EM 1110-1-4009, EM 385-1-1, EM 385-1-97 and Interim Guidance (Draft Army Regulation XXX) Chemical Warfare Materiel Responses and Related Activities, dated 1 April 2009, as appropriate. This SSWP references the applicable components of the Site-Wide WP. However, the content focuses on site-specific objectives, information and requirements, procedural decisions, and/or omissions from the site-wide documents. If revisions to this SSWP are required, a dated summary page listing all revised pages will document the associated changes and will be included with each revision.

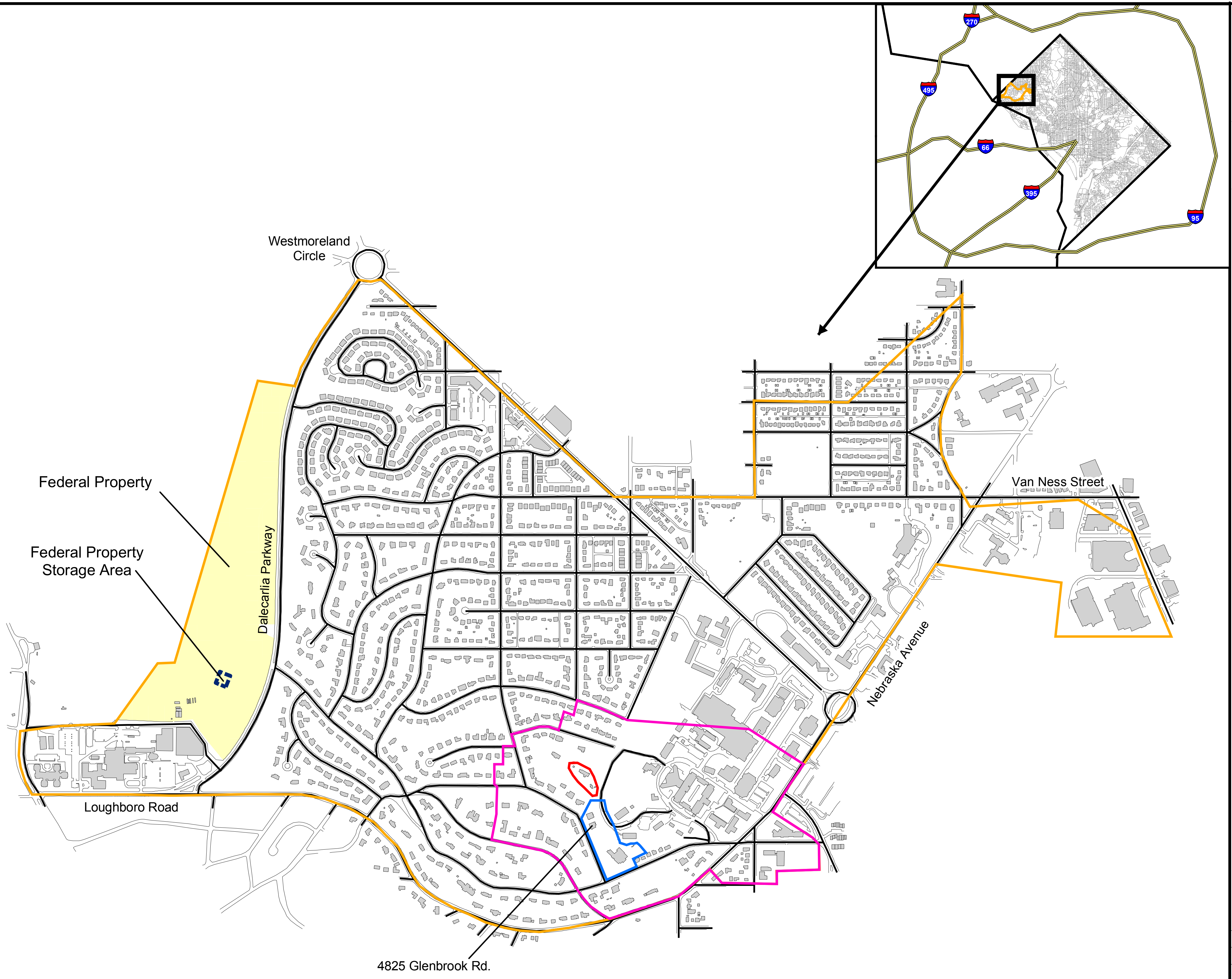

Figure 1-1
Spring Valley FUDS Location and Operable Units

Spring Valley
Washington, D.C.

Legend

▨ Buildings
╱ Road
🟨 Federal Property
⌇ Federal Property Storage Area

Operable Unit
🟥 OU-2
🟦 OU-3
🟪 OU-4
🟧 OU-5

Notes:
1. OU-1 encompasses all of the areas depicted as OU-2, 3, 4, and 5.
2. OU-4 and OU-5 do not include the smaller operable units shown within their boundaries (e.g., OU-4 does not include the areas shown as OU-2 and OU-3).

1,200 600 0 1,200 Feet

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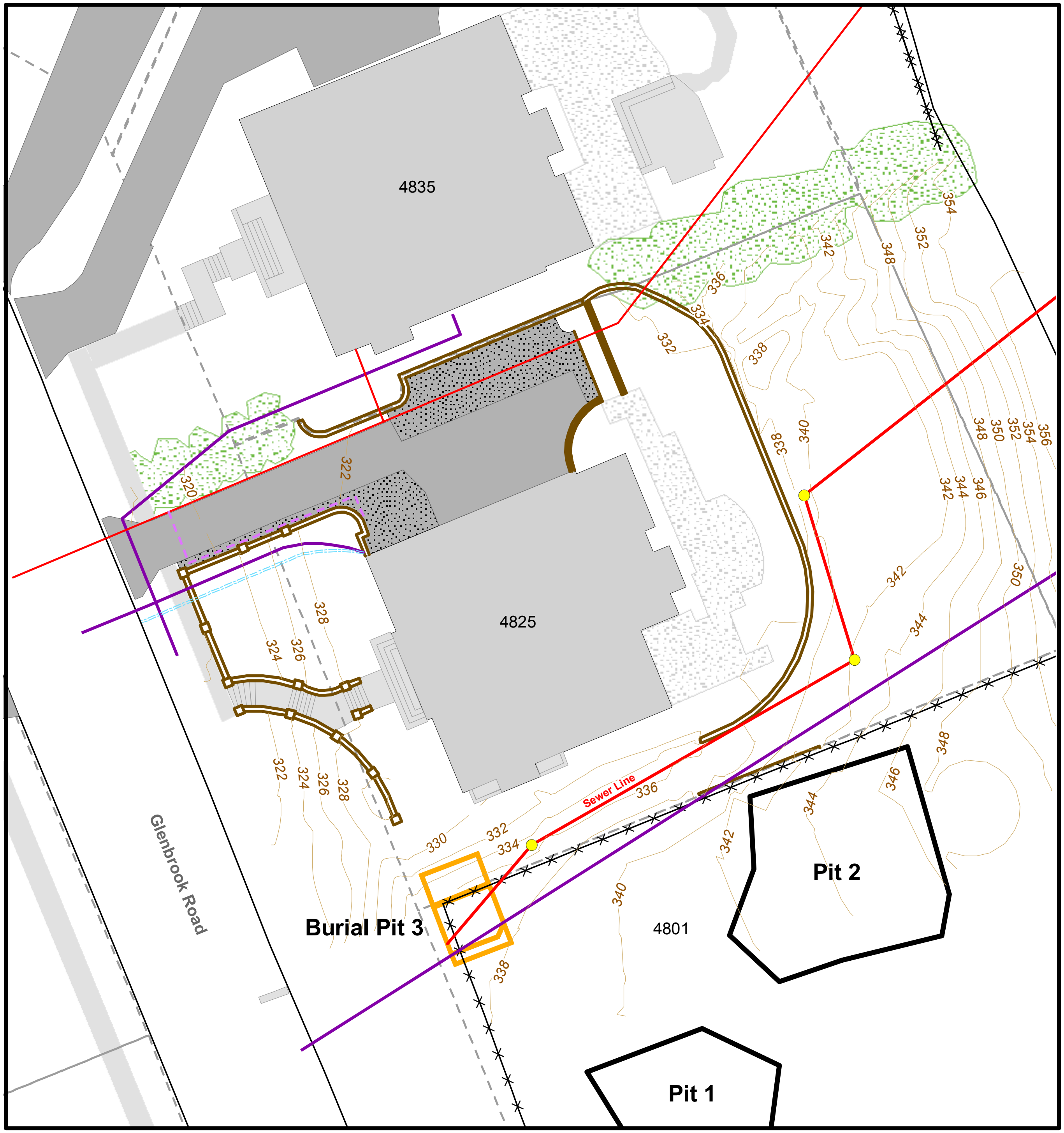

Figure 1-2
Site Map
4825 Glenbrook Road

Spring Valley
Washington, D.C.

Legend

▬	Pits 1 & 2
▭	Test Pit 23 (Burial Pit 3)
▭	Parcels
▨	Buildings
▨	Driveway
▨	Gravel Surface
▨	Sidewalk
▨	Deck/Porch
🟩	Shrubbery
×—×	Property Fence
▬	Retaining Wall
●	Manhole
▬	Sewer Line
▬	Water Line
- - -	Gas Line
- - -	Electric Line
╱╲	Elevation Contours

30 15 0 30
Feet

1 inch equals 30 feet

Scale:	1:360
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1.1.1.5 Based on the DD (USACE 2012b), the RA areas on the 4825 Glenbrook Road property were designated as high probability and low probability areas (Figure 1-3). Three areas where AUES items may be encountered during the RA will be excavated under the high-probability protocols as defined in the Site-Wide WP. These three areas are: the backyard patio and the southern portion of backyard retaining wall (Area D); the area under the house, including the basement and foundation walls (Area E); and the front yard (Area F). Two areas where AUES items are not likely to be encountered during the RA will be excavated under the low-probability protocols as defined in the Site-Wide WP. The two low-probability areas are: the backyard area behind the retaining wall (Area A) and the driveway area (Area B). Area C (Burial Pit 3) where previous investigations were conducted requires no further action. Site preparation will be conducted in accordance with (IAW) low probability procedures as described in the Site-Wide WP (USACE 2007) and this SSWP.

1.1.1.6 In addition to these tasks, this SSWP includes plans to remove and dispose of the residence, including the home, foundations, slabs, all utilities (i.e., to include relocation and replacement), driveway, sidewalks, and landscaping adjacent to the house. The fence along the property boundary adjacent to 4835 Glenbrook Road and 4801 Glenbrook Road will also be removed. Site restoration will be completed in support of the RA.

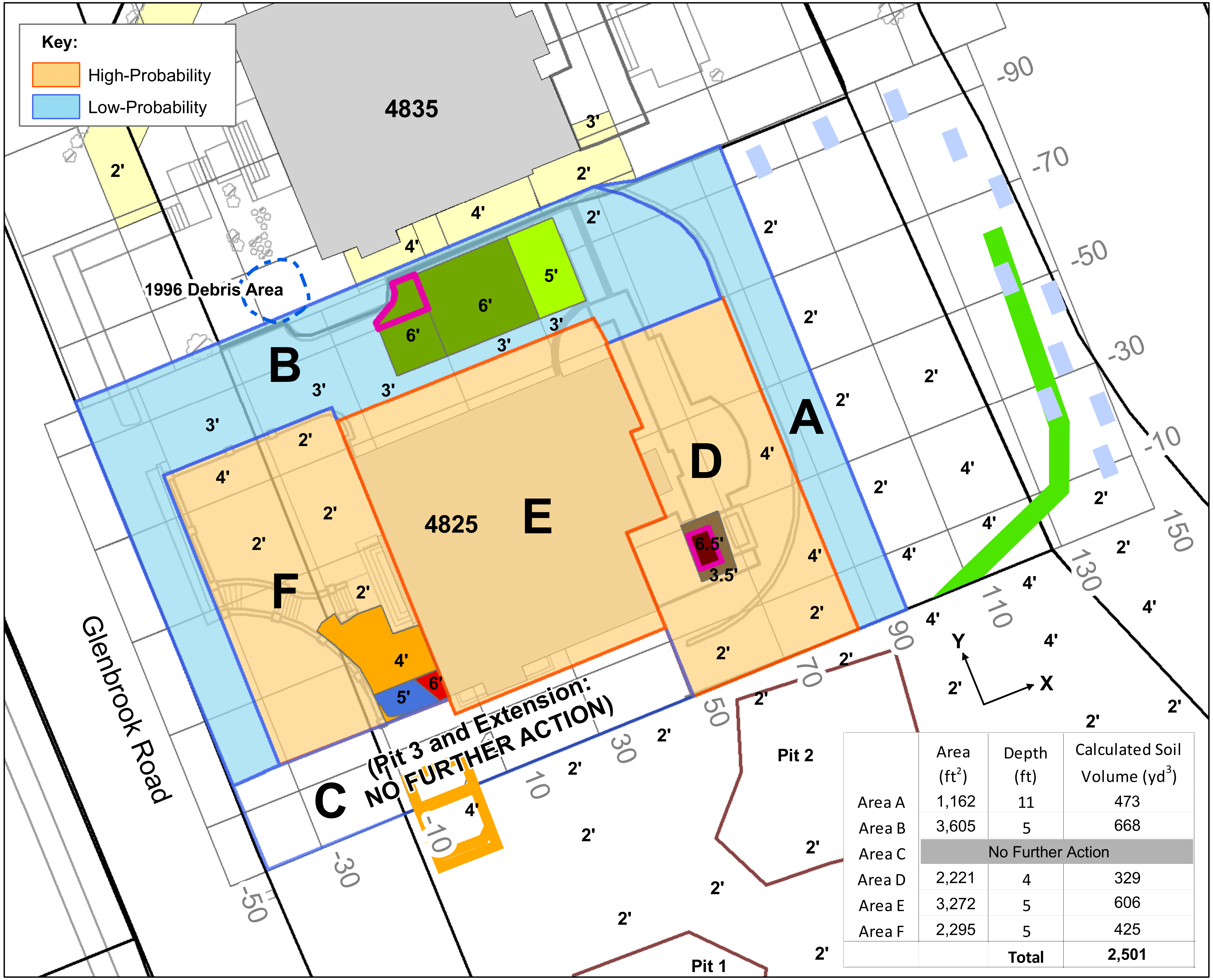
1.2 PURPOSE AND SCOPE

1.2.1.1 Based on the DD, the remediation goal for the 4825 Glenbrook Road RA is the removal of all soil with a concentration greater than 20 mg/kg for arsenic. The remedial action objectives for the site are:

- Prevent direct contact with soil having a non-carcinogenic Hazard Index (HI) exceeding 1
- Prevent direct contact with soil having a cancer risk in excess of 1×10^{-4}
- Remove military munitions from the Site, allowing for Unrestricted Use/Unlimited Exposure (UU/UE)

1.2.1.2 The purpose of this SSWP is to detail the plans and schedule to achieve these remedial objectives. The scope of this RA is inclusive of the following tasks:

- Define the high and low probability protocols to remove, assess, and dispose of CWM or hazardous and toxic waste (HTW) impacted soil and any potential recovered chemical warfare materiel (RCWM), laboratory waste, and other suspect AUES-related debris remaining at or in the immediate vicinity of the area;



	Area (ft^2)	Depth (ft)	Calculated Soil Volume (yd^3)
Area A	1,162	11	473
Area B	3,605	5	668
Area C	No Further Action		
Area D	2,221	4	329
Area E	3,272	5	606
Area F	2,295	5	425
		Total	2,501

Figure 1-3
Proposed Remedial Action
4825 Glenbrook Road

Spring Valley
Washington, D.C.

Legend

- ▨ Buildings
- ☐ Property Boundaries
- ☐ 20' Grid
- — Pits 1 and 2
- 🟧 Test Pit 23 (Burial Pit 3)
- 🟪 Arsenic Exceedance to be Further Excavated
- 🟩 Trench for Rerouted Sewer Line

Additional Low Probability Investigation

- 🟦 Test Pits

Arsenic Soil

- 🟩 Arsenic Grid Previously Removed [5'] (2009)
- 🟩 Arsenic Grid Previously Removed [6'] (2009)

Soil Excavation

- 🟫 Excavation Depth [3.5'] (2009)
- 🟧 Excavation Depth [4'] (2010)
- 🟦 Excavation Depth [5'] (2010)
- 🟥 Excavation Depth [6'] (2010)
- 🟥 Excavation Depth [6.5'] (2009)
- ⬚ 1996 APEX Tree Removal (Debris Area) Perimeter
- 🟨 Previously Excavated Arsenic: Adjacent Properties

Note:
Excavation depths shown from previous arsenic removal.

0 10 20 40 Feet
1 inch = 20 feet

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- Describe the plans for the removal and disposal of the residence and appurtenances;
- Present the approach for restoring the site after completion of the RA, which includes but is not necessarily limited to, backfilling the area with clean soil, stabilizing slopes, seeding the area, and reinstalling fencing at the property boundaries.

1.2.1.3 Mobilization and demobilization activities, training, and government required tabletop exercises and pre-operational surveys also are addressed in this document.

1.3 WORK PLAN ORGANIZATION

1.3.1.1 This SSWP covers the RA activities at the 4825 Glenbrook Road property. This SSWP discusses the general approach for the RA. Specific aspects of the RA such as Accident Prevention Plan (APP), Sampling and Analysis Plan (SAP), and Remedial Design are discussed in Appendices (Appendices, D, E, and M, respectively) to this SSWP. Discussion on selection of MCE, evaluation of engineering control alternative, ECS configuration and ECS locations, evaluation of slope stability and design, and noise study for the RA at the high probability areas are included in Appendix M - Remedial Design. The SSWP is organized to address each of the components of the performance work statement (PWS) in accordance with Data Item Description (DID) Worldwide Environmental Remediation Services (WERS) 001, WERS 006.01, EM 1110-1-4009, EM 385-1-1, EM 385-1-97 and Interim Guidance (Draft Army Regulation XXX) Chemical Warfare Materiel Responses and Related Activities, dated 1 April 2009, as appropriate and comprises several sub plans, each discussing a different aspect of the RA. These plans are summarized below.

- Introduction: Chapter 1 of this SSWP details the overall scope and objective of the project and overview of the site and its history.
- Technical Management Plan: Chapter 2 details the site-specific organizational structure, lines of authority, and communication procedures for the project team for the RA at 4825 Glenbrook Road.
- Field Remedial Action Plan: Chapter 3 describes the field methods and remediation procedures planned for this site, and the approach to confirm the completion of the RA.
- Quality (QC) Control Plan: Chapter 4 describes procedures for controlling and measuring the quality of work performed, including the required organization, responsibilities, and policies. A Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP) is prepared in accordance with the Department of Defense (DoD) Quality Assurance Manual (QAM) and WERS 009.01. The UFP-QAPP describes the quality management and QC testing programs related to the environmental sampling program on-site. It integrates the most recently approved DoD (QSM), the Army Three Phase Quality Assurance Program, and USEPA’s Data Quality Objectives (DQO) Process into the project’s technical approach. The QAPP describes QA/QC procedures (including DQOs for laboratories) and includes a description of the project’s Sampling and Analysis Plan (SAP) with standard operating procedures (SOP) for field and analytical procedures.

- Explosives Management Plan: Chapter 5 is a placeholder chapter as it is not applicable to this RA.
- Explosives Siting Plan: Chapter 6 is a placeholder chapter as it is not applicable to this RA.
- Environmental Protection Plan (EPP): Chapter 7 provides general site-specific information and applicable requirements.
- Property Management Plan: Chapter 8 provides detailed information on the types, quantities, and sources of equipment and materials that will be required to perform field and office operations on this project.
- Interim Holding Facility (IHF) Siting Plan for RCWM Projects: Chapter 9 is a placeholder chapter as all the information required is contained within the Site-Wide WP. Chapter 9 of the Site-Wide WP describes the provisions that will be made and the siting requirements for the storage of RCWM ordnance and containers, and potential MEC.
- Hazardous and Toxic Waste (HTW)-Contaminated Soil Excavation Plan: Chapter 10 is applicable to the planned RA for the low probability areas at 4825 Glenbrook Road.
- Physical Security Plan for RCWM Project Sites: Chapter 11, Physical Security Plan for RCWM Projects is not included in this document for security purposes and will serve as a placeholder chapter only. The Physical Security Plan for RCWM is maintained by CENAB. Operations Security (OPSEC) Plan for Spring Valley Formerly Used Defense Site is prepared and updated annually be CENAB. A copy of the OPSEC is available at the Federal Property.
- References: Chapter 12 includes a list of references used in the preparation of this SSWP.

1.3.1.2 This SSWP uses the same appendix designations as the Site-Wide WP to maintain the same overall work plan structure.

- Appendix A, Scope of Work: The Performance Work Statement (PWS) which describes the scope of work is provided in this appendix. The probability assessment for 4825 Glenbrook Road is also included in the appendix as Attachment A-1
- Appendix B, Site Maps: The figures and maps provided in this document are included as Appendix B to this SSWP. However, for easy reference the site maps are included within associated chapters.
- Appendix C, Local Points of Contact: Various points of contact are listed in Appendix C to this SSWP.
- Appendix D, Accident Prevention Plan (APP) Supplement: This Appendix of the SSWP describes the health and safety procedures, personal protection standards, and environmental health hazards specific to this site, in addition to the site-specific

activity hazard analysis tables for this RA. Appendix D of the Site-Wide WP contains the site-wide APP that describes the overall health and safety procedures, personal protection standards, and environmental health hazards for the entire SVFUDS.

- Appendix E, Sampling and Analysis Plan: The SAP, Appendix E outlines the anticipated sampling and analysis procedures for the project site, and contains a list of the required analytes and the associated sampling procedures.
- Appendix F, Forms: This appendix is a placeholder as all relevant forms and templates are provided in Appendix F of the Site-Wide WP.
- Appendix G, Minimum Separation Distance (MSD) Calculations: This appendix is a placeholder as all the information required is contained within the Site-Wide WP. Calculations used to derive the MSDs to be employed for project operations are included in Appendix G of the Site-Wide WP.
- Appendix H, Résumés: This appendix includes the Contractor Personnel Qualifications Certification Letter in accordance with DID WERS-012 and résumés of key personnel on this project.
- Appendix I, Technical Project Planning (TPP): The TPP process for the SVFUDS is implemented through the Spring Valley Partnering process. Members of the Spring Valley Partners comprise stakeholders who meet monthly to discuss and plan the SVFUDS activities. Monthly Partnering Meeting minutes will include progress on the 4825 Glenbrook Road RA effort.
- Appendix J, Air Monitoring Plan: The site-specific plans for chemical agent (CA) and ABP monitoring/soil screening and CWM sample analysis, as prepared by Edgewood Chemical Biological Center (ECBC), are provided in Appendix J to this SSWP.
- Appendix K, Product Manager for Non-Stockpile Chemical Materiel (PMNSCM) Plans: This appendix is a placeholder as all the information required is contained within the Site-Wide WP. Plans for the storage and transportation of RCWM are in Appendix K of the Site-Wide WP.
- Appendix L, MEC Transportation Plan: A description of the procedures used to transport MEC items not transported as potential RCWM is contained in Appendix L of the Site-Wide WP. This appendix is a placeholder as MEC transportation should not be required during this RA. RCWM transportation plan is similar to the MEC transportation plan and will be followed as outlined in Appendix L of the Site-Wide WP.
- Appendix M, Remedial Design including Engineering Control Structure (ECS) Plans: A description of the engineering controls evaluation and the ECS selected to be used for RA of the high probability areas are included in Appendix M.

1.4 PROJECT LOCATION

The 4825 Glenbrook Road property is located in the south central portion of the SVFUDS, which is located in the northwest section of Washington, D.C. (Figure 1-1).

1.5 SITE DESCRIPTION

The SVFUDS is located in the Spring Valley neighborhood of northwest Washington, D.C. The 661-acre area currently includes approximately 1,600 private residences, foreign embassies, AU, Wesley Seminary, and numerous commercial properties. The environmental setting of the SVFUDS is described in Subchapter 1.5 of the Site-Wide WP (USACE 2007). Figure 1-2 shows the site map for 4825 Glenbrook Road.

1.6 SITE HISTORY

RCWM was found on or in the vicinity of the former World War I era site, historically known as the AUES. During World War I, the U.S. Government established the AUES to investigate the testing, production, and effects of noxious gases, antidotes, and protective masks. The AUES was located on the grounds of the current AU and used additional portions of property in the vicinity to conduct this research and development of CWM, including mustard and lewisite agents, adamsite, irritants, and smokes. Areas not used for testing were used to house and train troops (Camp Leach). Immediately after the war, these activities were transferred to other locations, and the site was restored and returned to the owners.

1.7 CURRENT AND PROJECTED LAND USE

The property at 4825 Glenbrook Road is a single-family, detached residential dwelling currently owned by AU. No changes to land use are projected. (Note: the property is currently vacant due to upcoming RA activities.)

1.8 PREVIOUS INVESTIGATIONS

1.8.1.1 Previous investigations across the entire SVFUDS are described in detail in Subchapter 1.8 of the Site-Wide WP (USACE 2007). Previous investigation activities were performed in accordance with the SSWPs for each of the investigations and the results are summarized in the RI for 4825 Glenbrook Road (USACE 2011a). The following previous investigations were carried out at the 4825 Glenbrook Road property:

- Geophysical Investigation (February 1999)
- Arsenic Sampling and Removal (2000-2001)
- Test Pits and Trenches Investigation (2001-2002)
- 4825 Test Pit Investigation (Test Pit 23) – (May 2001 – March 2002)
- Soil Gas and Driveway Boring ABP Soil Sampling (March – June 2007)
- Burial Pit 3 Investigation and Burial Pit 3 Extensions (October 2007 – March 2009)

- Low Probability Test Pit Investigation (March – August 2009)
- Arsenic Sampling and Removal in the Driveway (May – July 2009)
- High Probability Test Pits Investigation (November 2009 – April 2010)
- Geotechnical Soil Boring and Backyard Soil Sampling (August 2010)

1.8.1.2 High Probability Test Pits 120, 134, and 138 were investigated from November 2009 – April 2010. Among the closed and open cavity items uncovered during the excavation, which included glass bottles, glass vials, glass test tubes, glass jars, metal bottles, and 75mm projectiles, 26 items were identified as CWM, two items were identified as MEC (one closed cavity 75mm projectile and one 75 mm unfuzed, unfired shrapnel round), three items were identified as Munitions Debris (MD) (two open cavity 75mm projectiles and one 75mm unfuzed with hexagonal plug), and the remaining items were identified as suspected AUES-related nonmunitions scrap. Agent/agent breakdown products (ABP) were detected in intact containers and soil uncovered in the vicinity of the excavation. Other industrial chemicals such as chloroacetophenone, diphenylchloroarsine, and arsenic trichloride ($AsCl_3$), were also detected in the intact containers. Intact containers were destroyed by ECBC, located in Edgewood, Maryland, after analysis was performed. Agent/ABPs impacted soil excavated during the investigation was placed in drums and properly disposed. Metals detected in agent/ABPs-cleared grab samples that exceeded the accepted comparison levels included aluminum, arsenic, iron, magnesium and thallium. Sample results show that soil exceeding the accepted comparison levels still remains in this area. The investigation was ceased due to detection of $AsCl_3$ in a vapor and solid sample. Analysis of the ability of the previous safety control measures to adequately contain and filter the unanticipated chemical was needed as arsenic trichloride was not previously found in the Spring Valley FUDS. USACE ceased investigation/removal activities to perform the safety analysis. When USACE ceased operations, the property was rendered safe by backfilling. Further remedial activities will be completed under this RA.

1.8.1.3 The ability of the existing safety control measures to adequately contain and filter the unanticipated chemical was analyzed and the results indicate that the existing Chemical Agent Filtration System (CAFS) is capable of handling arsenic trichloride (ECBC 2011).

1.8.1.4 Additional information on the history of the AUES operations is provided in the Remedial Investigation (RI) Evaluation Report (USACE 1998), the Remedial Investigation Report for 4825 Glenbrook Road (USACE 2011a), the Feasibility Study (FS) for 4825 Glenbrook Road (USACE 2011b), Proposed Plan for 4825 Glenbrook Road (USACE 2011c), and DD for 4825 Glenbrook Road (USACE 2012b).

1.8.1.5 The RI (USACE 2011a) concluded that CWM and MEC hazards may still be present at the site.

1.8.1.6 The RA objectives noted in paragraph 1.2.0.1 specify the contaminants and media of concern, receptors, and exposure pathways, and preliminary remedial goals for the 4825 Glenbrook Road property developed in the FS (USACE 2011b). Five alternatives evaluated in the FS to achieve these objectives included:

- Alternative 1: No Further Action
- Alternative 2: Land Use Controls (LUC)

- Alternative 3: Cleanup to residential standards without demolishing the house; restricted future use (LUCs)
- Alternative 4: Remove the house and cleanup to recreational standards; restricted future use (LUCs)
- Alternative 5: Remove the house and cleanup to residential standards; unrestricted future use of the property.

1.8.1.7 Based on the detailed and comparative analysis of alternatives, Alternative 5, Remove the house and remediate (cleanup) to Residential Standards with Unrestricted Future Use was the recommended RA alternative. The Proposed Plan (PP) and DD provide further details on this proposed remedy.

1.9 SUMMARY OF RISK FROM RECOVERED CHEMICAL WARFARE MATERIEL AND MUNITIONS AND EXPLOSIVES OF CONCERN

1.9.1.1 RCWM and CA-contaminated material (CACM) are known to be present in the high probability test pits. Mustard agent was detected in glassware excavated from one of these test pit locations (Test Pit 138) and mustard agent, lewisite, and ABPs were detected in the soil at another (Test Pit 120). Based on USACE's Probability Assessment (USACE 2012a) and with the concurrence of the Project Delivery Team (PDT), MEC are not anticipated to be present at 4825 Glenbrook Road in areas where high probability RA will be performed under this SSWP.

1.9.1.2 Potential RCWM at these test pits may include, bulk containers (e.g., ceramic containers or drums), and laboratory bottles with chemical agent. CACM includes soil, water, or debris contaminated with chemical agents. Although MEC have been recovered during previous investigation activities at this property, MEC are not anticipated to be found during the RA efforts. However, all site personnel will be given RCWM recognition training on the type of chemical agent(s) suspected of being present prior to commencing any field activities. Recognition training on the type of MEC that may potentially be present will also be provided. In the event CACM or RCWM is encountered, all site personnel will be instructed to proceed in accordance with the procedures described in Chapter 3 of this document.

CHAPTER 2 TECHNICAL MANAGEMENT PLAN

2.1 PROJECT OBJECTIVES AND APPROACH

2.1.1.1 The objective for this RA effort per the DD (USACE 2012b) is described in Section1.2. A summary of the approach to meet the project objectives is as follows:

- Remove and dispose of the residence, including the home, foundations, slabs, all utilities (i.e., to include relocation and replacement as needed), driveway, sidewalks, and landscaping adjacent to the house;
- Perform low and high probability intrusive activities to safely remove CWM or HTW impacted soil, any RCWM or CACM hazards, CWM, and any other AUES-related items and debris that remain within the low and high probability areas;
- Collect data to confirm that remediation goals are met;
- Properly dispose of all solid and hazardous waste;
- Maintain a detailed accounting of all CWM and CACM and provide appropriate disposal and disposition of related items or waste;
- Conduct all activities in accordance with health and safety protocols to be protective of workers and the public;
- Prepare, submit, and obtain acceptance of a Remedial Action Closeout Report (RACR); and
- Provide technical and community relations support to accomplish these tasks.

2.1.1.2 Based on the results of the previous investigations, the Army determined that areas where there is a high probability that AUES-related items may be encountered (i.e., Area D, E and F) will be excavated to the depth of bedrock or competent saprolite. The low probability areas (Areas A and B), where there is a lower probability of encountering AUES-related items will also be excavated to the depth of bedrock or competent saprolite (See Figure 1-3). Saprolite is thoroughly decomposed rock formed by in-place chemical weathering. It retains characteristics (such as cross-stratification) that were present in the original rock from which it formed, thus providing a strong indication that man-made activities have not impacted the layer. For this reason, saprolite was used during previous SVFUDS investigations to represent the limits of past intrusive activities. For the purposes of this RA, competent saprolite is defined as saprolite that cannot be excavated by hand tools, but can be excavated by powered equipment. A Parsons/ERT geologist will determine bedrock or competent saprolite with concurrence by the USACE Geologist. Excavation depth calculation conservatively assumes a 1-foot layer of competent saprolite overlying the bedrock at 4825 Glenbrook Road.

2.1.1.3 Digging to bedrock or competent saprolite will result in an over-excavation of the soil relative to the cleanup goals based on soil contamination alone. However, the proposed excavation depth would also accomplish the goals of removing AUES-related items that may contain CWM. Parsons will perform the low and high probability RA activities in accordance with the approved Chemical Safety Submission (CSS) [USACE 2012c] and this SSWP.

2.2 ORGANIZATION

Several organizations are directly involved in the RA planned for 4825 Glenbrook Road. The technical team and their respective roles for this RA are listed in Table 2-1. More detailed information concerning the organization and roles of major team members is provided in Subchapter 2.2 of the Site-Wide WP.

2.2.1 U.S. Army Corps of Engineers, Baltimore District

2.2.1.1 CENAB is the Project Manager (PM) for this project. CENAB responsibilities include review of project plans and documents, obtaining rights-of-entry (ROE) to properties in the intrusive areas, working with the news media and the public, and coordinating with regulatory agencies on issues pertaining to protection of human health and the environment. As the generator of any excavated HTW, CENAB will be responsible for signing waste manifests or required documentation for transportation and disposal of HTW. CENAB also appoints a Public Affairs Officer to communicate progress and results to the public. CENAB also assigns a Site Operations Officer, who will assist in making decisions during field operations when the CENAB PM is not present.

2.2.2 U.S. Army Engineering and Support Center, Huntsville

USAESCH is the implementing agency for execution of this project and provides technical expertise for MEC/RCWM activities. USAESCH responsibilities include procurement of CWM/MEC removal services, direction of the contractor, coordination of document reviews, conduct of QC, and provision of an on-site safety specialist during high probability investigations.

2.2.3 Product Manager for Non-Stockpile Chemical Materiel

2.2.3.1 PMNSCM is responsible for destroying non-stockpile chemical materiel.

2.2.3.2 With respect to operations at the SVFUDS, PMNSCM is responsible for arranging the interim storage, as well as the on-site disposal or off-site transportation of any RCWM items recovered during the remedial activities.

2.2.4 Chemical Biological Radiological Nuclear and Explosives Analytical Remediation Activity

2.2.4.1 The Chemical Biological Radiological Nuclear and Explosives (CBRNE) Analytical Remediation Activity (CARA) provides the DoD with a worldwide capability of responding to, neutralizing, and interim holding (until final disposal by PMNSCM) of chemical agents, munitions, and other hazardous materials. CARA will provide Explosives Ordnance Disposal personnel. CARA is responsible for:

- Working with contractors to perform the intrusive operations;
- Packaging of suspect RCWM/MEC items;
- Transporting RCWM/MEC to the IHF containers;
- Responding to emergencies occurring during the on-site transport or storage of RCWM/MEC in the IHF;
- Recommending a course of action to USACE in case of an emergency;
- Assessing potential RCWM/MEC items; and
- Maintaining and operating the personnel decontamination station (PDS).

2.2.5 Air Monitoring Team and Contract Surety Laboratory

2.2.5.1 The ECBC Air Monitoring Team is responsible for the development of analytical procedures pertaining to chemical operations. During all high probability intrusive operations, the air monitoring team will conduct air monitoring for CA and toxic industrial chemicals in the Exclusion Zone (EZ). Air monitoring for the same parameters will be conducted during low probability intrusive operations at the excavation location, as close to the active excavation as practical, and at the work area perimeter.

2.2.5.2 Soil, scrap material, or archeological items potentially contaminated with agent will be containerized and the headspace will be sampled using miniature continuous air monitoring system (MINICAMS) and depot area air monitoring systems (DAAMS) tubes. DAAMS tubes will be analyzed either on site by the air monitoring team Mobile Analytical Platform (MAP), or at the ECBC contract surety laboratory at Aberdeen Proving Ground (APG), Maryland.

2.2.5.3 After headspace screening and clearance, samples of any soil and other materials showing evidence of possible contamination will be collected for analysis of CA and ABPs products. These analyses may be performed either on site using the MAP, or at the contract surety laboratory at APG, Maryland.

2.2.6 Contractor

2.2.6.1 Parsons is the RCWM/MEC contractor, providing overall site management and coordination during field operations, including sampling, coordination of analytical samples, coordination of subcontractors, documentation of site activities, and preparation of closure report. Parsons also will supply the Site Safety and Health Officer (SSHO) who will be responsible for ensuring the RA are conducted safely and in accordance with this SSWP.

Table 2-1 Organizations and Responsibilities

Responsibility	Organization
Project Manager (Site Operations Officer)	CENAB
Implementing Agency (Safety Specialist)	USAESCH
Contractor (PM, Site Manager, Project Safety and Health Manager [PSHM], and SSHO)	Parsons
Air Monitoring Team/Contract Surety Laboratory	ECBC
PDS Operation, Emergency Rescue, Chemical Agent Response, and Explosives Ordnance Disposal (EOD) Support	United States Army 22nd CARA
RCWM Storage, Shipment, and Destruction	PMNSCM

2.3 FEDERAL, STATE, AND LOCAL AGENCIES

The U.S. Environmental Protection Agency (USEPA) Region 3 and District of Columbia Department of the Environment (DDOE) are the regulatory agencies that will provide review and technical support of the related SSWP.

2.4 SPRING VALLEY PARTNERING GROUP

The Spring Valley Partners comprise representatives of CENAB, USAESCH, USEPA, and DDOE. This group meets monthly to facilitate the planning process. For the 4825 Glenbrook Road project, AU (the property owner) participates in the meetings of the Spring Valley Partnering Group. The Partners Meetings are open to the Restoration Advisory Board (RAB) members, including the Technical Assistance for Public Participation (TAPP) consultant and Advisory Neighborhood Commissions (ANC) or RAB member.

2.5 PROJECT PERSONNEL

The key Parsons personnel who are involved in this RA are listed in Table 2-2. The roles of these personnel are described below.

2.5.1 Project Manager

2.5.1.1 The Parsons PM will be the direct point-of-contact for USACE. The Parsons PM will be responsible for managing all requirements of the project, overseeing the performance of all individuals on the project team, coordinating contract work, and overseeing specific task identification and resolutions. The PM will also schedule field efforts, identify site personnel to accomplish the specific project tasks as defined in this SSWP, implement project QC and safety procedures, and direct personnel to achieve successful and timely completion of the project tasks. The Project Manager will also be the Project QCM for this Delivery Order (see below). The PM will promptly implement approved and authorized changes to ongoing work orders, as necessary. The Parsons PM will be assisted by the following key personnel.

2.5.2 Site Manager

2.5.2.1 The Site Manager will manage the successful execution of all field activities, beginning with mobilization. During RCWM, operations the Site Manager will be a qualified Senior Unexploded Ordnance Supervisor (SUXOS). The Site Manager will be responsible for scheduling daily safety meetings, scheduling and coordinating field team activities, and submitting a daily progress report to the Parsons PM. The Site Manager will have direct oversight of all field activities during the project. The Site Manager will coordinate with the Parsons PM as necessary to take corrective actions to assure that WP and schedule requirements are met. Site Manager duties will also include enforcing compliance with the APP (Appendix D) and general daily field operating procedures.

2.5.3 Project Safety Officer and Health Manager

2.5.3.1 The PSHM will ensure that procedures developed in the work plan and APP are safe and that all safety processes and procedures are implemented in the field. The PSHM will be responsible for safety inspections, and the SSHO/UXO Safety Officer (UXOSO) will report to the PSHM concerning non-MEC related safety issues.

2.5.4 Technical Director

2.5.4.1 The Project Technical Director (TD) will provide support to a variety of the work components, including project plans and reports. The TD will review major deliverables and will provide technical input/comment to the Parsons PM. The TD will be available to consult with key USACE and Parsons project personnel on technical issues as they arise.

2.5.5 Project Chemist

2.5.5.1 The Project Chemist will assist in preparation and review of the SSWP and SAP, support contract laboratory procurement, provide contract laboratory oversight and technical support to the field sampling teams, review analytical results, provide analytical QC, and prepare laboratory data validation reports in compliance with the SOW.

2.5.6 Project QC Manager (QCM)

2.5.6.1 The Project QCM will provide oversight of all facets of QC for the project in accordance with the SSWP, SAP, and other pertinent USACE guidance. The Project QCM will be responsible for overall QC, including field sampling, disposal, and scrap management, review of QC reports, and development and implementation of QC procedures. However, as stated above, laboratory QC will be the direct responsibility of the Project Chemist. The Project Manager will be the Project QCM for this Delivery Order.

2.5.7 GIS Manager

2.5.7.1 The geographic information system (GIS) Manager will be responsible for establishing a GIS in accordance with the SOW. The GIS Manager will also be responsible for collecting, processing, and qualifying GIS data obtained during field activities for input into the GIS.

2.5.8 UXO Personnel

2.5.8.1 During field operations one UXO Technician III will be designated the UXO QC Specialist (UXOQCS). The UXOQCS reports to the Project QC Manager on quality matters and is the key QC person onsite for RCWM and MEC. The UXO Technician's QC responsibilities are outlined in Chapter 4 of this WP. Similarly, a UXO Technician III will be designated as the SSHO. The SSHO reports to the PSHM for safety-related issues and serves as the field team safety officer, who has the responsibilities as outlined in the APP. All UXO personnel also report to the MEC Operations Manager.

Table 2-2 Key Parsons Project Personnel

Project Role	Name
Project Manager/QC Manager	Sean Buckley, P.G., PMP
Site Manager/SUXOS	Phillip Matter
Project Safety and Health Manager	Ed Grunwald, CIH
UXOSO/SSHO	Bobby Nelms
UXOQCS	David Day
Technical Director	James Salisbury
Project Engineer	Janelle Boncal, P.E.
Project Chemist	Tammy Chang

GIS Manager	Randall Patrick
MEC Operations Manager	Mike Coon

2.6 PROJECT COMMUNICATION AND REPORTING

2.6.1 Record Keeping

2.6.1.1 Aspects of the administration of the contract must be substantiated by permanent records, such as written correspondence, notes, and photographs. It is essential to summarize important non-written communications with notes covering conferences, telephone calls, and discussions, giving the date, location, parties involved, and important issues/topics discussed. Written correspondence is the most deliberate, as well as the most important, of the three general types of contractual communication (i.e., person-to-person, telephone calls, and written correspondence).

2.6.2 Office Communications and Reporting

2.6.2.1 The Parsons' PM is responsible for issuing the following documents throughout the project:

- Meeting minutes in accordance with DID WERS 014.01(due 10 calendar days after a meeting);
- Record of Telephone Conversations in accordance with DID WERS-015.01(due with the Project Status Report); and
- Project Status Reports (in accordance with DID WERS-016.01 and .02).

2.6.2.2 A Project Status Report (PSR) will be issued pursuant to the terms of the contract. The PSR will include a summary of the work performed during the reporting period as well as work planned for performance in the upcoming period. The report will summarize results of meetings and telephone conversations that occurred during the reporting period. A request for payment invoice will be provided showing verification of achievement of payment milestones.

2.6.3 Field Communications and Reporting

2.6.3.1 The following actions or communications will be documented as discussed in Chapter 4 of the Site-Wide WP in a written or electronic log maintained by the Parsons Site Manager:

- Each and every occasion that potential RCWM or MEC are encountered including detailed photos with date, time, location, and items in photos;
- When and why work is stopped for safety reasons;

- Health and safety violations;
- Personnel changes and reason for changes; and
- Any deviations from the approved Site-Wide WP or this SSWP that occur in the field (e.g., number of samples, analysis, or problems encountered).

2.6.3.2 A Daily Progress Report will be completed by the Parsons Site Manager. The report will include the following:

- Discussion of work progress;
- List of personnel and equipment on site;
- Individuals contacted or interviewed;
- Problems encountered; and
- Discussion of work completed versus project schedule.

2.6.3.3 Additionally, during sampling activities, Daily Quality Control Reports (DQCR) will be prepared and submitted with the Daily Progress Report. The DQCR will include, at a minimum, weather information at the time of sampling, field instrument measurements, calibrations, identification of all field and control samples collected, departures from the SAP, any problems encountered, and any Government personnel directives. Distribution of the DQCR is identified within the SAP (Appendix E).

2.7 PROJECT DELIVERABLES

2.7.1.1 Project deliverables will meet the schedule requirements of the project and will be prepared in accordance with the applicable DID format referenced in the SOW. Deliverables will undergo internal Parsons review prior to submittal to other organizations. The following deliverables will be submitted as specified in the SOW:

- SSWP (draft, draft final, and final versions)
- Remedial Action Closeout Report (draft, draft final, and final versions)

2.7.1.2 Other deliverables will include DQCRs submitted daily during the remedial activities, and Sample Data Reports (for environmental samples, if applicable).

2.8 PROJECT SCHEDULE

2.8.1.1 A project schedule was prepared and includes project tasks such as work plan preparation, review and approval; demolition of the house; mobilization and training; RA; demobilization; and report preparation. The schedule is updated periodically (typically updated on a monthly basis) and presented to USACE. Dates on the project schedule are planned only and are subject to change based on ongoing project developments and discussions with the Project Delivery Team (PDT). The PDT includes USAESCH, CENAB, and its contractors. Property owners will be kept apprised of the RA schedule by USACE.

Table 2-3 Project Schedule

Action	Date*
Demolition of the house	December 2012
Approved SSWP	January 2013
Mobilization and Training	March 2013
Utility Re-route	April 2013
Initial ECS set-up, CAFS installation, and sound suppression	May – September 2013
Pre-operational exercises for high probability	July – September 2013
Remedial Action Completion	November 2016
Draft RACR	June 2017

*The dates listed on the schedule are tentative.

2.9 PERIODIC REPORTING

Periodic reporting requirements are described in the PWS in Attachment 1 of Appendix A.

2.10 COSTING AND BILLING

Costing and billing requirements are described in Subchapter 2.11 of the Site-Wide WP (USACE 2007).

2.11 PROJECT PUBLIC RELATIONS SUPPORT

Details concerning project public relations support are described in Subchapter 2.12 of the Site-Wide WP (USACE 2007).

2.12 SUBCONTRACTOR MANAGEMENT

The subcontractors that will assist with this RA are listed in Table 2-4. More detailed information concerning the organization and roles of the major subcontractors is provided in

Subchapter 2.13 of the Site-Wide WP. Parsons has subcontracted Earth Resource Technology Inc. to provide assistance as a task order lead for the 4825 Glenbrook Road RA effort.

Table 2-4 Subcontractors

Responsibility	**Organization**
Technical support for work plans and remediation report. Project geologist support for field operations.	Earth Resources Technology (ERT)
Site Support and Waste Disposal Subcontractor	Zimmer Environmental Solutions (ZES)
Site Surveyor	C.P. Johnson and Associates
Demolition of the Residence	Demolition Services, Inc. (DSI)
HTW Laboratory	APPL, Inc.
ECS tent	Rubb, Inc.
Sewer reroute	ACI
Traffic Control	Traffic Engineering Services
Site Restoration	Bunker Hill and ZES
Waste Disposal Landfill/Locations	*Non Hazardous "Special" Waste - (Subtitle D)** Old Dominion Landfill, 2001 Charles City Rd, Henrico, VA. King Queen Landfill, 4443 Iris Rd, Little Plymouth, VA. EQ, 730 Vogelsong Rd, York, PA. *RCRA Hazardous Soil and Water** EQ, 730 Vogelsong Rd, York, PA. *CWM Contaminated Soil and Water** Veolia-Port Arthur TSDF Incineration, Highway 73, Port Arthur, TX. * The list above is based on previously generated waste streams; disposal facilities are always subject to change

2.13 MANAGEMENT OF FIELD OPERATIONS

2.13.1 Introduction

2.13.1.1 This Subchapter describes the general steps relating to field operations that will be implemented during this RA.

2.13.2 Technical Project Planning

2.13.2.1 The SVFUDS has a pre-established process through the Spring Valley Partners whereby sites are selected and prioritized for geophysical and/or intrusive investigation, and site-specific objectives are developed.

2.13.3 Probability Assessment

2.13.3.1 The probability assessment (USACE 2012a) prepared for the RA of the low probability areas is included in Appendix A.

2.13.4 House Demolition

2.13.4.1 The 4825 Glenbrook Road residence will be demolished prior to the RA activities. The Demolition Work Plan is included as Attachment D-3 of Appendix D. All debris generated from the demolition of the house will be collected and disposed as specified in the Demolition Work Plan.

2.13.4.2 During demolition, perimeter air monitoring for respirable particulate matter (PM10) will be performed using a dust meter. As a conservative approach, noise monitoring will be performed by Parsons using a noise meter at the property perimeter.

2.13.4.3 If the contingency plan is implemented for any reason during the demolition activities, AU will be notified in accordance with the Public Protection Plan (PPP) for 4825 Glenbrook Road RA. The PPP has been prepared as a separate submittal and will be maintained on site at the command post during RA operations.

2.13.5 Mobilization and Site Preparation

2.13.5.1 Mobilization and site preparation for the RA activities at 4825 Glenbrook Road will commence once the SSWP and related submittals are approved and all required permits are in place. These initial activities associated with the RA include:

1. Mobilization and positioning, setup, and testing of equipment at trailer, command post, and site and arrange for related services (power, internet, phone, etc.);
2. Prepare site for residence demolition (e.g., complete environmental survey, disconnect all utility lines (including electrical, gas, water, and sewer, remove universal waste streams, de-energize/protect overhead power lines, remove air conditioning units and Freon);
3. Complete utility relocation investigation of low probability Test Pits, J-shaped trench and front yard sidewalk;
4. Clear area by leveling and placing mats at the backyard for the three CAFSs, MINICAMS, DAAMS, multiple power distribution system (MPDS), and backup generator;
5. Support CAFS and MINICAMS setup;

6. Support the set up of PDS, ECBC trailer, DAAMS trailer, and cascade system;
7. Set up medical monitoring tent, drum handling area, and guard station;
8. Set up ECS tent for the high probability areas, and relocate the tent to the back yard for the rest of the high probability areas;
9. Reconfigure privacy screens and gates as needed to keep the site secured; and
10. Complete training and pre-operational exercises.

2.13.5.2 Prior to commencement of any work at the site, the area will be photographed and videotaped to document the existing site conditions.

2.13.6 Topographic Survey

2.13.6.1 In support of the RA, Charles P. Johnson & Associates, Inc. completed a topographic survey (2’ contour lines) of the property and field marked the four corners of the plat boundary in January 2012.

2.13.7 Remedial Action

2.13.7.1 Following site preparation activities, but prior to commencement of RA activities at 4825 Glenbrook Road, the demolition of the house at 4825 Glenbrook Road property will be conducted in accordance with the demolition Work Plan (Appendix D, Attachment D-3).

2.13.7.2 Eleven low probability test pits (TPs 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, and 154) and one J-shaped trench will be investigated in accordance with the 4825 Glenbrook and 4835 Glenbrook Road test pit investigation SSWP for low probability efforts (USACE 2009). The locations of these test pits and J-shaped trench to relocate the sewer are illustrated on Figure 2-1. The remedial activities at the low probability test pits and the J-shaped sewer trench may be conducted prior to the high probability remedial activities. Seven test pits (TPs 135, 136, 139, 140, 143, 144 and 145) remained uninvestigated during the previous test pit investigation efforts. Two of these seven test pits (TPs 144 and 145) are outside the low and high probability areas. The other five test pits will be investigated along with the excavation activities performed in the low and high probability areas. TP 143 is located in the low probability area (Area B) and the other four test pits are located in the high probability areas (TPs 135 and 136 in Area E and TPs 139 and 140 in Area D). Nine new test pit locations (TPs 146-154) and the J-shaped sewer trench were added as part of this RA. The approach for the high probability and low probability RA at 4825 Glenbrook Road is detailed in Subchapter 3.8 of this SSWP.

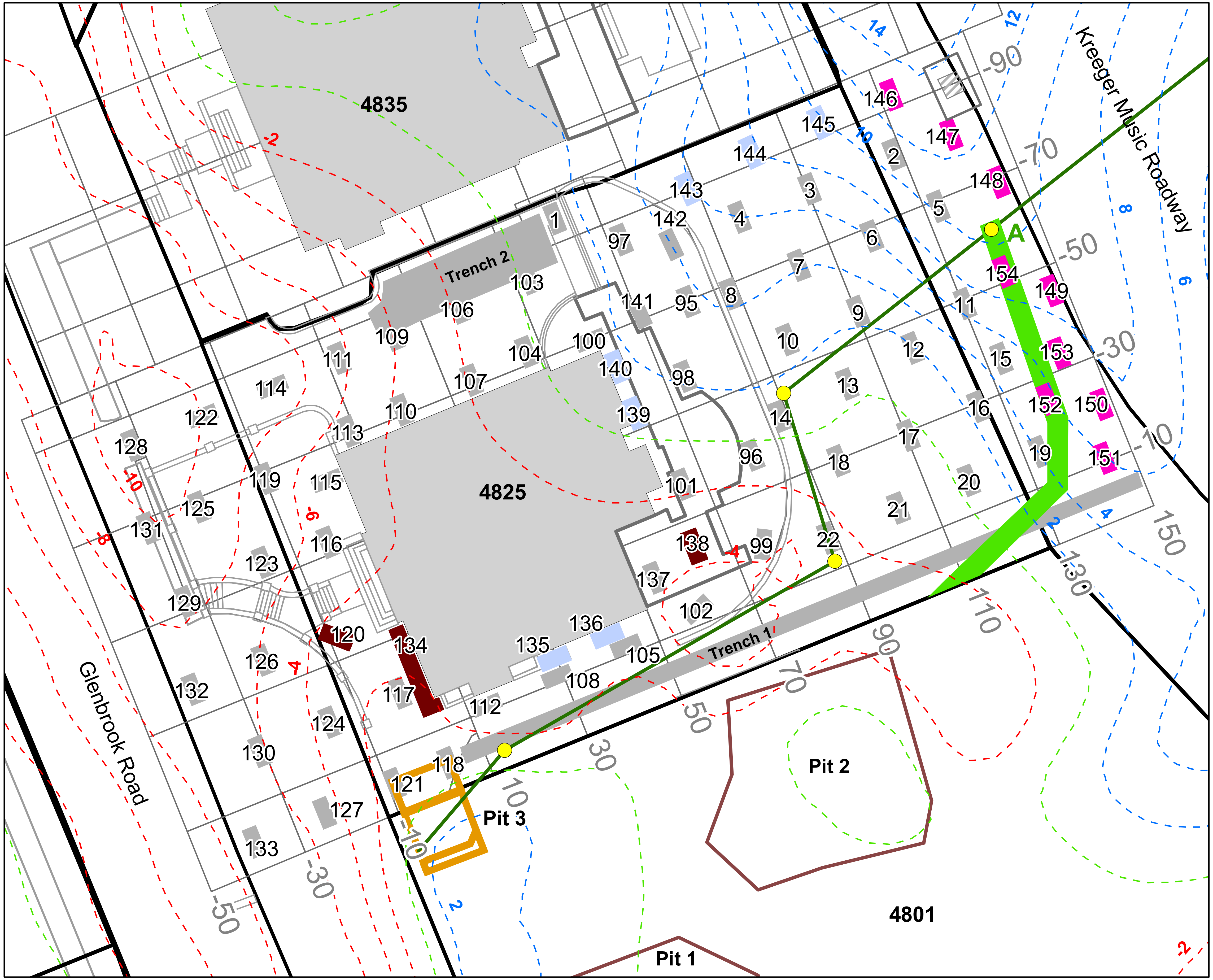

Figure 2-1
Test Pits and Trench Locations
Low Probability Excavation
4825 Glenbrook Road

Spring Valley
Washington, D.C.

Legend

■ Additional Test Pits
■ Trench for Rerouted Sewer Line
■ High Probability Test Pits (2 TPs)
■ Test Pits Pending Investigation (7 TPs)
■ Test Pits/Trenches Investigated with No Significant Finds (68 TPs)
— Pits 1 and 2
□ Test Pit 23 (Burial Pit 3)
- - - Cut
- - - Level
- - - Fill
□ Property Boundaries
■ Buildings
□ 20' Grid
● Manhole
— Sewer Line

0 10 20 40 Feet
1 inch = 20 feet

Scale:	1:240
Created By:	Parsons
File:	20120222 4825 Glenbrook Test Pit Locations.mxd
Date:	2/22/2012
Figure Number:	2-1
Page Number:	-

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2.13.7.3 The RA of high probability areas will be conducted using a combination of hand-digging and mechanical excavation (e.g., mini-excavator) inside an ECS (tent). One ECS tent will be constructed for the RA of the high probability areas in the front yard closest to Glenbrook Road. This tent will be relocated to the back yard of 4825 Glenbrook Road when RA activities are complete at the first ECS location. Once the backyard of the property has been remediated, the tent will be repositioned at the center of the high probability area. Figure 3-3 illustrates the three proposed locations of the tent. The set-up and movement of the ECS will be conducted as described in Appendix M of this SSWP. The RA of the high probability areas will be addressed by excavating the entire area to bedrock or competent saprolite. The high probability areas include Area D, Area E, and Area F, as delineated in the DD for 4825 Glenbrook Road (USACE 2012b) and Probability Assessment (Attachment A-1). RA of the high probability areas will be conducted within an ECS (approximately 60 feet wide by 84 feet long and 17 feet tall). To cover the relevant areas, the ECS tent will be re-positioned twice.

2.13.7.4 The low-probability RA at 4825 Glenbrook Road will be performed in open-air with air monitoring at the excavation location, as close to the active excavation as practical, and at the work area perimeter, and will involve use of mechanical equipment and hand digging tools. The low probability RA will include investigation of previously un-investigated test pits (TP 144 and 145), nine additional test pits (146-154) and an J-shaped trench. The test pits will be approximately 3 feet wide by 6 feet long. The depth of each test pit will be the maximum reach of the equipment or competent saprolite, whichever comes first. TP 143 will be investigated during the RA to be conducted in Area B under low probability protocols. The remaining un-investigated test pits from previous investigation activities (TP 135, 136, 139, and 140) lie within the high probability areas (Area D and Area E) for RA and will be addressed during the high probability operations.

2.13.8 HTW Soil Removal

2.13.8.1 HTW-contaminated soil excavation is planned to take place during the RA of the low and high probability areas at 4825 Glenbrook Road. Excavation of HTW-contaminated soil will be conducted in accordance with Chapter 10 of this SSWP. Soil excavated from the RA will be disposed as Remedial action Derived Waste (RDW), the management of which is described in Subchapter 3.9.

2.13.9 MEC/RCWM Storage

2.13.9.1 MEC are not anticipated to be encountered during the RA activities at 4825 Glenbrook Road. The federal property storage area will be used for storing potential RCWM recovered during the intrusive operations. The federal property storage area is described in Subchapter 2.14.6 and Chapter 9 of the Site-Wide WP.

2.13.10 Disposal

2.13.10.1 All waste items and materials will be properly disposed of in accordance with DoD, federal, state, and local regulations as described in Subchapter 3.9 of the Site-Wide WP (USACE 2007).

2.13.11 Remedial Action Closure Report

2.13.11.1 Following completion of the field effort and evaluation of the data collected, a RA closure report will be prepared to document the activities conducted during the remedial activities. Photographic documentation of operations and items uncovered, survey data, sampling/analysis, and air monitoring data will be included in the closure report.

CHAPTER 3
FIELD REMEDIATION PLAN

3.1 OVERALL APPROACH TO THE REMEDIATION ACTIVITIES

3.1.1.1 The scope of this RA includes residence demolition, removal of any RCWM and other suspected AUES-related debris, removal of soil, investigation of the remaining low probability test pits, and backfill and site restoration. With completion of these actions, the property will be released for unrestricted future use.

3.1.1.2 The overall approach for the RA is to conduct the following remedial action during field activities:

- Residence demolition to remove the house and keep the basement slab and exterior masonry walls below grade intact;
- Re-route sewer and water and perform investigation of eleven test pits, one J-shaped sewer trench and the front sidewalk area;
- Remediation of high probability areas including the basement slab and exterior walls below grade;
- Remediation of low probability areas; and
- Site restoration.

3.1.1.3 If RCWM is encountered, these items will be identified, removed, and disposed of in accordance with this SSWP. In addition, any AUES-related contamination identified during this intrusive activity will be assessed and disposed of in accordance with regulatory requirements. If MEC are encountered, work will stop pending assessment of the item. The PDT will determine based on the assessment results if it is a unique event prior to continuing intrusive activities. Items potentially related to AUES include, but are not limited to:

- Any item identified as suspect RCWM/MEC or as being related to RCWM/MEC; or
- Any sealed container that cannot be positively identified to be unrelated to AUES (e.g., paint cans, etc., are known to be unrelated to AUES activities); or
- Any unsealed container or identifiable fragment thereof that cannot be positively identified to be unrelated to AUES (e.g., beer bottles, etc., are known to be unrelated to AUES activities); or
- Any other item suspected to be agent-related material or suspected to contain agent-related material; or

- Any other item that cannot be positively identified as an obvious cultural feature or a post-1918 feature (obvious cultural features or post 1918 features include such items as root ball baskets, poly vinyl chlorinated [PVC] piping, wiring, etc.).

3.1.1.4 In accordance with the DD (USACE 2012b), excavation will be to the depth of bedrock or competent saprolite within the excavation boundaries of the low and high probability areas (i.e., areas of concern). Consequently, this over-excavation of the soil will achieve clean up to residential standards, allowing for unrestricted future use of the property.

3.2 IDENTIFICATION OF AREAS OF CONCERN

3.2.1.1 The residence and associated appurtenances will be removed and disposed of in accordance with the approved Demolition Plan (Appendix D).

3.2.1.2 The high and low probability areas at 4825 Glenbrook Road specified in the DD (USACE 2011d) are identified as the areas of concern. Figure 3-1 illustrates the high and low probability areas for the proposed RA.

3.2.1.3 The remaining uninvestigated low probability test pits (TP144 and 145), nine additional test pits (TPs 146 through 154), and a J-shaped sewer trench will be investigated.

3.3 SITE MOBILIZATION/DEMOBILIZATION AND SUPPORT PLAN

3.3.1 Objective

The objective of this Subchapter is to describe the logistics of mobilizing personnel, equipment, and facilities to begin the project; and demobilizing personnel, equipment, and facilities upon completion of RA at the 4825 Glenbrook Road.

3.3.2 Overview

Mobilization activities for this RA will be conducted at 4825 Glenbrook Road.

3.3.3 Right-of-Entry

CENAB will obtain the appropriate ROEs to perform the work outlined in this SSWP. CENAB will notify the property owners of the field operation schedule prior to the start of work at the property. If an ROE cannot be obtained, work will not be permitted to proceed at the property and the project completion date may need to be extended.

3.3.4 Permits

Under CERCLA [Section121 (e)] and the NCP [40 CFR 300.400(e)] USACE is not required to obtain federal, state and local permits for on-site response action conducted pursuant to CERCLA sections 104,106,120,121 or 122. CERCLA response actions should be subject only to substantive requirements and not any administrative requirements.

3.3.4.1 Building/Erosion and Sediment Control

Title 21, Water and Sanitation, Section 502.1 of the District of Columbia Municipal Regulations (DCMR) requires any person engaging in "land disturbing" activities to obtain a building permit. Land disturbing activities include stripping, grading, excavating, and transporting and filling of land. Approval of a building permit is conditioned on the submission by the permit applicant of an erosion and sediment control plan that is reviewed and approved by the Department of Consumer and Regulatory Affairs. Parsons obtained this permit based on the information in this plan.

3.3.4.2 Storm Water Management Permit

Under 21 DCMR § 526.1, any earth moving or land change activities in the District of Columbia must institute appropriate storm water management measures to control or manage runoff, unless exempt. Exempt activities include construction or grading operations that do not disturb more than sixty-five thousand square feet of land, unless the operation is part of an approved subdivision that contains provisions for storm water management. Because the operation involves disturbing less than 65,000 square feet, a storm water permit will not be required.

3.3.4.3 House Demolition Permit

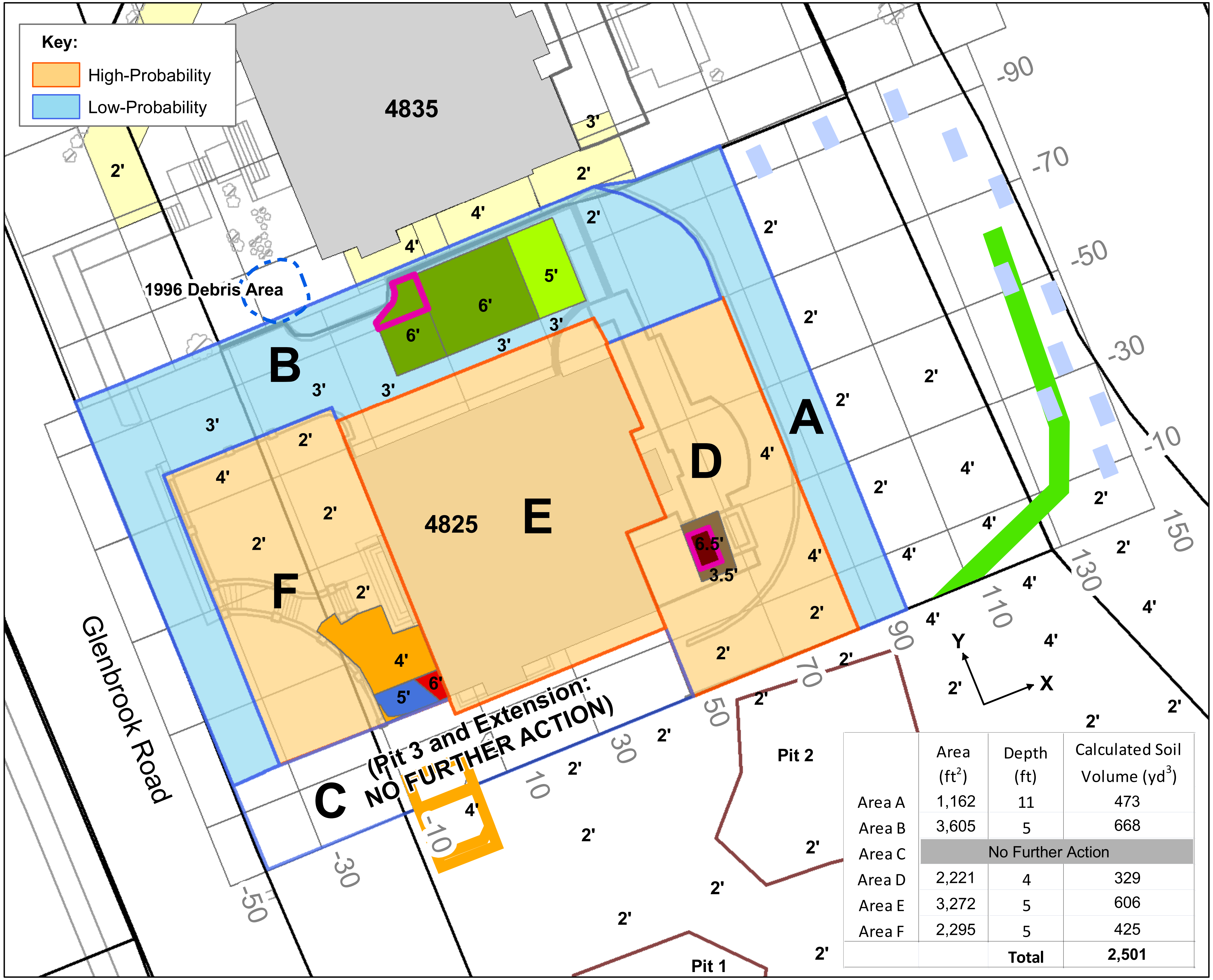
A raze permit will be obtained for the house demolition by Parsons demolition subcontractor, DSI prior to the demolition activities. The permit will be posted at the site during the demolition activities.

3.3.4.4 Permit to Discharge to Sanitary Sewer

No discharges to the sanitary sewer are expected to be necessary and, therefore, no temporary discharge permit will be required. Excavation water or groundwater encountered during the RA will be collected in separate containers or vac trucks and temporarily stored at federal property. Disposal samples will be collected analyzed to meet with appropriate regulatory requirements before final disposal.

3.3.4.5 Public Space Permit

The District of Columbia requires anyone using space in a public street or digging in the right-of-way to obtain a public space permit. Parsons will secure this permit prior to mobilization.



	Area (ft^2)	Depth (ft)	Calculated Soil Volume (yd^3)
Area A	1,162	11	473
Area B	3,605	5	668
Area C	No Further Action		
Area D	2,221	4	329
Area E	3,272	5	606
Area F	2,295	5	425
		Total	2,501

Figure 3-1
Proposed Remedial Action
4825 Glenbrook Road

Spring Valley
Washington, D.C.

Legend

▨	Buildings
☐	Property Boundaries
☐	20' Grid
—	Pits 1 and 2
☐	Test Pit 23 (Burial Pit 3)
☐	Arsenic Exceedance to be Further Excavated
🟩	Trench for Rerouted Sewer Line

Additional Low Probability Investigation

🟦	Test Pits

Arsenic Soil

🟩	Arsenic Grid Previously Removed [5'] (2009)
🟩	Arsenic Grid Previously Removed [6'] (2009)

Soil Excavation

🟫	Excavation Depth [3.5'] (2009)
🟧	Excavation Depth [4'] (2010)
🟦	Excavation Depth [5'] (2010)
🟥	Excavation Depth [6'] (2010)
🟥	Excavation Depth [6.5'] (2009)
☐	1996 APEX Tree Removal (Debris Area) Perimeter
🟨	Previously Excavated Arsenic: Adjacent Properties

Note:
Excavation depths shown from previous arsenic removal.

0 10 20 40 Feet

1 inch = 20 feet

Scale:	1:245
Created By:	Parsons
File:	20120301 4825 Glenbrook Road Hi-Lo Areas.mxd
Date:	3/01/2012
Figure Number:	3-1
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3.3.5 Utility Protection Service

3.3.5.1 Parsons will notify Miss Utility, the utility protection service for the area, at least 48 hours prior to demolition and any intrusive work. The phone number for Miss Utility is (800) 257-7777. Parsons will also coordinate with the property owner (AU) in an effort to avoid inadvertent damage to utilities.

3.3.5.2 Prior to demolition of the house, the demolition subcontractor will ensure that all utilities at the site are disconnected or de-energized and rerouted.

3.3.5.3 Parsons will subcontract ACI Inc. to temporarily re-route sewer and water lines that lay within the property. The proposed sewer and water line re-routes are depicted in Figure 3-2. The sewer line that runs from the top hill backside of the property down to behind the retaining wall will be demolished and re-routed toward to 4801 Glenbrook Road property boundary in preparation of the high probability excavation. The J-shaped portion of the rerouted sewer line outside of the remediation area will be buried underground. The portion starting from Area A down to the existing manhole will be a temporary above ground flexible line. The existing gas and electric lines connecting to 4825 Glenbrook Road from the street will be abandoned and capped at the property boundary. A yard hydrant from the existing water line at the street and/or a temporary fire hydrant connection will be installed to be used during the house demolition activities and/or for PDS operations and maintained through the completion of all RA effort at this property. The sewer line that runs along the drive adjacent to 4835 Glenbrook Road will be demolished and re-routed, if the excavation of Area B is deeper than the sewer line depth. The small section of the water line that cuts across the entrance of the driveway will be left intact and the field crew will be informed to excavate around the line. However, if needed, the water line will be demolished and rerouted during the excavation.

3.3.5.4 After the completion of the RA, the sewer and water lines that run across the property will be restored. The gas, electric, and water lines to the house will remain capped at the property boundary.

3.3.6 Federal Property

The federal property, located at 5201 Little Falls Road, NW, Washington D.C., will be the primary staging area for all mobilizations and is described in Subchapter 3.3.5 of the Site-Wide WP (USACE 2007). Facilities such as offices and MEC/RCWM storage facilities already exist at the federal property and, therefore, minimal mobilization activity will be necessary. ECBC will mobilize its Mobile Analytical Platform to the federal property for agent analysis.

3.3.7 Land Survey

3.3.7.1 Site surveys were completed at 4825 Glenbrook Road in January 2012 to provide accurate site maps for use during the RA. Site surveys included the major site structures (e.g., houses and driveways), vegetation, landscape features (e.g., retaining walls, patios, and water features), and site contours. Locations of buried utilities at 4825 Glenbrook Road are based on

Miss Utility markings and findings during previous investigations at the property. Site surveys were also performed for a 20 feet strip on the adjacent 4801 Glenbrook Road property to locate the man-made structures and surveyed the site contours.

3.3.7.2 Prior to commencement of the RA activities, a Parsons land survey contractor will locate and mark the low probability test pits and the J-shaped sewer trench. Table 3-1a and Table 3-1b provides the coordinates for the center points of the test pits and corner coordinates for the J-shaped trench. The locations of the test pits and the J-shaped trench are illustrated on Figure 2-1.

3.3.7.3 After the completion of the RA for 4825 Glenbrook Road, post survey will be performed to document the limits of excavation and elevations.

Table 3-1a Test Pit Center Point Coordinates

Test Pit ID	EASTING	NORTHING
4825-144	1285697.3047	461984.6313
4825-145	1285710.6521	461990.5659
4825-146	1285724.7456	461996.0352
4825-147	1285736.5087	461988.382151
4825-148	1285745.873	461978.7325
4825-149	1285756.2783	461957.5812
4825-150	1285766.2862	461934.9423
4825-151	1285766.6947	461924.8114
4825-152	1285755.6638	461936.1449
4825-153	1285757.7269	461945.3814
4825-154	1285746.8347	461961.3699

Note: Coordinates are in North American Datum (NAD) 83, Maryland CS83 Projection. Units are in U.S. Survey Feet

Table 3-1b J-Shaped Trench (Sewer Line) Coordinates

Trench Points	EASTING	NORTHING
A	1285744.3567	461969.6297
B	1285757.4312	461932.1111
C	1285757.3558	461919.6225
D	1285737.1701	461899.5662
E	1285734.2255	461892.3809
F	1285661.7116	461862.8988

Note: Coordinates are in North American Datum (NAD) 83, Maryland CS83 Projection. Units are in U.S. Survey Feet

3.3.8 Residence Demolition

The house at 4825 Glenbrook Road will be demolished as part of the RA effort. Parsons demolition subcontractor DSI will remove the residence with the exception of the basement foundation (slab and exterior walls below grade) of the residence. No subsurface work will be completed during the demolition work; this includes the slab, exterior walls of the basement in that are below existing ground surface, the front porch and the rear patio. Demolition will be performed according to the approved demolition plan included as Attachment D-3 of Appendix D. The low probability contingency plan will be followed if any AUES-related item is encountered during this effort. Low probability contingency plan is included as Attachment D-5 of Appendix D to this SSWP.

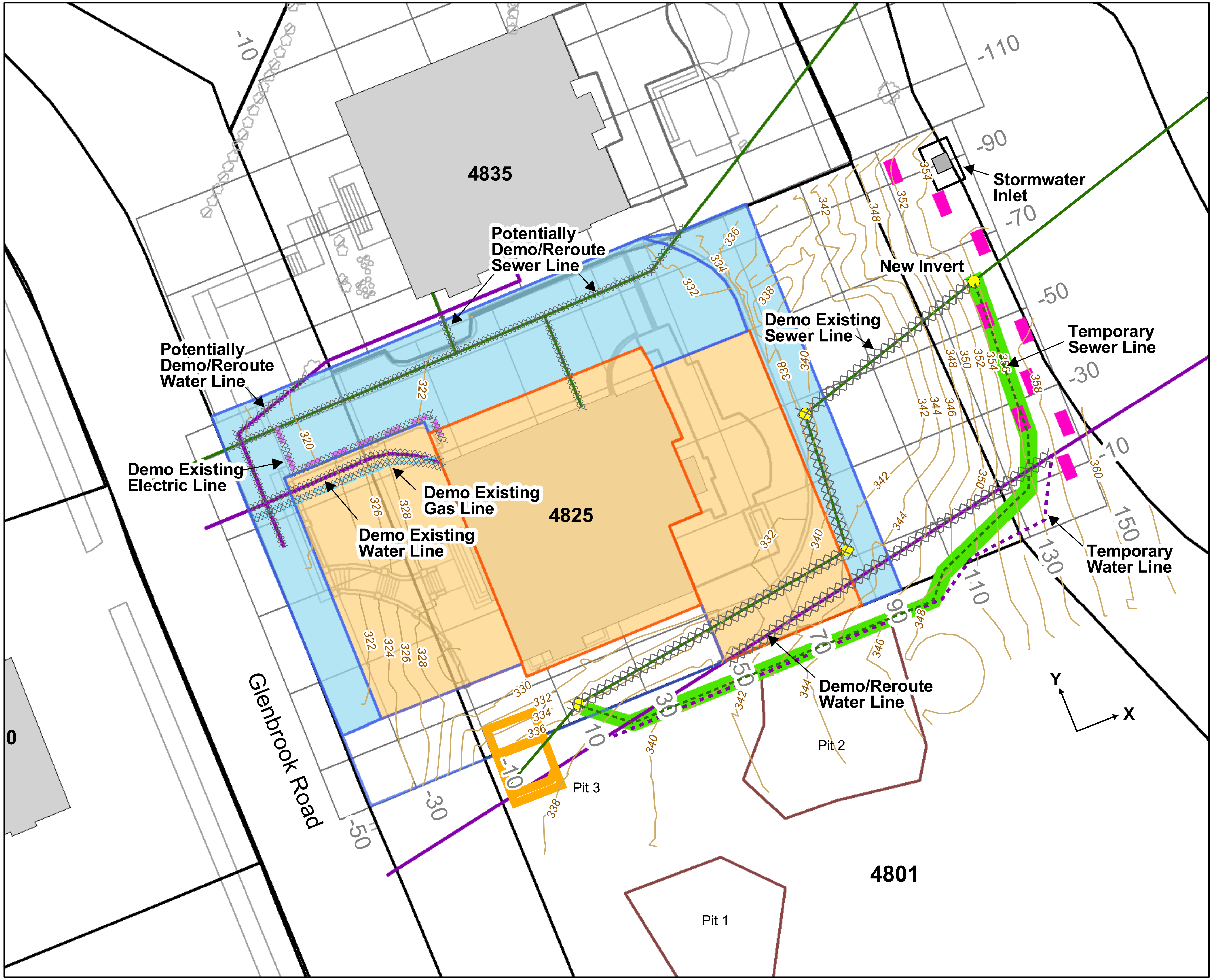

Figure 3-2
Proposed Sewer and Water Line Re-Route
4825 Glenbrook Road

Spring Valley
Washington, D.C.

Legend

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File:	20130118 4825 Glenbrook Sewerline Reroute.mxd
Date:	1/18/2013
Figure Number:	3-2
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3.3.9 Intrusive Operations for High Probability Areas

3.3.9.1 Figure 3-3 depicts the proposed site layout for the RA of the high probability areas at 4825 Glenbrook Road. This figure shows that the high probability areas will be excavated under an ECS tent that will be relocated twice after the initial set-up to cover the entire area (*i.e.*, location #1 (front), location #2 (back), and location #3 (middle)). The ECS tent will be used in combination with a chemical agent filtration system (CAFS) to maintain negative pressure within the ECS. This system will cycle air through filter beds capable of absorbing and adsorbing chemicals in the air, including agent vapors, prior to exhausting that air to the atmosphere. Details on the general configuration of the CAFS including placement of monitoring and filtration equipment and parameters used for the stack exhaust air modeling are discussed in Section 1.4 of Appendix M of this SSWP. Three CAFS units, and MINICAMS (expendable) and DAAMS will be set-up on the hillside during the site preparation. Backup generator and MPDS will be set-up on the AU parking lot area. ECS, PDS, medical monitoring tent, and drum handling area will also be set-up as part of the site preparation activity. Personnel who are severely injured during high probability intrusive operations will be evacuated directly from the ECS to EPDS. EPDS is only used in emergency situations. Any minor adjustments to the layout due to site-specific issues will have concurrence of the Parsons Site Manager, USAESCH Safety Specialist, and the CENAB Site Operations Officer. After completion of RA activities at ECS location #1, the ECS will be repositioned to ECS location #2 to cover the backyard retaining wall and patio area, followed by relocating the tent to ECS location #3 to cover the center of the remaining high probability areas delineated for RA. Detailed RA approach is discussed in subsection 3.8 of this Chapter. The high probability protocols will apply and high probability Contingency Plan (Attachment D-6 of Appendix D) will be initiated during these operations, if a closed cavity munition item or an unusual intact container is encountered.

3.3.9.2 Preparation

3.3.9.2.1 As part of the site preparation for the high probability intrusive operation, the hillside in the backyard will be graded to create a flat space so that ECS supporting systems can be placed in the area. During the site preparation grading, precautions will be taken for suspected AUES-related items, stained soil and unidentified powders. Additional site preparation may be conducted prior to each tent move for access and soil stability in accordance with the Appendix D and M of this SSWP. Detailed discussions on overall approach to suspected AUES-related items are included in Section 3.1.1.3.

3.3.9.3 Utility Tie-in

3.3.9.3.1 The following is a list of equipment and their respective electrical power requirements:

- Air Monitoring Team MINICAMS, trailer, and three CAFS – 480V, 3-phase, 150A (standalone)
- Two trailers (Command Post and Break Trailer) – 60A each (total 120A)
- PDS and ECS – 30A each (total 60A)

3.3.9.3.2 Electrical services will be supplied from AU's Watkins and Kreeger Halls. The CAFS will include a generator back-up supplied by ECBC. Parsons will use a temporary yard hydrant to supply water to the PDS. The temporary yard hydrant will be installed prior to RA operations.

3.3.9.4 Facility Construction

3.3.9.4.1 Figure 3-3 shows the proposed general layout of the facilities. The majority of the facilities will be pre-fabricated or self-contained. Two trailers, a storage shed, and two portable toilets will be placed within a fenced area behind 4825 Glenbrook Road on the AU Campus. One trailer will be used as the Command Post and Parsons/USAESCH office trailer. The second trailer will be used as a break trailer. The storage shed already at the site will be used to store sampling materials. Stairs will be constructed leading to the front yard driveway and the existing steps along the northern boundary of the back yard will be extended to the retaining wall.

3.3.9.4.2 ECBC will provide a trailer on the 4825 Glenbrook Road property to house the MINICAMS. Medical personnel will perform pre-work and post-work monitoring of EZ personnel in the Medical Monitoring Tent. CARA will supply the PDS, cascade system, and the Medical Monitoring Tent.

3.3.9.5 Road mats will be placed as appropriate to aid in accessing the RA locations within the 4825 Glenbrook Road.

3.3.9.6 Work Area Establishment

The 4825 Glenbrook Road property is bounded to the north, south, and east sides by walls or fences. An additional fencing with privacy screen will be temporarily constructed on the west side at the front of the property along Glenbrook Road to ensure the entire property is enclosed. Gates will be provided in this fence to provide access to the driveway and the drums/roll-off handling area.

3.3.9.7 Site Security

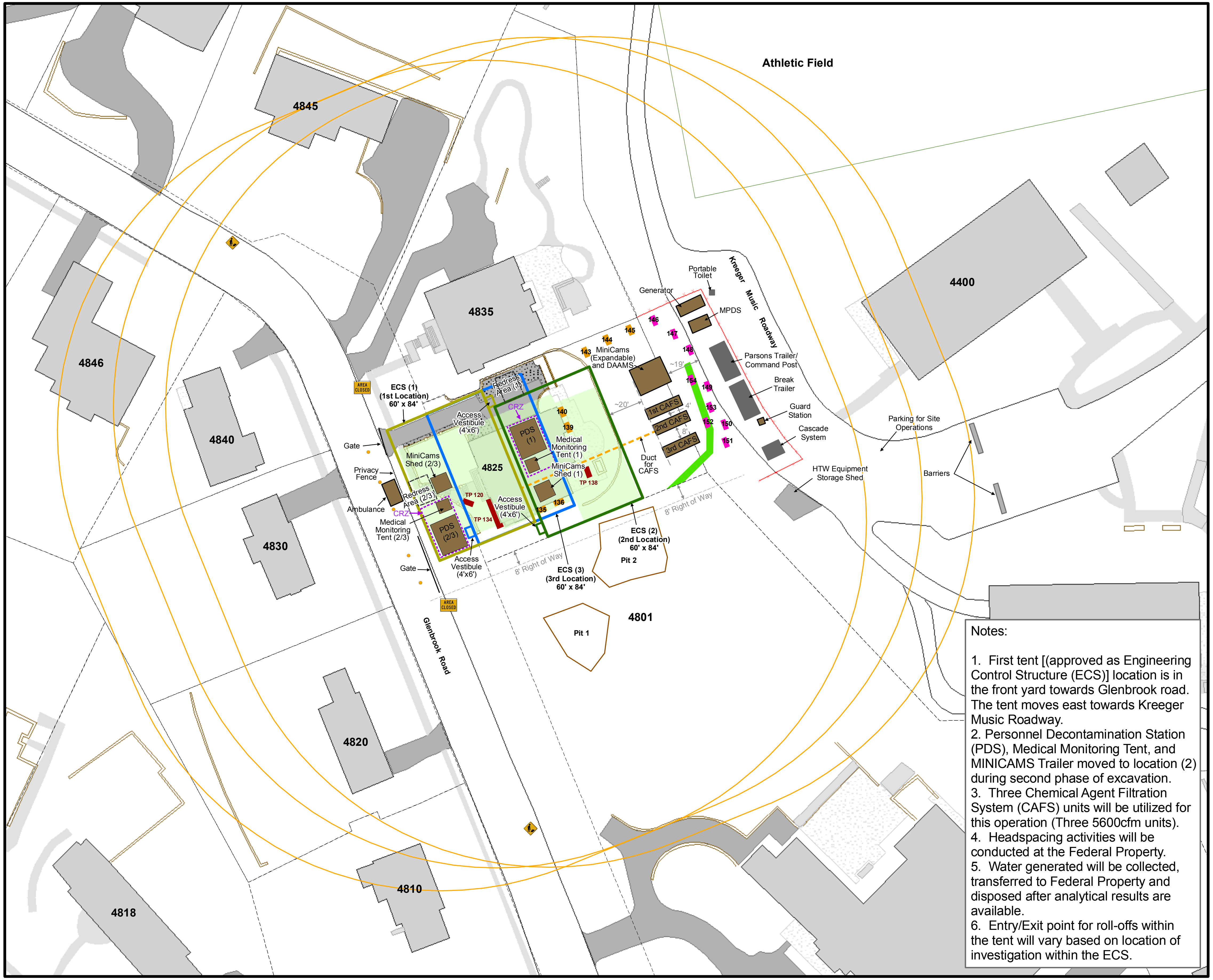
Once intrusive work begins at the property, reflective cones will be placed along the front of the property to control access. A security guard contracted by CENAB will be present at the site during non-working hours to periodically monitor the support zone to ensure that no unauthorized personnel enter the site during non-working hours.

3.3.10 Huntsville Survey, Table Top Exercise and MACOM Pre-Operational Survey

Parsons will direct the site setup and training in preparation for pre-operational surveys and exercises consisting of USAESCH Survey, review of the site and team readiness and MACOM Pre-Operational Survey, final review and demonstration of readiness; and Table-Top Exercise, a meeting with emergency responders and stakeholder (including AU Public Safety personnel) to discuss daily operational procedures, worker protections, and public safety prior to operations. The USAESCH Survey and Pre-Operational Survey exercises will take place at 4825 Glenbrook Road. Table Top Exercises will be performed at the Federal Property. Parsons will provide logistical support for government personnel.

Figure 3-3
Proposed Site Layout
High Probability Excavation
4825 Glenbrook Road

Spring Valley
Washington, D.C.



Notes:

1. First tent [(approved as Engineering Control Structure (ECS)] location is in the front yard towards Glenbrook road. The tent moves east towards Kreeger Music Roadway.
2. Personnel Decontamination Station (PDS), Medical Monitoring Tent, and MINICAMS Trailer moved to location (2) during second phase of excavation.
3. Three Chemical Agent Filtration System (CAFS) units will be utilized for this operation (Three 5600cfm units).
4. Headspacing activities will be conducted at the Federal Property.
5. Water generated will be collected, transferred to Federal Property and disposed after analytical results are available.
6. Entry/Exit point for roll-offs within the tent will vary based on location of investigation within the ECS.

Legend

- ▨ Buildings
- ▨ Deck/Porch
- ▨ Sidewalk
- ▨ Stairs
- ▨ Driveway
- ▨ Gravel Surface
- — Retaining Wall
- ⌐ ¬ Property Boundary
- ✕—✕ Privacy Fence; 4801 Privacy Fence
- ✕—✕ Property Fence
- — Pits 1 & 2
- 🟩 High-Probability Area
- 🟥 High Probability Test Pits
- 🟧 Remaining Low Probability Test Pits
- 🟩 Trench for Rerouted Sewer Line

Additional Low Probability Investigation

- 🟪 Additional Test Pits
- ☐ 1 Liter $AsCl_3$(MCE): 59 Meters/194 Feet (TEEL-1)
- ▨ Supporting Structures/Equipment
- ☐ ECS and Exclusion Zone (First Location)
- ☐ CRZ
- ◆ Excavation Ahead Sign
- AREA CLOSED Sidewalk Closed Sign
- ● 36" High Reflective Cones

0 30 60 120 Feet

1 inch = 60 feet

Scale:	1:480
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File:	20120809 4825 Glenbrook Rd Proposed Layout.mxd
Date:	8/9/2012
Figure Number:	3-3
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3.3.11 Intrusive Operations for Low Probability Areas

The low probability areas (e.g., Areas A and B) will be excavated in open air and air monitoring will be conducted at the excavation location, as close to the active excavation as practical, using MINICAMS for CA, phosgene (CG), cyanogen chloride (CK), and chloropicrin (PS), DAAMS confirmation of MINICAMS detections, electrochemical detectors for arsine, hydrogen chloride (HCl), and hydrogen cyanide (HCN), and a calibrated photoionization detector (PID) for VOCs. Area air monitoring will be implemented during low probability operations using DAAMS tubes for mustard agent and lewisite around the work area perimeter, and electrochemical detectors for arsine, hydrogen chloride (HCl), and hydrogen cyanide (HCN) at a downwind work area perimeter location. The SSHO will define the work area perimeter for each excavation based on personnel and public safety. A weather station will be used to determine the prevailing wind direction to ensure that the instruments are located downwind from the active excavation. The instruments will be moved as appropriate if the prevailing wind direction changes. The low-probability protocols will apply and Low-Probability Contingency Plan (Attachment D-5 of Appendix D) will be initiated during these operations, if AUES-related debris is encountered.

3.3.12 Demobilization

With the exception of heavy equipment (e.g., mini-excavator or equivalent-sized equipment), equipment and personnel will demobilize from the site at the end of each day.

3.3.13 Site Restoration

After the completion of the RA at 4825 Glenbrook Road, the excavated areas will be surveyed and backfilled with clean backfill soil and compacted to meet the standards referred in Section 3.8.2 about backfill and compaction standards. The source of the backfill currently staged at the Federal Property was sampled, analyzed, and approved by USACE, USEPA, DDOE, and AU. Additional backfill source will be selected when available, sampled, analyzed, and approved by USACE, USEPA, DDOE, and AU. The entire site will be graded to natural slope. The proposed grading plan is illustrated in Figure 3-4. Erosion control will be implemented using sod, seed mixture/mulch, or mulch, to be determined by the field team based on project schedule, site conditions, etc.

3.4 BRUSH CLEARING AND DEBRIS REMOVAL PLAN

3.4.1 Introduction

This Subchapter details the location and method for brush clearing and debris removal.

3.4.2 Brush Clearing

Brush clearing at this property was conducted during previous investigation activities. Therefore, removal of vegetation during site preparation will include only the minimum amount of removal necessary to perform the remediation.

3.5 GEOPHYSICAL PROVE OUT PLAN AND REPORT

No geophysical prove-out will be required for the RA. Geophysical prove-out was already performed for the SVFUDS and accepted by the Spring Valley Partners. See Subchapter 3.5 of the Site-Wide WP for additional details.

Figure 3-4
Proposed Final Grading
4825 Glenbrook Road

Spring Valley
Washington, D.C.

Legend

▨ Buildings
☐ Property Boundaries
— Elevation Contours

0 10 20 40 Feet
1 inch = 20 feet

Scale: 1:245
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File: 20120423 4825 Glenbrook Road Grading.mxd
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Figure Number: 3-4
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3.6 GEOPHYSICAL INVESTIGATION PLAN

No geophysical data acquisition or anomaly reacquisition will be required for the investigation of the remaining low probability test pits during this RA. The property has been subject to prior geophysical surveys and sufficient data have already been collected.

3.7 GEOSPATIAL INFORMATION AND ELECTRONIC SUBMITTALS

Geospatial information and electronic submittals will be maintained and submitted in accordance with Subchapter 3.7 of the Site-Wide WP (USACE 2007).

3.8 INTRUSIVE REMEDIATION PLAN

3.8.1 General Methodology

3.8.1.1 The intrusive remediation of the high and low probability areas will be performed in accordance with the procedures outlined in this SSWP and Subchapter 3.8 of the Site-Wide WP as appropriate, including all referenced regulations and procedures and the DDESB approved CSS which outlines all Explosive and Chemical safety requirements. At any point during the intrusive remediation, if recovered items, analytical results, or field observations are inconsistent with what is addressed by the Site-Wide WP or this SSWP and the related APP/SSHP, work will cease until the inconsistencies are resolved.

3.8.1.2 Intrusive remediation of the high probability areas will be conducted inside an ECS, which will be repositioned twice to cover the entire high probability area as delineated in the DD (USACE 2012b). ECS location #1, the area in front of the house and the front portion of the ground beneath the house (Area F and part of Area E), will be remediated first, ECS location #2, the back portion of the house and the backyard toward the retaining wall area (remaining part of Area E and Area D), will be remediated next, and ECS location #3, the ground beneath the house (part of Area E), will be remediated last. The structure will have large doors for roll-offs and drum transport and personnel entrance /exit doors as specified in Appendix M. The area adjacent to Area F along the Glenbrook Road will be excavated under the low probability intrusive operation.

3.8.1.3 The ECS will be maintained under negative pressure during all high probability remedial activities by the CAFS. Prior to commencement of RA inside the ECS at each location, the structure will be smoke-tested to demonstrate adequate containment and airflow readings will be taken at the tent openings to ensure it is under negative pressure.

3.8.1.4 Excavation activities will be conducted using hand-digging tools and mechanical equipment (i.e., mini-excavator or equivalent-sized equipment operated by a heavy equipment operator). Excavation near the inside perimeter of the structure will be conducted in phases to ensure the stability of the structure is maintained. The buffer area around the inside of the tent may be adjusted if deemed safe by USAESCH Safety Specialist, CENAB Site Operations Officer, and the Parsons Site Manager. No personnel will enter an excavation deeper than 4 feet unless appropriate benching/shoring as described in the Site-Wide SSHP and Appendix M is in place.

3.8.1.5 Excavation will be conducted in six-inch lifts and each lift of excavated material will be inspected by a UXO Technician II or UXO Technician III for items of interest (e.g., suspect items, lab ware, etc.) before the next lift is excavated. This process applies to high and low probability excavation. After screening (visual screening and use of a Schonstedt and rake for sorting), the excavated material will be collected in 55-gallon drums or roll offs, as feasible. Table 3-2 illustrates the dig sheet that will be used during excavation of each low or high probability area. The following information will be collected during the intrusive operations:

- Any item(s) removed from an area will be photographed;
- Written descriptions of the item(s) removed from each area will be recorded in the field logbook and on the dig sheet including approximate depth (within 6 inches), item type [where known], approximate size, and material;
- The final open area will be photographed;
- The final physical excavated dimensions of each excavated area will be recorded including depth to competent saprolite or bedrock, and maximum depth excavated;
- A general description of the soil type and color will be recorded.

3.8.1.6 As soil is being excavated, the material in the excavation bucket will be visually inspected and screened for debris by a UXO Technician II or UXO Technician III. A soil sample will be collected from the excavation bucket for a representative composite sample. Soil can be loaded directly into drums or roll-offs after it is visually inspected by a UXO Technician for items of interest (e.g., suspect items, lab ware, etc.) or if it was hand excavated. The soil in the excavation bucket may be spread on a plastic sheet or non-porous material for further inspection of debris. The roll-offs will be lined with a 6 mil liner. If drums are being used, enough room will be left in the drum to allow the lid to be properly attached (generally each drum will be filled to approximately 2/3 full). Drums of soil or roll off will be staged inside the ECS until such time as the Site Manager and SSHO determines that the drums can be brought outside. If drums are being used, the drums will be cleaned with a dry brush and will be kept free of loose soil and debris to prevent contamination from being transported outside the tent. Drums or roll-offs will be removed from the tent if no MINICAMS alarm ring-offs occurs during the excavation of soil collected in the drum or roll-off and only when approved by the Site Manager and SSHO. Drums or roll-offs will not be removed when high probability intrusive excavation activities are occurring or during potential item packaging operations.

3.8.1.7 Once drums or roll-offs are ready to be moved outside the ECS, the drum handling truck or the roll-off truck will be brought to the gate outside the area and loaded. While the truck is maneuvering into place and drums or roll-offs are loaded onto the truck, traffic in both directions will be temporarily blocked along Glenbrook Road. This will be performed by two certified traffic control technicians positioned along Glenbrook Road. Traffic Cones will be temporarily used if additional space is required during the site operation. Figure 3-3 shows the traffic control plan for work at 4825 Glenbrook Road. The drums or roll-offs will be transported to federal property where they will be temporarily stored. The drums will be stored in a fenced and secured storage area at the Federal Property. A key log will be maintained by the site manager to control access. The roll-offs will be covered with a non-permeable fabric sheet and temporarily stored in the southwest corner of the Federal Property. Drummed soil may be transferred to roll-off containers before being sent for final disposal based on the analytical results. The tracking system outlined below will be followed for each waste stream encountered during the RA. Every container will be tracked from point of generation to disposal, as follows:

- **Container Number**: Each container drum (or overpack) will be given a unique alphanumeric container number, which will be marked directly on the top and side of each drum. Additionally, the date of generation will be marked on the drum. The first six characters represent the site location (4825GR), while the next three characters represent the container type (MD for munitions debris, SCR for scrap, ESW for excavated soil waste, IC for intact container, RDW for all other waste). The next four characters indicate the location (i.e., EX for excavation with a two digit number for grid location). The last set of characters indicates the number of respective container types generated so far. The following are examples of container designations:
  - 4825GR-MD-EX01-001
  - 4825GR-SCR-EX22-180, 4825GR-SCR-EX1-181, etc.
  - 4825GR-ESW-EX40-666, 4825GR-ESW-EX40-667, etc.
  - 4825GR-RDW-EX40-240, 4825GR-RDW-EX40-241, etc.
  - 4825GR-IC-EX01-001, 4825GR-IC-EX01-002, etc.
- **Container Form**: Each drum will be associated with a container form that documents the pertinent information about the drum contents, including waste type, generation date, source, associated sample numbers, and storage area location. The Site Manager will maintain the container forms in a binder.
- **Container Log**: The container log is a form that tabulates all information found on the individual container forms.
- **Storage Area Loading Plan**: The storage area loading plan tracks the exact location of an individual container at the storage area at the federal property. This form will be posted at the federal property, with an additional copy being maintained by the Parsons Site Manager.

3.8.1.8 Once an area is excavated to the area boundary as defined by the DD, confirmation samples for sidewalls and floor will be collected and analyzed as appropriate. Sidewall confirmation samples will be collected at locations depicted in Figure 3-5 or as further determined by the PDT. Floor confirmation samples will be collected from 20’ grids where bedrock is not reached. If the soil is not chemical agent/ABPs contaminated but is found to contain HTW compounds, the Spring Valley Partners will discuss the appropriate action to be taken if the HTW contamination extends beyond the footprint of the ECS or the property boundary. If no agent/ABPs are detected in these confirmation samples, the remediation of the area will be confirmed as complete. All numerical decision limits for the analytical parameters are included in Attachment A-1 of Appendix E-SAP. Once an area is confirmed as completed, clean soil will be backfilled into the hole and compacted as required.

3.8.1.9 If the soil is found to be free of agent/ABPs but is identified to contain HTW compounds at concentrations exceeding the residential cleanup standards, soil removal action and additional confirmation sampling will be performed. Non-RCWM intact containers, scrap, and RDW will be handled and disposed in accordance with Subchapter 3.8.14 and 3.9 of the Site-Wide WP (USACE 2007).

3.8.1.10 For the low probability areas, the soil excavation will be performed to clear each area of AUES-related material and to meet the remediation goals. For Area A, the excavation will stop at the planned boundaries as shown in Figure 3-1 if no debris is encountered within 2 feet of the east side wall. If debris is observed to extend past the east side wall boundary of Area A, additional debris clearance will be performed in six-inch increments. Once the soil is considered to be "cleared for debris", the excavation will be extended 1.5 feet laterally for confirmation (a total of 2 feet clearance). If debris remains at the north and south Area A boundaries (i.e. the north and south property boundaries), PDT will decide if additional debris clearance should be performed. Confirmation sidewall and floor samples will be collected and analyzed (Subchapter 10.3) to confirm the completion of the remediation of the area.

3.8.1.11 For the two uninvestigated low probability test pits remaining from the previous test pit investigation at the property and additional nine proposed test pits, a dimension of 3 feet by 6 feet test pit will be investigated. For the J-shaped trench, a dimension of 3 feet wide by approximately 57 feet long (parallel to the Kreeger Music Roadway) and approximately 3 feet wide and 39 feet long (parallel to the 4801 and 4825 Glenbrook Road boundary) will be investigated. A test pit is considered "cleared for debris," when the excavated soil from a six-inch lift contains no debris, as determined by the intrusive team. Once the soil is considered to be "cleared for debris," the excavation will be taken six-inches deeper for confirmation (*i.e*. a total of one foot contains no debris) for lateral debris clearance. The excavation depth will be to reach competent saprolite or bedrock or to the maximum extent of the equipment reach, whichever comes first. The J-shaped trench will be dug to the depth that is needed to install the temporary sewer line except where test pits (Test Pits 152 and 154) are collocated with the sewer trench.

3.8.2 Backfill and Compaction

3.8.2.1 Once an area is confirmed as completed, clean soil will be backfilled into the hole and compacted. Timing for backfill, compaction, and the other procedures described in this section will be determined by the field team based on project schedule, site conditions, etc. High and low probability areas will be backfilled with clean backfill soil obtained from the approved stockpile at the federal property, sampled and approved in accordance with Subchapters 3.8.1.8.3 through 3.8.1.8.5 of the Site-Wide WP under a previous separate effort. If additional clean backfill material is needed, a source will be identified, sampled and approved in accordance with Subchapters 3.8.2.1.1 through 3.8.2.1.3.

3.8.2.1.1 The soil and topsoil to be used for backfill will be sampled and analyzed in general accordance with USEPA's December 6, 2001, letter to USACE. Four samples will be collected per 1,000 cubic yards of backfill from random locations at the surface of each pile. One sample will be a six point composite; the remaining samples will be collected as discrete samples.

3.8.2.1.2 The composite and discrete samples will be collected in accordance with the SAP in Appendix E. These samples will be analyzed and the data evaluated separately in accordance with the UFP- QAPP in Appendix E.

3.8.2.1.3 Upon completion of all data analyses, the soil and topsoil will be determined to be acceptable or unacceptable as fill material. A copy of the backfill testing results will be provided to USACE including a determination of whether the material is acceptable. Should a source be considered unacceptable, another source will be identified and sampled.

3.8.2.2 The open excavations will be backfilled in compacted lifts (maximum compacted lift will be 6 inches thick from 9 inches loose lift). The backfill will be compacted to a minimum 95 percent of maximum dry density (American Society for Testing and Materials [ASTM] D 698). One in place dry density test per 2500 square feet, or fraction thereof, of each lift of fill or backfill areas compacted by other than hand-operated machines will be performed. While the compactor can be lowered to the full depth of the test pit in order to compact the backfill, it will not be possible to perform compaction tests to the full depth. This is because the narrowness and depth of the proposed test pit excavations make it unsafe for the operator to enter the excavation to perform the compaction test. The backfill compaction procedures at this property established during the previous effort will be used to backfill and compact the excavated areas. Backfill will be compacted in the excavated areas to match adjacent grade. The final grading across the site will be performed after the completion of the RA.

3.8.2.3 Field in-place dry density will be determined in accordance with ASTM D 1556, ASTM D 2167, or ASTM D 2922. If ASTM D 2922 is used, a minimum of one in ten tests will be checked using ASTM D 1556 or ASTM D 2167. Test results from ASTM D 1556 or ASTM D 2167 will govern if there is a discrepancy with the ASTM D 2922 test results.

3.8.2.4 The timing for placement of the sod, seed mixture/mulch, or mulch will be determined by the field team based on project schedule, site conditions, etc.

3.8.3 Accountability and Records Management for RCWM and Potential MEC

Accountability and records management for RCWM, potential MEC, and suspected AUES-related debris will be conducted in accordance with Subchapter 3.8.2 of the Site-Wide WP.

3.8.4 Personnel Qualifications

Qualifications for UXO personnel are described in Subchapter 3.8.3 of the Site-Wide WP.

3.8.5 Sampling Overview

3.8.5.1 Various types of samples will be collected during intrusive remedial activities (low and high probability) as summarized below and explained in Subchapter 3.8.6. These include:

confirmation (soil), area characterization (soil), soil disposal (excavated soil), aqueous RDW (decontamination water), scrap, and non-agent intact containers. These samples will be analyzed for two general types of compounds: CA (including ABPs) and HTW constituents.

3.8.5.2 For the 4825 Glenbrook Road RA, CA analysis will be limited to mustard agent and lewisite. ABPs will also be analyzed. Mustard agent breakdown products are thiodiglycol, dithiane, and oxathiane, and the lewisite breakdown products are chlorovinylarsenious oxide (CVAO) and chlorovinylarsenious acid (CVAA). Thiodiglycol will be analyzed only if dithiane or oxathiane are detected in a sample. The presence of dithiane and oxathiane eliminates false positives from plastics based on the ECBC protocol. Detection limits of these parameters are included in the QAPP (Attachment A-1) of Appendix E – SAP. CA/ABP samples will be transported off-site to the ECBC laboratories located at Aberdeen Proving Ground, Maryland.

3.8.5.3 HTW constituents, which include disposal parameters, will be sampled and analyzed in accordance with the SAP in Appendix E of this WP. For confirmation soil samples, this will include the SVFUDS Comprehensive List compounds, including VOCs, SVOCs, explosives, metals, cyanide, fluoride, iodine, and perchlorate.

3.8.6 Analytical Sampling Procedures

3.8.6.1 Confirmation Samples

3.8.6.1.1 Once the excavation of each high and low probability area is considered to be resolved (Subchapter 3.8.1), sidewall samples will be collected from the excavation perimeter sidewalls and analyzed in accordance with the SAP in Appendix E of this SSWP. Sidewalls adjacent to Area C (the Burial Pit 3 area) and outside the property boundary will not be sampled. In general, three representative confirmation samples will be collected in the mid-point of the grid or partial grid at every 20 feet linear increment of the excavation boundary. These samples will be collected from surface soil (0 - 6 inches beneath the existing ground surface or clean backfill where applicable), and 6 inches above the maximum excavation depth. A midpoint sample will also be collected between existing ground level and the excavation depth, if the excavation depth is greater than 5 feet. The excavation depth will be measured from existing ground surface or beneath clean backfill (where applicable) to the bottom of the excavation. These samples will be collected from the horizontal midpoint of that sidewall. The proposed confirmation sidewall soil samples are illustrated in Figure 3-5. Confirmation floor samples will be collected if the excavation of an area does not reach bedrock. The floor confirmation samples will be collected at the center of a 20 foot grid where bedrock is not reached.

3.8.6.1.2 The confirmation sample will be analyzed for CA/ABPs by ECBC and the list of compounds in the SVFUDS Comprehensive list of chemicals in accordance with the SAP in Appendix E of this WP.

Table 3-2a
Digsheet
Low Probability Test Pit Investigations at 4825 Glenbrook Road

Test Pit ID ______________________ **Start Date** ____________ **Completion Date** __________

Grid Number ______________________

TEST PIT DESCRIPTION				
Dimensions in feet (W/L/D)				
Depth to saprolite or bedrock				
Soil Description				
Magnetometer Clearance	Y / N	Comments:		
AIR MONITORING	Task performed?	Alarms?	Comments	
MINICAMS	Y / N	Y / N		
ARSINE	Y / N	Y / N		
HCL	Y / N	Y / N		
HCN	Y / N	Y / N		
PID	Y / N	Y / N		
Dust monitoring	Y / N	Y / N		
Dust samples ID				
SAMPLING				
Samples Collected	Y / N			
Sample Description				
Sample ID				
ITEMS FOUND				
Type (cultural debris, glassware, MD, etc.)	Depth Found	Item ID	Photograph	Size, Weight and Description

FINAL CLEARANCE

Recommended by ________________________________

Parsons Site Manager

Concurred by ______________________ Concurred by ______________________

USAESCH Safety Specialist CENAB Site Operations Officer

Table 3-2b
Digsheet
Remedial Action in High Probability Areas at 4825 Glenbrook Road

Area ID ______________________ **Start Date** ____________ **Completion Date** __________

Grid Number ______________________

TEST PIT DESCRIPTION				
Dimensions in feet (W/L/D)				
Depth to saprolite or bedrock				
Soil Description				
Magnetometer Clearance	Y / N	Comments:		
AIR MONITORING	Task performed?	Alarms?	Comments	
MINICAMS	Y / N	Y / N		
ARSINE	Y / N	Y / N		
HCL	Y / N	Y / N		
HCN	Y / N	Y / N		
PID	Y / N	Y / N		
Dust monitoring	Y / N	Y / N		
Dust samples ID				
SAMPLING				
Samples Collected	Y / N			
Sample Description				
Sample ID				
ITEMS FOUND				
Type (cultural debris, glassware, MD, etc.)	Depth Found	Item ID	Photograph	Size, Weight and Description

FINAL CLEARANCE

Recommended by ______________________________

Parsons Site Manager

Concurred by ______________________ Concurred by ______________________________

USAESCH Safety Specialist CENAB Site Operations Officer

Table 3-2c
Digsheet
Remedial Action in Low Probability Areas at 4825 Glenbrook Road

Area ID ______________________ **Start Date** ____________ **Completion Date** __________

Grid Number ______________________

TEST PIT DESCRIPTION				
Dimensions in feet (W/L/D)				
Depth to saprolite or bedrock				
Soil Description				
Magnetometer Clearance	Y / N	Comments:		
AIR MONITORING	Task performed?	Alarms?	Comments	
MINICAMS	Y / N	Y / N		
ARSINE	Y / N	Y / N		
HCL	Y / N	Y / N		
HCN	Y / N	Y / N		
PID	Y / N	Y / N		
Dust monitoring	Y / N	Y / N		
Dust samples ID				
SAMPLING				
Samples Collected	Y / N			
Sample Description				
Sample ID				
ITEMS FOUND				
Type (cultural debris, glassware, MD, etc.)	Depth Found	Item ID	Photograph	Size, Weight and Description

FINAL CLEARANCE

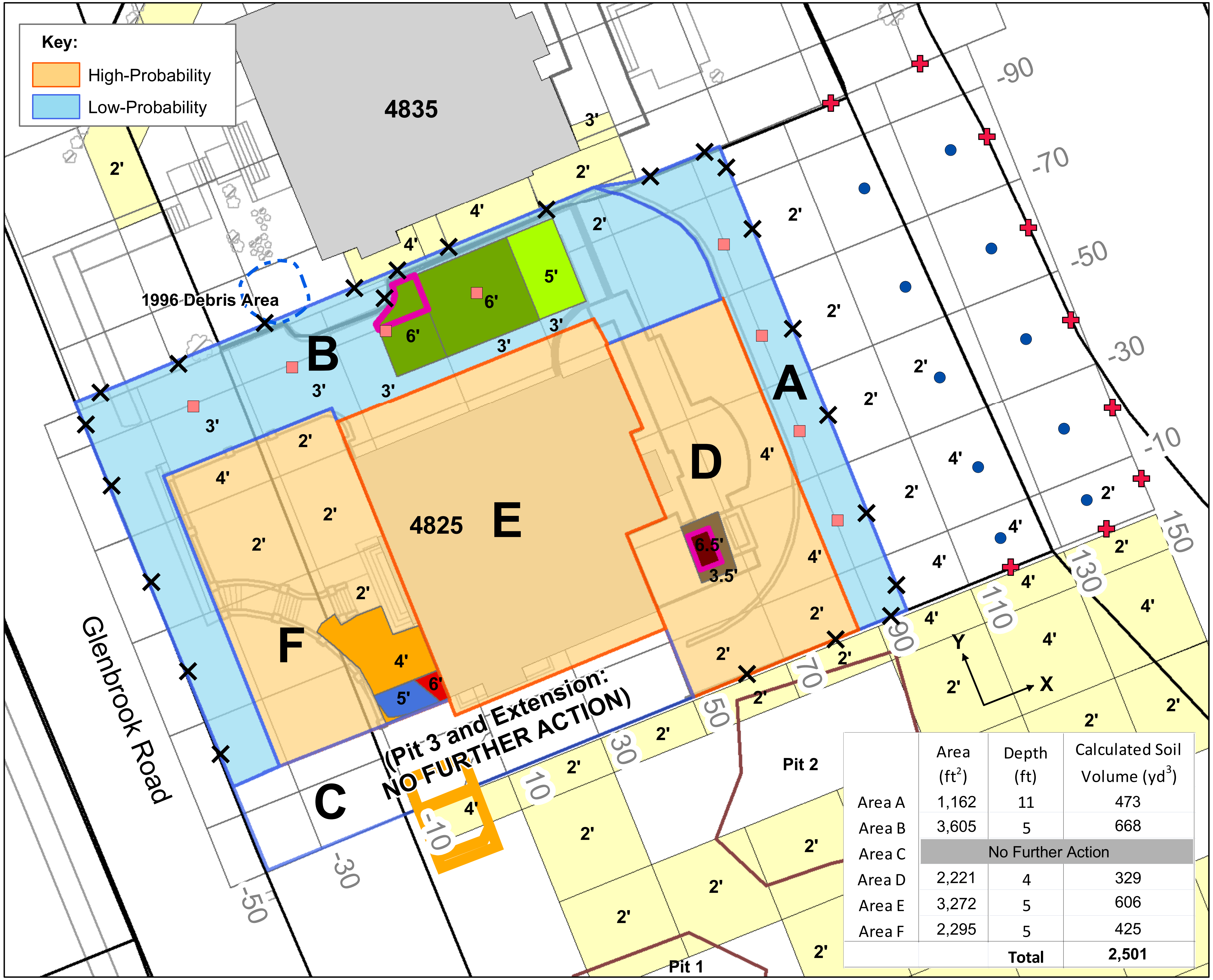
Recommended by ______________________________
Parsons Site Manager

Concurred by ______________________ Concurred by ______________________________

USAESCH Safety Specialist CENAB Site Operations Officer

Figure 3-5
Proposed Confirmation Soil Sample Locations
4825 Glenbrook Road

Spring Valley
Washington, D.C.



	Area (ft^2)	Depth (ft)	Calculated Soil Volume (yd^3)
Area A	1,162	11	473
Area B	3,605	5	668
Area C	No Further Action		
Area D	2,221	4	329
Area E	3,272	5	606
Area F	2,295	5	425
		Total	2,501

Legend

- ▨ Buildings
- ☐ Property Boundaries
- ☐ 20' Grid
- — Pits 1 and 2
- ☐ Test Pit 23 (Burial Pit 3)
- ☐ Arsenic Exceedance to be Further Excavated

Arsenic Soil

- 🟩 Arsenic Grid Previously Removed [5'] (2009)
- 🟩 Arsenic Grid Previously Removed [6'] (2009)

Soil Excavation

- 🟫 Excavation Depth [3.5'] (2009)
- 🟧 Excavation Depth [4'] (2010)
- 🟦 Excavation Depth [5'] (2010)
- 🟥 Excavation Depth [6'] (2010)
- 🟥 Excavation Depth [6.5'] (2009)
- ⬚ 1996 APEX Tree Removal (Debris Area) Perimeter
- 🟨 Previously Excavated Arsenic: Adjacent Properties
- ✕ Sidewall Confirmation Sample Location
- ■ Insitu RCRA Disposal Samples
- ● Area Characterization Sample Location
- ✚ Sidewall Characterization Sample Location

Notes:

1. Sidewall confirmation samples on the east side of Area A will be collected on a 1:1 slope. Therefore, actual locations may vary from those depicted here.

2. Excavation depths shown from previous arsenic removal.

0 10 20 40 Feet

1 inch = 20 feet

Scale:	1:245
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Date:	6/05/2013
Figure Number:	3-5
Page Number:	-

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3.8.6.1.3 If it is determined that further excavation is required for a sidewall based on the results of the confirmation sampling for CA/ABPs, the over-excavation will be taken 12 inches farther. This 12-inch over-excavation will be conducted down to the full depth of the sidewall and half the grid width in both directions laterally from the sample point (e.g., if the grid is 20 feet wide, the over-excavation would extend 10 feet in each direction laterally from the sample point.

3.8.6.1.4 Following the over-excavation of the area, additional confirmation samples will be collected and the process will be repeated until the area is determined to meet the soil residential cleanup standards as specified in the DD (USACE, 2012b).

3.8.6.2 Area Characterization Samples

3.8.6.2.1 Area characterization samples will be collected within ECBC equipment staging, sidewall samples will be collected from the excavation perimeter sidewalls and analyzed in accordance with the SAP in Appendix E of this SSWP. In general, three representative confirmation samples will be collected in the mid-point of the grid or partial grid at every 20 feet linear increment of the excavation boundary. These samples will be collected from surface soil (0 - 6 inches beneath the existing ground surface or clean backfill where applicable), and 6 inches above the maximum excavation depth. A midpoint sample will also be collected between existing ground level and the excavation depth, if the excavation depth is greater than 5 feet. The excavation depth will be measured from existing ground surface or beneath clean backfill (where applicable) to the bottom of the excavation. These samples will be collected from the horizontal midpoint of that sidewall. The proposed area characterization sidewall soil samples are illustrated in Figure 3-5. Area characterization floor samples will be collected if the excavation of an area does not reach bedrock. The floor area characterization samples will be collected at the center of a 20 foot grid where bedrock is not reached.

3.8.6.2.2 The confirmation sample will be analyzed for CA/ABPs by ECBC and the list of compounds in the SVFUDS Comprehensive list of chemicals in accordance with the SAP in Appendix E of this WP.

3.8.6.2.3 If it is determined that further excavation is required for a sidewall based on the results of the area characterization sampling for CA/ABPs, the over-excavation will be taken 12 inches farther. This 12-inch over-excavation will be conducted down to the full depth of the sidewall and half the grid width in both directions laterally from the sample point (e.g., if the grid is 20 feet wide, the over-excavation would extend 10 feet in each direction laterally from the sample point.

3.8.6.2.4 Following the over-excavation of the area, additional confirmation samples will be collected and the process will be repeated until the area is determined to meet the soil residential cleanup standards as specified in the DD (USACE, 2012b).

3.8.6.3 Soil Disposal Characterization Samples

3.8.6.3.1 Soil disposal characterization samples will be collected and analyzed in accordance with Subchapter 4.6 of the site-specific SAP (Appendix E of this SSWP) and as further clarified below.

3.8.6.3.2 Following CA/ABP clearance, soil disposal characterization samples (i.e., Resource Conservation and Recovery Act [RCRA] samples) will be collected and analyzed to determine the waste profile and meet the disposal facility requirements during the intrusive operations. This is explained further below.

3.8.6.3.3 CA Analysis

- During the excavation of the high probability areas, one representative composite soil sample will be collected for every three drums of excavated soil. These representative samples will be composited as described in Table 4.3 of the site-specific SAP (Appendix E of this SSWP). Following headspace analysis for CA clearance by the Air Monitoring Team, this sample will be analyzed for CA/ABPs by ECBC.

3.8.6.3.4 RCRA Disposal Samples

- RCRA soil samples will be collected and analyzed as described in the SAP in Appendix E of this SSWP. During the excavation of the high probability areas, one representative composite soil sample will be collected daily (not to exceed more than two days) from the drums, or roll-off box of excavated soil. These representative samples will be composited as described in Table 4.3 of the site-specific SAP (Appendix E of this SSWP). These samples will be kept on site, on ice or in a refrigerator in a secure location, until a separate aliquot is cleared for the presence of CA/ABPs. When the individual composite samples are cleared for CA/ABPs, they will be further composited into a single sample representing the day’s production, and submitted to the HTW Laboratory (samples for VOC analysis will not be composited). These samples will be analyzed for RCRA disposal characterization parameters in accordance with the SAP in Appendix E of this SSWP.

3.8.6.3.5 Waste Profile Samples

- The purpose of the waste profile sample is to ensure the disposal facility has sufficient knowledge of potential contaminants not addressed by the RCRA samples. Waste profile samples were collected and analyzed in the past at this site during the Burial Pit 3 Investigation, but additional waste profile sampling may be required based on requirements of the disposal facilities.

3.8.6.3 Scrap Samples

General scrap recovered during the remediation activities will be sampled and analyzed in accordance with Subchapter 3.8.6.3 of the Site-Wide WP and the SAP in Appendix E of this SSWP.

3.8.6.4 Aqueous Samples

Aqueous RDW generated during the remediation activities will be sampled and analyzed in accordance with Subchapter 3.8.6.4 of the Site-Wide WP and the SAP in Appendix E of this SSWP.

3.8.6.5 Intact Container Samples

Intact containers recovered during the RA will be sampled and analyzed for mustard agent, lewisite, and ABPs. Additional GC/MS analysis will be performed to qualitatively identify the compounds in the intact container if sufficient samples can be collected. Bulk analysis will be performed if there is sufficient liquid. in accordance with Subchapter 3.8.6.5 and 3.8.14 of the Site-Wide WP and the SAP in Appendix E of this SSWP.

3.8.6.6 Other Samples

If a consensus member of the Spring Valley Partners requests that a sample be taken, USACE will consider the request. The item or an adequate volume of material to be sampled will be stored appropriately until a decision is made regarding the analysis of the sample. In the case of a disagreement among the Spring Valley Partners, the material will be stored appropriately until the disagreement is resolved. Once the decision regarding the analysis is made, the sample will be cleared for the presence of CA/ABPs as specified previously, and analysis will be performed for parameters specified in the SAP in Appendix E of this SSWP.

3.8.6.7 Sample Designations

Sample designations will be assigned in general accordance with Chapters 4 of the SAP in Appendix E of this SSWP.

3.8.7 Maximum Credible Event and Munition with the Greatest Fragmentation Distance

3.8.7.1 The Maximum Credible Event (MCE) is selected for high probability sites based on the maximum release of a chemical agent from a munitions, bulk container, or process that could occur as a result of an unintended, unplanned, or accidental incident. The event must be realistic with reasonable probability of occurrence. Based on the CENAB probability assessment, the MCE identified for operations at high probability areas at 4825 Glenbrook Road is the evaporative release of arsenic trichloride from a 1-liter container. It should be noted that the DDESB approval for the CSS states that the approved MCE is based on a one (1) liter container of the chemical agent Lewisite, which is consistent with Army policy. The selected MCE using arsenic trichloride provides more conservative hazard distances than the DDESB-approved MCE using Lewisite; therefore, the PDT agreed that the arsenic trichloride MCE will be used for this operation.

3.8.7.2 Based on the probability assessment conducted by CENAB and concurred by the PDT, MEC are not anticipated to be present in any of the high probability areas to be remediated under this SSWP for the 4825 Glenbrook Road RA. Per USAESCH recommendation, the MCE for 4825 Glenbrook is similar to the MCE Evaluation for AU Lot 18 and previously used for the 4825 Glenbrook High Probability Test Pit Investigation. Therefore, the selection of a munition with the greatest fragmentation distance (MGFD) is not required for the operations at high probability areas at 4825 Glenbrook Road.

3.8.7.3 If items are recovered during the RA at high probability areas that are inconsistent with the MCE and MGFD referenced above, work at the site will cease until the inconsistencies are resolved.

3.8.8 Acute Exposure Guideline Hazard Distance, MSD, and Exclusion Zone

3.8.8.1 The hazard distance for operations at high probability areas at 4825 Glenbrook Road is based on the maximum release of a chemical agent from a munitions, bulk container, or process that could occur as a result of an unintended, unplanned, or accidental incident. The event must be realistic with reasonable probability of occurrence. Based on the probability assessment prepared by CENAB, the MCE identified for the RA is the evaporative release of $AsCl_3$ from a 1-liter container. The Acute Exposure Guideline Level (AEGL)-2 distance for the evaporative release of lewisite from a 1-liter container is 96 feet. The Temporary Emergency Exposure Limit (TEEL)-1 distance for the evaporative release of $AsCl_3$ from a 1-liter container is 194 feet. The TEEL-1 was used for the $AsCl_3$ model because AEGL-2 was not available for this compound. TEEL is the Department of Energy’s (DOE) temporary value until the chemical is reviewed and approved through the AEGL process. Considering the interim nature of the TEEL values, the hazard distance of release from 1 liter of $AsCl_3$ was evaluated using the more stringent TEEL-1 instead of the TEEL-2 value to protect the general population.

3.8.8.2 The EZ for a site is defined as the greater of the MGFD-based minimum separation distance (MSD) and the MCE-based hazard distance. Therefore, the EZ distance for this site would be 194 feet. However, since an ECS will be used for this RA, the EZ will be confined to the limits of the ECS. The work area perimeter, as defined by the SSHO based on worker and public safety, will be used to define the EZ for all low probability excavations (see Section 11.2 of the SSHP).

3.8.9 Evacuation

No evacuation is planned for the operations at high probability areas as engineering controls will be used to reduce the hazard distances to within the ECS or the site. In the event that the engineering controls are compromised, the PPP will be implemented to warn the public to shelter-in-place.

3.8.10 RCWM/MEC Identification

3.8.10.1 In the event the Low Probability Contingency Plan is initiated during site grading activities due to AUES items being encountered, subsequent actions taken will be determined according to the nature of the potential item. For ease of reference, the Low Probability Contingency Plan is included as D-5 of the APP/SSHP Supplement (Appendix D of this SSWP).

3.8.10.2 High probability protocols will apply when RA is conducted within the high probability footprint. If a potential RCWM container is encountered during the high probability RA operations, the Excavation Team and/or Technical Escort (TE) from CARA unit will perform an initial reconnaissance. If during the initial reconnaissance the item is determined to be potential RCWM, the High Probability Contingency Plan will be initiated. For ease of reference, these procedures are also included as Attachment D-1 of the APP/SSHP Supplement (Appendix D of this SSWP). For the purposes of high probability operations, a potential RCWM container is defined as either (a) a container with markings denoting chemical agent or RCWM, or (b) an unidentifiable intact container that contains liquid. Note that, during the RA operations at a high probability area, any discovered unidentifiable intact container that contains liquid will be assumed to be potential RCWM until determined otherwise.

3.8.10.3 Based on the probability assessment (USACE 2012a), encountering MEC is not anticipated during the RA at this site. If MEC are encountered the contingency plan (Attachment D-6 of Appendix D) will be initiated. An evaluation will be performed by USACE Huntsville. The PDT will make a determination on whether intrusive operations can be resumed.

3.8.11 RCWM Removal

3.8.11.1 In the event the Low Probability Contingency Plan is initiated because potential AUES items are encountered during site preparation activities, subsequent actions taken will be determined according to the nature of the potential item as summarized in the Subchapter 16.13 of the Site-Wide SSHP (also provided as Attachment D-5 of the APP/SSHP Supplement in Appendix D of this SSWP for ease of reference).

3.8.11.2 If potential RCWM is encountered during the high probability RA operations, the Excavation Team and/or CARA will perform an initial reconnaissance following the procedures described in Subchapter 16.14 of the Site-Wide SSHP (also provided as Attachment D-2 of the APP/SSHP Supplement in Appendix D of this SSWP).

3.8.11.3 RCWM will be transported to the IHF via the route shown in Figure 3-6. MEC are not anticipated to be found during this RA.

3.8.12 MEC/RCWM Storage

MEC is not anticipated to be encountered during the RA at the site. RCWM storage for this project is addressed in Subchapter 3.8.13 of the Site-Wide WP.

3.8.13 Intact Container Monitoring and Disposal

Intact container monitoring and disposal is addressed in Subchapter 3.8.14 of the Site-Wide WP.

3.8.14 MEC Disposal

MEC is not anticipated to be encountered during the RA at the site. If MEC are encountered, MEC disposal is addressed in Subchapter 3.8.15 of the Site-Wide WP.

3.8.15 MEC Disposal Alternatives

MEC are not anticipated to be encountered during the RA at the site. If MEC are encountered, MEC disposal alternatives are addressed in Subchapter 3.8.16 of the Site-Wide WP.

3.8.16 AUES-Related Debris, MD and Scrap Disposal

All AUES-related debris, MD and scrap recovered from 4825 Glenbrook Road will be headspaced. All AUES-related debris and scrap items that clear headspace analysis will be disposed at a Subtitled D Special waste landfill. All MD items cleared for headspace will be disposed in a metal recycling facility. Items that do not clear for headspace will be decontaminated and re-headspaced for confirmation and shipped to the Subtitled D Special waste landfill or metal recycling facility.

3.9 REMEDIAL ACTION DERIVED WASTE PLAN

3.9.1.1 The RDW Plan to be followed during all investigations at the SVFUDS is described in Subchapter 3.9 of the Site-Wide WP. Waste streams requiring disposal that may be generated during operations at 4825 Glenbrook Road could potentially include scrap, soil, decontamination water, PPE, solid waste, and on-site air monitoring laboratory-generated waste, all considered RDW. RDW will be transported to the federal property via the route shown in Figure 3-6.

3.9.1.2 If shallow groundwater is encounter during the intrusive operations, dewatering will be performed. Water will be pumped out from the excavation into a container and transported to the federal property for temporary storage. If a significant amount of groundwater is encountered, a Vac truck will be used to pump and transport to the federal property and Baker tanks will be used for temporary storage.

3.9.1.3 The following are examples of container designations for various media waste collected during these operations at 4825 Glenbrook Road:

- For munitions debris: MD-4825GR-TP#005, MD-4825-TP#006, etc.
- For general scrap: SCR-4825GR-180, SCR-4825-181, etc.
- For excavated soil waste: ESW-4825GR-666, ESW-4825-667, etc.
- For intact containers: IC-4825GR-001, IC-4825-002, etc.
- For all other RDW: RDW-4825GR-240, RDW-4825-241, etc.

3.9.1.4 All other details of the RDW Plan are described in Subchapter 3.9 of the Site-Wide WP (USACE 2007).

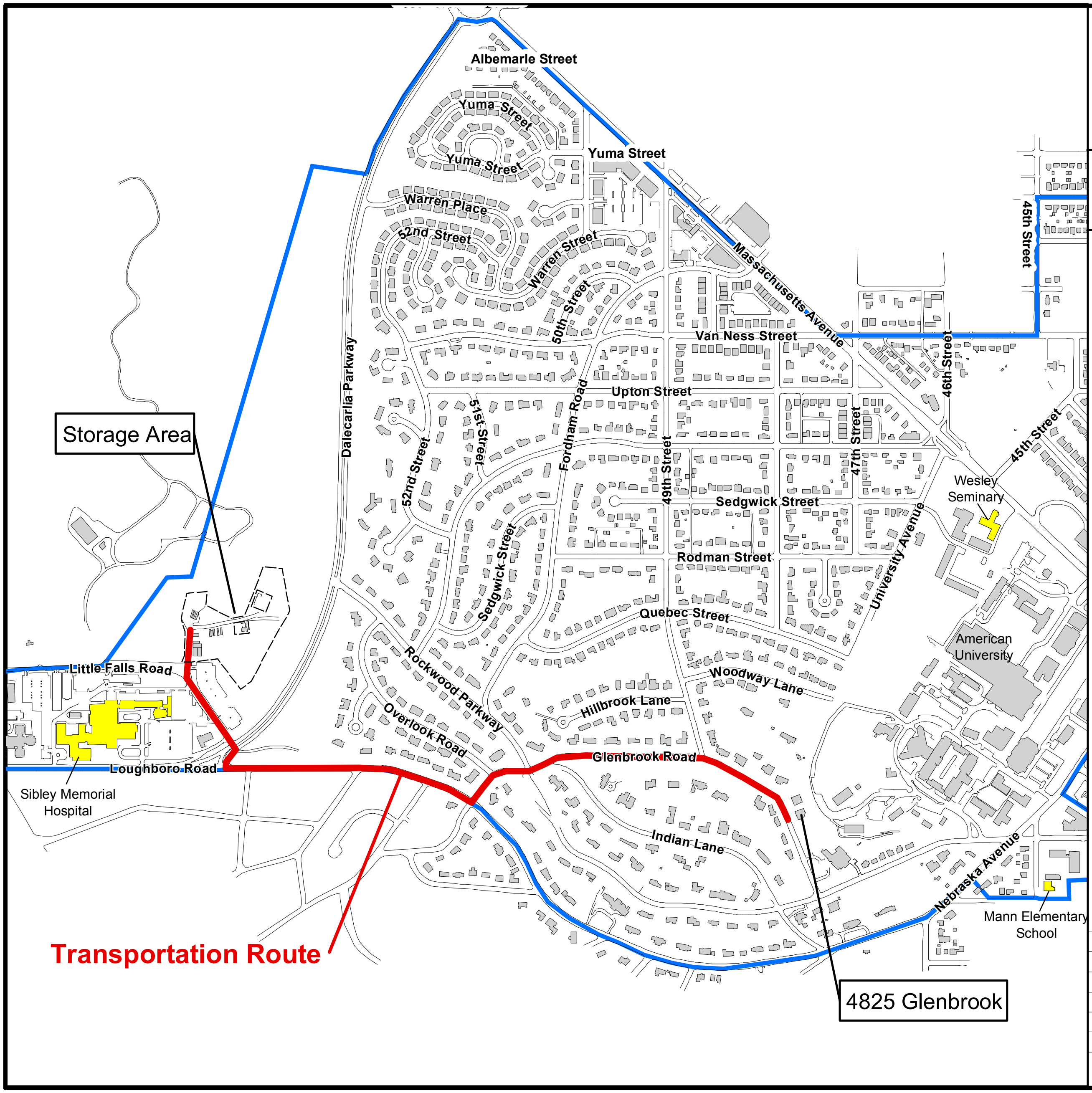

Figure 3-6
Transportation Route

Spring Valley
Washington, D.C.

Legend

- 🟥 Transportation Route
- ─── Roads
- - - - - Fence
- ▨ Buildings
- ☐ Spring Valley FUDS

0 500 1,000 2,000 Feet

1 inch = 1,000 feet

Scale:	1:12,000
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File:	20040429 Lot 18 Transportation route 8.5x11.mxd
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N W E S

PARSONS

3.10 RISK CHARACTERIZATION AND ANALYSIS

Risk characterization and analysis was addressed in the Human Health Risk Assessment report, which was included as Appendix Q of the Remedial Investigation Report for 4825 Glenbrook Road (USACE 2011a).

3.11 ANALYSIS OF INSTITUTIONAL CONTROLS

Based on the evaluations of the Feasibility Study (USACE 2011b) performed for the site, a land use restriction is not required under the selected alternative. Therefore, no Land Use Control Implementation Plan is required as a part of the remedial design phase.

3.12 PREPARATION OF RECURRING REVIEW PLAN

A Recurring Review Plan is not applicable for the site since the selected remedy is to clean up to unrestricted residential use.

CHAPTER 4 QUALITY CONTROL PLAN

4.1 GENERAL

The purpose of the Quality Control Plan (QCP) is to provide the approach and procedures used to ensure quality throughout the execution of the tasks required by the SOW. The QCP details the organization, responsibilities, policies, and procedures for maintaining the highest possible standards. The QCP applies to all work performed by Parsons and its subcontractors.

4.2 REQUIREMENTS

The Parsons QCP was written to encourage positive communication throughout the Parsons project team. It is also intended to foster clear communication between Parsons, USAESCH, and CENAB. Honest and effective communication among the project team requires that all parties clearly understand the project requirements. This QCP dictates the methods and procedures that will be used during this project, addressing personnel, equipment testing and calibration, QC inspection and audits, and data reduction and reporting. All QC reports and documents will be kept on site and accessible for review upon request. The QCP was prepared in accordance with DID MR-005-11.

4.3 RESPONSIBILITIES

4.3.1.1 Above all, project quality is the responsibility of the entire project team. The team's comprehension of this QCP is of primary significance for quality objectives to be accomplished; thus, training and indoctrination of key personnel in the quality objectives will be conducted. The project organization is headed by the Parsons PM; the single focal point for successful accomplishment of all phases of the project. The Parsons PM is given full authority and responsibility for project execution and is supported by direct line managers with functions and responsibilities outlined below.

4.3.1.2 The Parsons PM approves the QCP, implements procedures, and has direct responsibility for day-to-day contract management of the project. The PM's responsibilities related to QC include, but are not limited to:

- Implementation of all applicable Parsons policies and procedures;
- Timely submission of all contract deliverables; and
- Analyzing QC failures with the QCM and the appropriate QC person and implementing corrective actions.

4.3.1.3 The Project QCM interfaces with the PM on all project-related QC matters. The QCM, as a management representative, has the following authorities and responsibilities:

- Ensure the QCP has been established, maintained, and implemented;
- Establish guidelines to assist in the development of program, project, site, and task-specific QC policies and procedures;
- Coordinate with the Corporate Quality Manager to ensure completion of periodic audits of project activities in accordance with Parsons' corporate procedures;
- Initiate, recommend, approve, or provide solutions to the quality problems identified in the QCP during system audits;
- Conduct periodic evaluations of the project deliverables and submitting reports to the Parsons Sector Manager with copies to the PM; and
- Periodically report the adequacy, status, and effectiveness of the project to the Parsons Sector Manager.

4.3.1.4 The UXOQCS reports to the QCM on quality matters and has responsibility for overall quality of work performed onsite. Responsibilities of the UXOQCS related to QC include, but are not limited to:

- Oversee and ensure the implementation of the QCP during field activities;
- Verify implementation of corrective actions;
- Initiate actions to identify and prevent the occurrence of nonconformance relating to the services and QCP;
- Authority to stop nonconforming work;
- Ensure that QC procedures are being followed and are appropriate in demonstrating data validity sufficient to meet DQOs;
- Coordinate with District's QA representative for daily activities;
- Recommend actions to be taken in the event of QC failures, both to the PM and the QCM;
- Report non-compliance with QC criteria to the PM and QCM;
- Ensure MC sampling is conducted in accordance with the SAP (Appendix E);
- Authority to suspend project activities when a condition adverse to quality is identified and notify the PM and senior personnel when such action is required;
- Conduct daily QC inspections, submitting reports to the PM and the QCM; and
- Periodically report the adequacy, status, and effectiveness of the project to the QCM.

4.4 INSTRUMENT AND EQUIPMENT TESTING

4.4.1 Introduction

4.4.1.1 Instruments and equipment used to gather and generate environmental data will be tested with sufficient frequency and in such a manner that accuracy and reproducibility of results are consistent with the manufacturer's specifications and standard operating procedures. Instruments and equipment required for the SVFUDS intrusive operations may include analog geophysical instruments, digital camera, and air monitoring equipment.

4.4.1.2 Testing, calibration, repair, and replacement records will be filed and maintained by the UXOQCS. Testing records of the field instrumentation will be filed with the Parsons PM after completion of the project.

4.4.2 Instrument Standardization

No geophysical data acquisition or anomaly reacquisition is required for this RA. Therefore, a geophysical equipment standardization protocol is not detailed in this SSWP.

4.4.3 Analog Instrument Quality Control

The UXOQCS or designate will perform an "out of the box" inventory and inspection of the equipment upon arrival at the site (e.g., batteries including back up, end probe, sensitivity adjustment device, etc.). The UXOQCS or designate will check analog instruments (e.g., Schonstedt) at the start of each day by operating the instrument(s) over a metallic test item and will also check each instrument operator for interfering metallic items by scanning with the instrument. The UXOQCS or designate will also check the battery and the instrument will be shaken to check for loose parts and bad electrical connections. The UXOQCS will document performance of these tests in the field logbook.

4.4.4 Digital Camera Quality Control

The UXOQCS or designate will check the digital camera each day prior to use during the project. The battery level will be checked and, as needed, the batteries recharged, or replaced, as appropriate. Before work begins each morning, the Team Leader will verify that all camera functions are working properly and the available memory space on the camera is sufficient for a complete day of site photography.

4.4.5 Air Monitoring Equipment

4.4.5.1 Parsons is responsible for the operation and maintenance of the PIDs and electrochemical detectors used to monitor VOCs and arsine/HCl onsite, respectively. The Sample Team Leader or designate will calibrate the PID and electrochemical detector at the beginning of each day in accordance with the manufacturers' instructions. The instruments will be recalibrated and/or have sensors replaced as needed based on the results of the calibration. The Sample Team Leader will record the calibration in the field logbook.

4.4.5.2 ECBC is responsible for testing, calibration, repair, and replacement of the CA air monitoring equipment (e.g., MINICAMS). These activities are addressed in the ECBC plans and SOPs.

4.4.6 GIS Quality Control Procedures

The accuracy of the geographic analysis is equivalent to the accuracy of the underlying data being analyzed. Certain guidelines are necessary to ensure data quality after it is entered into the system. The QC guidelines presented in this chapter pertain to data loaded into the GIS.

4.4.6.1 Potential data problems include source data errors, data entry errors that can be corrected, data editing errors that can be corrected, data corruption errors that can be prevented, and user errors that can be anticipated.

4.4.6.2 *Geometric Accuracy*. After the coordinate information for reconnaissance waypoints are verified, the geometric accuracy of the geographic features will be checked. When this is detected, the source data will be examined and the correct location and place points will be determined in the GIS data set to represent identifiable elements of the feature such as corners or intersections. Original files will be backed up prior to making edits to prevent errors from occurring during the editing process.

4.4.6.3 *Geographic Accuracy*. One of the strengths of GIS is the accuracy with which geographic phenomena can be mapped. However, this strength can become a weakness if the overall spatial accuracy of the data is not clearly indicated. A statement of the accuracy of the spatial data will be included with documentation of the graphic files. GIS coverage will be evaluated to determine if the geographic features are graphically correct. If they are not in accordance with the data dictionary, they will be corrected.

4.4.6.4 *Data Loss and File Corruption*. There are several programs that manipulate the various files used by the GIS and relational database. Due to hard disk limitations, Random Access Memory (RAM) limitations or human error these programs occasionally crash, and the files being manipulated by these programs are corrupted, among other problems. To prevent data loss, these files will be backed up daily, and stored in a separate physical location from the primary storage device.

4.4.6.5 *Schema Quality Control*. The database values are the other part of the data structure that requires quality control. The database is generally treated as a single file with unique properties. QC procedures will be developed by the GIS Manager to ensure the data contained therein are accurate and usable. Before editing any database tables, the tables will be unloaded for backing up the schema. Another safeguard is to use a reference file of how data entry is performed.

4.4.6.6 The GIS Manager will develop and use a checklist of standard QC steps. For example, another approach to correcting errors is to run a program that edits the ASCII data export file.

4.5 INSTRUMENT/EQUIPMENT MAINTENANCE

Instruments, equipment, and other items requiring preventive maintenance will be serviced in accordance with the manufacturers' specified recommendations and written procedures developed by the operators. The exception will be digital geophysical equipment which, by manufacturer's design and calibrated at the time of manufacture, and should not require field calibration or maintenance. To ensure that equipment is fully capable and will perform in accordance with the manufacturer's specifications, pre-operational and post-operational checks will be performed. Following these checks, any equipment found to be unsuitable will be immediately removed from service. These checks will provide QC data indicating the proper functionality of the instruments.

4.5.1 Maintenance Procedures

4.5.1.1 Measurement equipment utilized on-site, i.e., magnetometers, monitors, etc., will be checked daily for operational reliability. Equipment such as vehicles, backhoe, and chipping/grubbing equipment, will have before-, during-, and after-operation maintenance performed in accordance with the equipment operating manual. The manufacturers' written maintenance schedules will be followed to minimize the downtime of the measurement system. It will be the operator's responsibility to adhere to these maintenance schedules and to arrange any necessary and prompt service as required. At a minimum, equipment used daily will be cleaned at the end of each workday and kept in good operating condition. Qualified personnel will perform service to the equipment and instruments. In the absence of any manufacturers' recommended maintenance criteria, the operator will develop a maintenance procedure based on experience and previous use of the equipment.

4.5.1.2 The UXOQCS is specifically responsible for inspecting the equipment and its maintenance records. Records of these checks are maintained in the UXOQCS journals. If equipment field checks indicate that any piece of equipment is not operating correctly, and field repair cannot be made, the equipment is tagged and removed from service. In this event, the UXOQCS will notify the Parsons PM and a request for replacement equipment will be placed immediately. Replacement equipment shall meet the same specifications for accuracy and precision as the equipment removed from service.

4.6 INSTRUMENT/EQUIPMENT TROUBLESHOOTING

Troubleshooting for equipment will consist of reviewing the guidelines provided in the operator's manual for the analog geophysical equipment, and ensuring batteries are charged, memory sticks have sufficient storage capability remaining, and wireless data transmitters are properly charged.

4.7 DATA MANAGEMENT

4.7.1 Data Reduction

Data reduction of the laboratory data from the environmental sampling is discussed in the SAP and UFP-QAPP (Appendix E).

4.7.2 Field Data Storage

Tracking data collected in the field will be stored electronically in notebook computers. Files associated with the SVFUDS data will be backed-up onto the DC file server or CD-ROM weekly.

4.7.3 Data Validation

Validation of the laboratory data is discussed in the SAP (Appendix E).

4.8 FIELD OPERATIONS DOCUMENTATION

4.8.1 Daily Field Activity Records

4.8.1.1 All site work field personnel will use either bound logbooks with consecutively numbered pages or electronic note pads. Field logbooks should record the daily activities of field teams, provide sketch maps and locations of CWM/AUES debris and other pertinent items, and note any observations that might affect the quality of data. Field logbooks and site records will be used to record the following:

- Field Log Books: The Site Manager or designate will maintain field logbooks to record site activities and field data. These logbooks will be maintained in a neat and legible manner and provide a historic record of site activities.
- Site Manager Daily Log Book: The Site Manager will maintain a daily journal. This provides a summary of all operations conducted, to include information on weather conditions, problem areas, work plan modifications, injuries, start/stop times, tailgate safety briefs, equipment discrepancies, RCWM/AUES debris located, training conducted, visitors, and any additional items deemed appropriate.
- Potential MEC/CWM and Suspect AUES-Related Item Excavation Records: These records will be maintained by the Site Manager or designate and consist of two series of sheets used to record data on the excavation of potential MEC/CWM and suspect AUES-related items encountered. These data are forwarded through the Site Manager (if not the original recorder) to the UXOQCS and GIS managers, who enter the data into the GIS and update the project database.
- Safety Log Book: The SSHO will maintain this log. It will record all safety matters associated with the specific project, such as safety briefings/meetings (including items covered and attendees), safety training, safety inspections, near-

misses/accidents/incidents with cause and corrective action taken, weather conditions, and any other matters relating to safety.

- Training Records: The SSHO maintains training records for all site personnel. These records contain training certificates, licenses, and other qualifying data for an individual's duty position.
- Quality Control Log: The UXOQCS maintains this log to record the performance and results of QC checks and inspections.
- Visitor's Log: The SSHO maintains this log. All personnel who are not directly involved in the project site activities are identified in this log by name, company, date, time in/out, and a contact phone number. Safety briefings and training for visiting personnel are also recorded in this log.
- Photographic Log: The UXOQCS maintains a photographic log to record all video recording and photographs taken to document work and/or site conditions. Photographic records will be used to supplement information recorded in the daily log and field data collection forms, including photographs of equipment prior to use, typical ordnance items, and the condition of sites prior, during, and after any activity. All digital photographs will be identified using a file name that accurately describes the site, subject of the photograph, and the date the photograph was taken.
- Site Maps: The Site Manager and GIS Manager maintain current working maps of the operating areas in the field office throughout execution of this project. These maps are used to document finds and the locations of soil sampling, auguring, drilling, and other soil disturbing activities.

4.8.1.2 The UXOQCS will inspect logs, records, and reports on a weekly basis. These inspections focus on the completeness, accuracy, and legibility of the entries and records. Results of these inspections are forwarded to the Parsons PM.

4.9 NON-CONFORMING ITEMS OR ACTIVITIES AND CORRECTIVE ACTIONS

4.9.1 Identification

Circumstances that prevent a work process from conforming to the contract requirements will be promptly identified, documented, investigated, and corrected appropriately. All project personnel have the responsibility, as part of their normal work duties, to promptly identify and report conditions adverse to quality. The status of non-conformance reports (NCR) will be maintained in a log, and progress of their resolutions will be documented and reviewed monthly to ensure prompt attention to their conclusion. Parsons NCRs will be submitted to USACE for review and distribution to others as appropriate.

4.9.2 Resolution, Corrective Action, and Verification

The appropriate level of management is responsible for evaluating the cause of an NCR and will recommend solutions for correcting the deficiency identified. Actions and technical justifications for an action proposed to resolve the corrective action will be reviewed and approved by personnel responsible for the technical aspect of the work. The QC organization will be responsible for verifying implementation of corrective action, monitoring the effectiveness of preventive action, and reporting any findings to the QCM.

4.9.3 Activity, Material, and Item Nonconformance

The QCM ensures implementation of the following requirements:

- Segregate nonconforming materials and items, when possible, from conforming materials and/or items to the extent necessary to preclude their inadvertent use; and
- Document and routinely review the status of nonconforming activities, materials, and items and the progress of their resolution to ensure prompt resolution of the nonconformance.

4.9.4 Review and Disposition of Nonconformance

The PM, QCM, and UXOQCS (if applicable) will conduct a review to ensure:

- The responsibility for review and disposition of nonconformance is defined;
- Nonconforming materials and items are reviewed in accordance with procedures. Nonconformance can be evaluated according to four criteria:
  - Reworked to meet the original requirements;
  - Accepted with or without repair;
  - Re-graded for alternative applications; and
  - Rejected or scrapped.
- Repaired or reworked materials items are re-inspected; and
- Each document used to identify and correct nonconforming conditions allows for the evaluation and approval of proposed actions by the appropriate authority.

4.9.5 Trend and Root Cause Analysis

4.9.5.1 The trend analysis of QC audits or inspections, subcontractor/supplier surveillance reports, and nonconformance will include the following information:

- Total number of audit/inspection findings and observations, surveillance reports, and NCRs for each area of the QCP;
- A summary of the root causes for the nonconformance consolidated for each area of the QCP; and
- Trends that are developing or that have developed.

4.9.5.2 The PM will perform the trend analysis once every year or as appropriate. QC will verify the implementation of any preventive actions resulting from the trend analysis.

4.9.5.3 The QCM is responsible for evaluating on a semiannual basis (or as appropriate) all NCRs affecting quality and will recommend solutions, as well as steps for verifying their implementation.

4.9.6 Lessons Learned

Opportunities to share lessons learned with the entire project team include monthly conference calls to discuss issues and concerns, as well as quarterly internal project review meetings. Additionally, Parsons will compile internal lessons learned and provide a forum for dissemination between project team members and distribute to other applicable Parsons' project locations.

4.10 AUDITS AND SURVEILLANCES

4.10.1 Audit Planning

4.10.1.1 The QCM will coordinate with the Corporate Quality Manager to ensure the completion of periodic audits of project activities and, as required, audits of subcontractors/suppliers in the manner specified in Parsons' Procedure QMS-P-7.2, *Quality Assurance Audits*, and as noted below:

- All areas of the activities being performed (where audits are not planned for certain areas, the audit schedule will include appropriate justification for the course of action);
- The audit schedule will identify office(s), including those in subcontractors' organizations, to be audited; and
- The audit schedule will identify the sequence and dates of audits for a fiscal year.

4.10.1.2 A Lead Auditor, certified in accordance with Parsons Procedure QMS-P-7.1, *Qualifications and Certification of Quality Auditors*, will prepare the audit plan. The plan will be reviewed and approved by the QCM before execution. The audit plan will include the following information:

- Identification of the organization and work areas to be audited;
- Identification of location, times, and dates of duration of the audit;
- Identification of the documents that specify the criteria against which the work will be measured;
- Checklists prepared as a guide during the audit;
- Identification of auditing personnel; and

- Signatures and dates approving the audit.

4.10.1.3 The organization to be audited will be notified of the impending audits at least 15 days in advance.

4.10.2 Audit Execution

A pre-audit briefing and a post-audit briefing will be conducted to inform key management personnel or to confirm results of the audit, including concerns and findings. Daily briefings may be conducted, as needed, to inform the audited organizations of the progress of the audit and potential findings or concerns.

4.10.3 Audit Reporting

4.10.3.1 Audit results approved by the Lead Auditor will include the following information:

- Reference to audit plan;
- Identification of and justification for any differences that occurred between the audit plan and the actual conduct of the audit;
- Synopsis of the audit results;
- Description of nonconformity (identified as findings and observations); and
- Completed audit checklist and documentation (objective evidence) supporting the discovery of the nonconformity.

4.10.3.2 Conditions determined to be in nonconformance with the contract, procedure, or other specified requirements, are identified as findings. Conditions not in nonconformance when first identified, but could lead to nonconformance if left uncorrected, are identified as observations. Formal responses are required for findings only. Corrective action is required for both findings and observations.

4.10.3.3 For internal audits, the Lead Auditor will issue the audit report to the Parsons PM, QCM, and the responsible Vice President. For audits of suppliers or subcontractors, the Lead Auditor will issue the report to the Parsons PM, and QCM, who will issue the audit report to the audited subcontractors and suppliers.

4.10.4 Review, Approval, and Verification of Recommended Action Response

4.10.4.1 The recommended corrective action proposed by the management of the organization audited in response to the nonconformity will be reviewed and approved by the QCM. Justification for rejection of the response will be documented by the QCM and transmitted to the organization providing the response.

4.10.4.2 Management of the organization being audited will report the implementation of corrective action to close out the audit nonconformity. The Lead Auditor or the QCM will verify a closeout action at the time of the next scheduled audit.

4.10.4.3 Verification of closeout action will be documented to ensure the satisfactory closure of the audit nonconformity and will be reported to the Parsons PM and to the management of the organization audited, when applicable.

4.11 DOCUMENTS AND SUBMITTALS

4.11.1 Process

Documents and submittals prepared for the SVFUDS will be the result of a collaborative effort by key personnel dedicated to the project. Qualified individuals from each major discipline represented in the deliverable will compose the applicable portion of the document.

4.11.2 Review

All documents and submittals will be reviewed for technical accuracy and editorial merit by qualified peers and/or the appropriate Technical Director(s). These reviews will be documented by the Parsons PM's signature on the associated document. The QCM will audit the project files to ensure that final reports and deliverables have gone through peer review.

4.11.3 Document Distribution and Retrieval

4.11.3.1 The most current revisions of documents that prescribe technical, management, and quality requirements are internally and externally distributed to the applicable project personnel. These personnel are responsible for the document's implementation and its verification for implementation.

4.11.3.2 The obsolete documents that prescribe obsolete technical and quality requirements are clearly marked and returned to the Parsons PM upon receipt of any revised document. The recipient will also immediately conduct a page change for all affected documents by inserting the revised document or slip pages in place of the obsolete.

4.12 PERSONNEL SELECTION

4.12.1.1 Key personnel will be designated by the PM. Those requiring licenses, certification, or other forms of qualifications necessary to perform their work, will be selected and evaluated periodically or on each change of task assignment by program management to ensure their credentials are current to perform the pre-established job description.

4.12.1.2 Project personnel performing functions that affect quality will receive, prior to assuming duty, indoctrination, and training conducted in accordance with Subchapter 4.13. The job description, indoctrination, training, and certification will be maintained in the project files in accordance with Subchapter 4.8. To ensure quality and consistency throughout the duration of the SVFUDS project, Parsons will maintain a dedicated group of qualified, trained project personnel to conduct the various project tasks.

4.13 PERSONNEL QUALIFICATIONS AND TRAINING

4.13.1.1 Personnel and subcontractors assigned to each site to perform activities affecting quality and safety will be trained to the project requirements and to the requirements of the QCP, as well as to the project and safety procedures.

4.13.1.2 The training program will ensure that project personnel:

- Possess adequate knowledge of the processes and procedures needed to conduct assigned tasks;
- Have working knowledge of the tools to be used;
- Possess an understanding of acceptance and rejection criteria for the work process;
- Understand the safety conditions/requirements of the work task;
- Know the consequences of inadequate quality levels;
- Are provided training for continued maintenance of job proficiency; and
- Are aware of the quality improvement and empowerment responsibilities.

4.13.1.3 All visitors will be required to go through a safety training and orientation regarding the general and site-specific hazard requirements.

4.13.1.4 Training records including certifications will be maintained as project records in Document Controls files in accordance with requirements in this QCP.

4.14 CHEMICAL DATA QUALITY MANAGEMENT PLAN

The QCP procedures for the Chemical Data Quality Management Plan are discussed in the SAP and UFP-QAPP (Appendix E).

CHAPTER 5
EXPLOSIVES MANAGEMENT PLAN

This Chapter does not apply to the planned activities at 4825 Glenbrook Road since the CENAB probability assessment determined that MEC are not anticipated to be present in the high probability areas to be excavated under this SSWP. However, if required for reference, the Explosives Management Plan for the project is described in Chapter 5 of the Site-Wide WP (USACE 2007).

CHAPTER 6
EXPLOSIVES SITING PLAN

This Chapter does not apply to the planned activities at 4825 Glenbrook Road since the CENAB probability assessment determined that MEC are not anticipated to be present in any of the high probability areas to be remediated under this SSWP. However, if required for reference, the Explosives Siting Plan for the project is described in Chapter 6 of the Site-Wide WP (USACE 2007).

CHAPTER 7
ENVIRONMENTAL PROTECTION PLAN

7.1 INTRODUCTION

The Environmental Protection Plan (EPP) for site-wide field activities at the SVFUDS is described in Chapter 7 of the Site-Wide WP. Details included in this EPP address site-specific measures to be implemented at the 4825 Glenbrook Road property during the RA activities to be conducted at this property. In any instance where something is not addressed in this chapter, the EPP for site-wide field activities will be followed.

7.2 IDENTIFICATION AND COMPLIANCE WITH ARARS

Applicable or Relevant and Appropriate Requirements (ARAR) are outlined the Feasibility Study (USACE 2011b), Proposed Plan (USACE 2011c) and DD (USACE 2011d).

7.3 AFFECTED ENVIRONMENT

The environment at the SVFUDS is described in Subchapter 7.3 of the Site-Wide WP (USACE 2007).

7.4 MITIGATION PROCEDURES

The mitigation procedures to be used to protect the environment during all field activities are detailed in Subchapter 7.4 of the Site-Wide WP (USACE 2007). Specific procedures to be implemented for the remediation at 4825 Glenbrook Road are described below. These specific procedures involve erosion and sediment control and the mitigation of noise.

7.4.1 Erosion and Sediment Control

Erosion and sediment control measures will be installed and maintained as described in the Erosion and Sediment Plan submitted to D.C. to obtain the building permit and Subchapter 7.4.9 of the Site-Wide WP (USACE 2007).

7.4.2 Noise Abatement

7.4.2.1 Noise abatement measures will be employed to ensure that noise generated by the CAFS is controlled sufficiently to comply with DCMR regarding noise control. As three CAFS unit are anticipated to be used during the high probability RA for air monitoring, noise abatement is critical to provide a safe environment for the site workers and public during these activities. A separate noise study is being completed to measure the noise levels that would be generated at the site during intrusive activities by the CAFS and backup generator. Data from the study will be released in March 2012 and will be used to develop a noise abatement strategy i.e., engineering controls, to meet with the DCMR noise levels. Detailed discussions on the noise study are included in Appendix M of this SSWP. During site preparation activities, Parsons will conduct noise monitoring around the boundary of the work area and coordinate measures required to keep noise levels in compliance during site activities (below 60dBA at the property line). As an additional measure to minimize noise impacts, the CAFS blower and back-up generator at the site will not be operated during non-working hours. The shutdown of the CAFS blower may be reassessed by the Partners if it has significant adverse effects on project operations.

7.4.2.2 During the operation at 4825 Glenbrook Road, additional noise monitoring and/or noise abatement measures may be implemented subsequently if considered necessary by the Partners.

7.5 PROCEDURES FOR POST-ACTIVITY CLEAN-UP

7.5.1.1 The clean-up activity after the demolition of the residence will be conducted by Parsons Subcontractor DSI, Inc. Clean-up activities will be conducted as discussed in the Demolition Plan (Appendix D - Attachment D-3). Clean-up activities after completion of the RA work will be performed by Parsons and other Parsons subcontractors as part of demobilization.

7.5.1.2 Drummed RDW moved from the ECS to the on-site drum staging area will be removed from the site daily upon completion of field activities and transported to the staging area for HTW-related RDW at the federal property storage area. The federal property staging area will be divided into three areas to separate the storage of drum cleared for CA, drums confirmed to be impacted by CA and an area for storage of drums pending clearance. As clearance of drums are confirmed, drums will be relocated and tracked to be in the appropriate storage area and it will be held there pending final disposal/disposition. Thus, no post-activity clean up will be required. However, post-activity site restoration will be performed as necessary.

7.5.1.3 Following completion of the intrusive operations at 4825 Glenbrook Road, all excavated areas will be backfilled using clean soil. In addition, the entire lot will be seeded or covered with sod during site restoration.

7.6 ENVIRONMENTAL DOCUMENTATION UNDER THE NATIONAL ENVIRONMENTAL POLICY ACT

Environmental compliance requirements under the National Environmental Policy Act are addressed in Subchapter 7.6 of the Site-Wide WP (USACE 2007).

7.7 AIR MONITORING PLAN

Air monitoring during intrusive operations will be conducted as defined in Appendix D of this SSWP, and the SSHP, which is Attachment D-1 to Appendix D of the Site-Wide WP (USACE 2007).

CHAPTER 8
PROPERTY MANAGEMENT PLAN

8.1.1.1 The Property Management Plan for the project is described in Chapter 8 of the Site-Wide WP.

8.1.1.2 Estimates of the types, quantities, and sources of equipment proposed for the RA at 4825 Glenbrook Road are summarized in Table 8-1.

Table 8-1 List of Equipment

Office/Field Operations	**Equipment Type (or equivalent)**	**Number of Units**	**Anticipated Source**	**Status**
Communication during fieldwork	Motorola HT-1000 radios	15	Parsons	GFE
Processing and interpretation of field data	Field computer, printer, plotter	2	Parsons/ Vendor	Rent/ GFE*
CCTV System	Video cameras, controller, DVRs, Monitors	1	Parsons	GFE
Excavation/Site Set-up	Excavator or Mini-excavator	1	Vendor	Lease
Geophysical Instrument	Schonstedt magnetic locator (GA-52Cx)	1	Vendor	Rent
Communication during fieldwork	Remote video camera system	1	Parsons	GFE*
Transportation of personnel and field equipment	Ford Explorers or equivalent	1	Parsons/ Enterprise	Lease
Transportation of personnel and field equipment	Vehicle – passenger car	1	Enterprise	Rent
Transportation of personnel and field	Vehicle - pickup 4 X 2	1	Enterprise/ Ford	Lease

Office/Field Operations	**Equipment Type (or equivalent)**	**Number of Units**	**Anticipated Source**	**Status**
equipment				
Site office	Office trailers	2	Vendor	Rent
Sanitation	Portable Toilets	4	Vendor	Rent
Personal Protective Equipment (PPE)	Respirators, Interspiro, M-40	14	Vendor/ Parsons	Rent/Purchase/ maybe GFE*
Intrusive fieldwork	hand tools/equipment	Multiple	Vendor	Purchase
ECS assembly	Crane, all-terrain forklifts, man lifts	1 ea.	Vendor	Rent
Demolition Equipment	Mini Excavator, Back Hoe	1 ea	Vendor	Rent
Air Monitoring Equipment	PID	2	Vendor	Rent
Air Monitoring Equipment	Arsine Monitors	4	Parsons	GFE
Air Monitoring Equipment	HCN Monitor	2	Parsons	GFE
Air Monitoring Equipment	HCL Monitor	2	Parsons	GFE
Soil Sampling Equipment	Hand Auger	1	Parsons	GFE
Soil Sampling Equipment	Sample Jars, Coolers Chain of Custody Forms, Labels	As Needed	Vendor	Purchase
Waste Disposal	Roll Off boxes - 40 Yard Boxes	As Needed	Vendor	Rent
Drum movement	Bobcat	1	Vendor	Lease
Photo documentation of fieldwork	Cameras	1	Parsons	Own
Office communication equipment	Office trailer phone/answering machine	1	Parsons	Purchase

Office/Field Operations	**Equipment Type (or equivalent)**	**Number of Units**	**Anticipated Source**	**Status**
Office communication equipment	Fax machine	1	Parsons	Purchase
Weigh drums containing MD	Drum Scale	1	Parsons	GFE*

*GFE = Government Furnished Equipment

CHAPTER 9
INTERIM HOLDING FACILITY SITING PLAN FOR RCWM PROJECTS

The IHF Siting Plan for the project is described in Chapter 9 of the Site-Wide WP.

CHAPTER 10
SOIL EXCAVATION PLAN

10.1 OVERVIEW

10.1.1.1 This operation includes excavation in the low probability areas (Areas A and B) and high probability areas (Areas D, E, and F) to meet the remedial objectives at 4825 Glenbrook Road. The formal determinations of low or high-probability were made through probability assessments (USACE 2012a). Figure 3-1 illustrates these low and high probability areas. These areas will be excavated to bedrock or competent saprolite, as determined by Parsons/ERT geologist with concurrence by USACE Geologist. After the completion of the excavation, floor and sidewall samples will be collected and discussed in Section 10.3. The floor samples will be collected from the center of the grids (20’ x 20’) where bedrock is not reached. The sidewall confirmation samples will be collected from the excavation perimeter sidewalls. Detailed discussions on the sampling locations are included in Section 10.3 below. The confirmation samples will be analyzed for the Spring Valley full list as discussed in the SAP included in Appendix E of this SSWP. Arsenic results will be compared to the a remedial goal of 20 mg/kg (developed by the Spring Valley Partners) to confirm that soil remaining at the site after excavation activities are below this remedial goal. For other analyzed compounds where remedial goals were not developed, the confirmation samples will be compared to the latest USEPA Regional Screening Levels for residential soil or Spring Valley background levels, whichever is higher. For compounds with detections exceeding these comparison levels, a 95 percent upper confident limit (UCL) will be calculated for each compound to estimate a representative site-wide exposure point concentration for further comparison to the screening levels. A risk evaluation may be performed if the representative exposure point concentrations exceed the screening levels. If the confirmation and area characterization sampling results do not meet the arsenic remediation goal, any additional over-excavation will be determined by the PDT after evaluation of the data.

10.2 EXCAVATION PROCEDURES

10.2.1.1 HTW-contaminated soil will be excavated in accordance with procedures described in Subchapter 10 of the Site-Wide WP.

10.2.1.2 For Area B in the driveway, the HTW-contaminated soil excavation is proposed to begin near the garage area adjacent to the high probability area. This area was previously not excavated to the required depth (i.e., bedrock or competent saprolite). In areas where backfill was placed during the previous investigation, the backfill soil will be excavated and stockpiled in a clean area on-site to be used as backfill soil when the excavation is completed. During excavation, disposal characterization samples will be collected from the excavated areas where excavation and backfilling operations were not performed during the previous effort. Sampling will be performed as described in Subchapter 10.6.1.2. Once all HTW-contaminated soil is excavated from Area B, confirmation sidewall samples will be collected as discussed in subsection 10.3. Excavation equipment will be decontaminated in accordance with Subchapter 14.2 of the Site-Wide SSHP.

10.2.1.3 Shoring or other approved system will be used as necessary to support the excavation when excavation depth is deeper than 4 feet. Detailed discussions on the house integrity evaluation for the adjacent 4835 Glenbrook Road residence and retaining wall removal procedures are included in Appendix M of this SSWP.

10.3 CONFIRMATION SAMPLING

10.3.1.1 Confirmation sampling will be performed from the excavation perimeter sidewalls to confirm the excavation is complete and the remedial goals are met. The proposed sidewall confirmation soil sample locations are illustrated in Figure 3-5. Sampling locations were selected in the mid-point of the grid or partial grid based on a 20 feet liner spacing. No samples were proposed adjacent to Area C where soil was previously excavated and replaced with clean backfill soil during the Burial Pit 3 and its extension investigations. Soil samples will be collected at each proposed sidewall sampling location from surface (0 - 6 inches beneath the existing ground surface or clean backfill where applicable), and 6 inches above the maximum excavation depth. A midpoint sample will also be collected between the existing ground level and the excavation depth if the excavation depth is deeper than 5 feet. The excavation depth will be measured from existing ground surface or beneath clean backfill (where applicable) to the bottom of the excavation. An additional confirmation sample will also be collected after removal of arsenic impacted soil at the curve of the retaining wall next to the driveway. Floor confirmation samples were also proposed if the excavation at any location does not reach bedrock. One floor sample will be collected from the center of a 20’ grid. The subsequent analyses of these confirmation samples for the volatile organic compounds (VOC) and semi-volatile organic compounds (SVOC), explosive, metals, total cyanide, fluoride, iodine, and perchlorate will be carried out in accordance with the Site-Specific SAP, which is Appendix E of this WP.

10.3.1.2 Air monitoring protocols described in Subchapter 7.7.0.1 will be implemented at each sampling location during the confirmation sampling (including MINICAMS, DAAMS, arsine, HCl, HCN, and VOC monitoring).

10.4 AREA CHARACTERIZATION SAMPLING

10.4.1.1 Area characterization sampling will be performed within the ECBC equipment staging areas, sidewalls to confirm the excavation is complete and the remedial goals are met. The proposed sidewall area characterization soil sample locations are illustrated in Figure 3-5. Sampling locations were selected in the mid-point of the grid or partial grid based on a 20 feet liner spacing. Soil samples will be collected at each proposed sidewall sampling location from surface (0 - 6 inches beneath the existing ground surface or clean backfill where applicable), and 6 inches above the maximum excavation depth. A midpoint sample will also be collected between the existing ground level and the excavation depth if the excavation depth is deeper than 5 feet. The excavation depth will be measured from existing ground surface or beneath clean backfill (where applicable) to the bottom of the excavation. Floor area characterization samples were also proposed if the excavation at any location does not reach bedrock. One floor sample will be collected from the center of a 20’ grid. The subsequent analyses of these area characterization samples for the volatile organic compounds (VOC) and semi-volatile organic compounds (SVOC), explosive, metals, total cyanide, fluoride, iodine, and perchlorate will be carried out in accordance with the Site-Specific SAP, which is Appendix E of this WP.

10.4.1.1.1 Air monitoring protocols described in Subchapter 7.7.0.1 will be implemented at each sampling location during the area characterization sampling (including MINICAMS, DAAMS, arsine, HCl, HCN, and VOC monitoring).

10.5 BACKFILL AND SITE RESTORATION

Backfill and Site Restoration will be performed in accordance with Subchapter 3.8.2.

10.6 SEDIMENT AND EROSION CONTROL

10.6.1 Run-off and Run-on Control

10.6.1.1 Erosion and sediment controls will be implemented prior to soil removal. Silt fences, hay bales, and/or other sediment traps will be installed down gradient of the excavation areas to trap any sediment and prevent run-off from the site into the surrounding areas.

10.6.1.2 Disposal piles are not anticipated because the soil will be containerized in roll-offs or other type of containers and transported to the federal property shortly after excavation. However, if the piles are constructed to temporarily store excavated HTW-contaminated soil prior to shipment, they will be covered with geotextile fabric or polyethylene sheeting when not in use unless under the ECS. . Silt fences will be placed around the disposal piles, and sheet polyethylene and jute mat netting will be used as required to control erosion and run-off.

10.6.2 Dust Control

10.6.2.1 Dust control measures will be implemented during excavation of HTW-contaminated soil in accordance with Subchapter 10.5.2 of the Site-Wide WP.

10.7 TRANSPORTATION AND DISPOSAL PLAN

10.7.1.1 Subchapter 10.6 of the Site-Wide WP describes the transportation and disposal plan for excavation of HTW-contaminated soil. Based on the expected volume of HTW-contaminated soil to be excavated at 4825 Glenbrook Road under this effort, it is expected that two disposal characterization samples will be collected; however, if confirmation sampling indicates that more than 2,000 tons of HTW-contaminated soil will be excavated, then additional disposal characterization soil sample(s) will be collected as needed (one sample per 1,000 tons). The disposal characterization sample will be collected prior to commencing excavation activities in order to obtain disposal facility approvals, and therefore avoid delays in the transportation of excavated soil. Disposal characterization samples will be analyzed for the parameters as described in the SAP (Appendix E of the SSWP). On site tracking of the drums and roll-offs will be performed in accordance with Section 3.9 of the Site Wide work plan.

10.7.1.2 In addition to the soil disposal characterization sample, a waste profile soil sample will be collected from soil excavated from areas. The purpose of this sample is to ensure that the disposal facility has sufficient knowledge of potential contaminants not addressed by the disposal characterization sample discussed above. The waste profile sample will be collected prior to commencing excavation activities in order to obtain disposal facility approvals, and therefore avoid delays in the transportation of excavated soil. Waste profile samples will be analyzed for the parameters as described in the SAP (Appendix E of the SSWP). Based on discussions at the Spring Valley partnering meetings, perchlorate analysis will be performed for the waste profile sample for this RA.

10.7.1.3 Wastewater from equipment decontamination will be sampled in accordance with Subchapter 10.6 of the Site-Wide WP and the SAP (Appendix E of the SSWP). This sample will be collected at the conclusion of the RA (one sample per 1,000 gallons).

10.7.1.4 Disposable PPE (e.g., sampling gloves and rubber booties) will be containerized in 55-gallon polyethylene drums. PPE will be disposed appropriately based on associated soil sampling results.

CHAPTER 11
PHYSICAL SECURITY PLAN FOR RCWM

For security purposes, the Physical Security Plan for RCWM for this project is not included in this document. Information on the Physical Security Plan for RCWM for this project can be found in the OPSEC order from CENAB. The Physical Security Plan for RCWM is maintained by CENAB.

CHAPTER 12
REFERENCES

ECBC, June 2011. Arsenic Trichloride Filtration Performance with the Impregnated Carbon ASZMT.

USACE, 1998. Remedial Investigation Evaluation Report.

USACE, March 2007. Site-Wide Work Plan for the Spring Valley Formerly Used Defense Site Spring Valley, Washington D.C. Prepared by Parsons.

USACE, June 2009. Site-Specific Work Plan for the Test Pit Investigations at 4825 and 4835 Glenbrook Road Properties, Amendment 2, Spring Valley SVFUDS, Washington D.C. June 11.

USACE, 2011a. USACE, July 2011a. Remedial Investigation Report for 4825 Glenbrook Road Spring Valley FUDS, Operable Unit 3, Washington, D.C. July 29.

USACE, September 2011b. Final Feasibility Study, 4825 Glenbrook Road Spring Valley FUDS, Operable Unit 3, Washington, D.C., September 26.

USACE, September 2011c. Proposed Plan, 4825 Glenbrook Road Spring Valley FUDS, Operable Unit 3, Washington, D.C., September 30.

USACE, 2012a. MEC/CWM Probability Assessment, Intrusive Remedial Action at 4825 Glenbrook Road Spring Valley FUDS, Washington, D.C. June 15.

USACE, 2012b. Final Decision Document for 4825 Glenbrook Road Spring Valley FUDS, Operable Unit 3, Washington, D.C. June.

USACE, 2012c. Chemical Safety Submission for Remedial Action at 4825 Glenbrook Road, SVFUDS Spring Valley, Washington D.C. Prepared by Parsons.

APPENDIX A
PERFORMANCE WORK STATEMENT

Performance Work Statement
Removal/Remedial Action
At 4825 Glenbrook Road, Spring Valley
Washington DC

10 May 2011
Revision:
Revision Date:

1.0 Objective: The objective of this task order is to remove Munitions and Explosives of Concern (MEC), Material Potentially Presenting an Explosive Hazard (MPPEH), Explosive Hazards, Industrial Chemical hazards, and Chemical Warfare Materiel (CWM) at 4825 Glenbrook Road, Spring Valley, Washington DC per the Decision Document.

2.0 BACKGROUND

2.1 Work under this Performance Work Statement (PWS) falls within the DERP-FUDS Military Munitions Response Program (MMRP) for Spring Valley, a Formerly Used Defense Site (FUDS). The Contractor shall perform all work in compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Contingency Plan (NCP), 40 CFR Part 300. All activities involving work in areas potentially containing explosive hazards shall be conducted in full compliance with United States Army Corps of Engineers (USACE), Department of the Army (DA), and Department of Defense (DOD) regulations, guidance, standards and manuals.

2.2 Available Site Specific information will be provided with the request for proposal for contractor review and use via either a designated Internet site or delivery of recorded data on CD/DVD. This information may include but is not limited to general site history, previous investigations, munitions response sites, and other documentation.

3.0 General Requirements:

3.0.1 Contractor Methods: This is a performance based task order. The performance objectives and standards included herein are the basis of the task order requirements. The technical approach and level of effort expended to achieve task order objectives and standards are solely up to the contractor to select and adjust as necessary through the life of the task order. Government recognizes the contractor's right to change the technical approach and level of effort from that proposed with the understanding that the contractor shall still meet all project objectives and gain government Quality Assurance acceptance in order to receive payment.

3.0.2 Quality monitoring and measurement: The contractor will be evaluated periodically during performance of this task order to ensure compliance with the proposed and accepted performance goals, regulations, guidance and DIDs, and to document that acceptance criteria (AC), delivery schedule, and the overall completion date are being met. This evaluation will be performed according to a Quality Assurance Surveillance Plan (QASP). A programmatic QASP will be provided by the government as a starting point for the contractor prepared Draft QASP per Task 1. The government will finalize the contractor's Draft QASP. This final QASP will be supplied to the contractor and used by the government to evaluate the contractor's performance. Failure to adequately complete any service or submittal to at least a satisfactory level of quality or timeliness may result in a repeat of the work, or a poor performance evaluation, or both.

3.0.3 Performance Requirements: Performance requirements are addressed in each task. Performance metrics are provided in Attachment A. If discrepancies or ambiguity exists between the documents, the order of precedence is 1) the Task; 2) Performance Metrics.

3.0.4 Task Pricing: A pricing schedule is provided in Attachment B which will be used as a basis for negotiation of price increase or decrease due to government changes in the specified performance objectives.

3.1 Task 1, Remedial Design/Remedial Action Work Plan (RD/RA WP), Accident Prevention Plan (APP), Chemical Safety Submission (CSS), Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP), and QASP: This is a Firm Fixed Price task.
Objective: Prepare, submit and gain acceptance of a RD/RA WP, APP, CSS, munitions constituent (MC) UFP-QAPP and QASP that are detailed and comprehensive plans covering all aspects of removal actions, final site characterization and project execution.

Performance Standard: Prepare the RD/RA WP and APP in accordance with CERCLA, DID WERS-001, WERS 006.01, and EM 1110-1-4009, EM 385-1-1, EM 385-1-97 and Interim Guidance (Draft Army Regulation XXX) Chemical Warfare Materiel Responses and Related Activities, dated 1 April 2009, as appropriate. Prepare the sampling and analysis plan, field sampling, and UFP-QAPP in accordance with EM 1110-1-4009, DID WERS-009.01, and Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP). UFP-QAPP content shall also meet the requirements of DoD Quality Systems Manual for Environmental Laboratories (current version). Draft QASP includes requirements in regulations, guidance, DIDs and the Quality Control Plan in the RD/RA WP.

AC: Acceptance of RD/RA WP, CSS, UFP-QAPP and QCP with two revisions. Draft QASP reflects requirements with one revision required.

Measurement / Monitoring: Review of RD/RA WP, CSS, UFP-QAPP and QASP per guidance to verify that the minimum acceptable content has been provided.

Task specific Incentives/Disincentives: Satisfactory or greater CPARS rating/poor CPARS rating and/or re-performance of work at contractor's expense.

Specific Task Requirements: The RD/RA WP and CSS shall describe the specific work proposed in order to meet the objectives and requirements of this PWS. The Contractor shall submit a project schedule, which demonstrates the ability to perform all tasks requirements within project timelines. The Contractor is authorized a post award site visit for the purpose of supporting preparation of the RD/RA WP and CSS. The Contractor shall notify the USAESCH Project Manager (PM) prior to a planned site visit. An Abbreviated Accident Prevention Plan (AAPP) is required for this activity. The AAPP must be approved by USAESCH prior to the site visit and shall be submitted no later than 5 calendar days before the site visit. The Contractor shall provide a discussion on data evaluation and fate and transport analysis. The potential for fate and transport will address all transport pathways, and it should also address future degradation products resulting from biodegradation, photolysis, and chemical reactions.

3.1.1 Chemical Safety Submission (CSS):

Objective: Prepare, submit and gain acceptance of a Chemical Safety Submission.

Performance Standard: Prepare, submit and gain acceptance of a Chemical Safety Submission that is a detailed and comprehensive plan covering all aspects of chemical and munitions operations in accordance with DoD Ammunition and Explosive Safety Standards, Manual 6055.09-M, Volume 7, and EM 385-1-97, Errata Sheet #3, as a stand-alone document for inclusion after acceptance into the RD/RA WP.

AC: Acceptance of submission with two revisions.

Measurement / Monitoring: Review by Government using guidance cited to determine acceptability.

Task specific Incentives/Disincentives: Satisfactory or greater CPARS rating/poor CPARS rating and/or re-performance of work at contractor's expense.

Specific Task Requirements: Allow eight (8) weeks in the schedule for DDESB approval after submission of final document to the CEHNC-CX.

3.2 Task 2, GeoSpatial Data: This is a cost plus fixed fee (CPFF) task.
Objective: Utilize GIS in the maintenance and management of all project and geospatial data.

Performance Standard: Manage and maintain project data, and develop CSM in GIS IAW DID WERS-007.01, EM 200-1-2, EM 1110-1-4009 and applicable Interim Guidance Documents.

AC: Acceptance of GeoSpatial Data submissions meets quality and formatting requirements.

Measurement / Monitoring: Review by Government using guidance cited to determine acceptability.

Task specific Incentives/Disincentives: Satisfactory or greater CPARS rating/poor CPARS rating and/or re-performance of work at contractor's expense.

Specific Task Requirements: The GeoSpatial Data shall include:
- A pre and post-project response action geospatial data analysis will be performed using a GIS.
- All available existing data that is applicable to the project will be consolidated into the GeoDatabase and analyzed to relay pertinent information to the PDT. A GIS database is available and it will be provided by the government.
- The management of data from the removal action may detail the fieldwork strategies, areas of concern, survey requirements, environmental concerns, milestones and/or other factors that affect product delivery and future action planning.
- Entities that may be affected by response actions include but are not limited to: landowners, homeowners, rental tenants, schools, utilities, roads, businesses, recreational areas, air traffic, water bodies and/or industries.
- The GeoDatabase shall be a living repository that is refined throughout the life of the project.
- Incorporate layers that overlay on maps of the site that identify physical features, and MPPEH/MD and Range-Related Debris found during the response action. Examples include: streets, anomalies, MEC positively identified, identifiable MD, sampling location, cultural resources, environmental, biological, and socio-economic variables.
- Archeological site location(s) will not be released to the public without written permission from USACE.
- Perform civil surveys IAW EM 1110-1-4009 and DID WERS-007.01.
- Government will provide the contractor with a landowner data base.
- Maintain and update property GIS data for all landowners within the project boundaries. Property owner privacy will be preserved. Property owner names shall not be disseminated in any documents.
- Track and assist the Baltimore District in obtaining property Right -of -Entry as needed.
- Assist the Baltimore District in GIS database requirements to include public meetings or project meetings .

3.3 Task 3, Remedial Action Field Activities: This is a cost plus fixed fee task.
Objective: Conduct a remedial or removal action (RA) in accordance with the PWS, CERCLA, Decision Document, the accepted work plans, CSS and all applicable standards.

3.3.1 Disposal/Burial Area, 4825 Glenbrook Road. Refer to historical project documentation of site location, historical information, and boundaries.

3.3.1.1 The following applies to the above subtasks:

Performance Standard: Field work, quality, and analysis of said data shall meet the following standards;
- the Contractor shall remove all surface and subsurface of the munitions response site (i.e. 4825 Glenbrook Road) of ferrous metal items (including, but not limited to MC, MEC, MPPEH, and other containers or items of interest) and glassware or non-ferrous containers containing industrial or chemical agent regardless of size , per the decision document requirements
-the Contractor shall remove all hazardous waste, to include contaminated soil, from the munitions response site (i.e. 4825 Glenbrook Road), per the decision document requirements
-The Contractor shall be protective (i.e. maintain engineering controls) of the Public while performing the removal actions in order to have minimal impact to the day to day activities of the Public to include American University.
-The Contractor shall provide industrial chemical monitoring to be protective of workers and the public.

- QC deliverables and QA inspections/review demonstrate that the work was performed in accordance with the RD/RA WP, CSS, applicable laws, regulations, and guidance documents;
- Proper processing and disposition of UXO, DMM and MD encountered in accordance with approved plan(s).
- All Material Potentially Presenting an Explosive Hazard (MPPEH) and munitions debris processed in accordance with Chapter 14, EM 1110-1-4009 and Errata Sheet No. 2.

AC: Conduct the RA in accordance with the accepted/approved RD/RA WP, APP and CSS. QC data submitted meets requirements described in the most recent geophysics and chemistry DIDs.

- No more than 3-4 CARs/948s for non-critical violations and/or 1 CAR/948 for critical violation. No unresolved corrective action requests.
- All final data and QC tests/documentation submitted. Government QA acceptance of QC tests/documentation gained.

- No Class “A” Safety, contractor at fault, violations during execution of work, <1 non-explosive related Class D, accidents, or <2 non-explosive Class C accidents IAW AR 385-40.
- Major safety violations, no more than 1 non-explosive related safety violation.
- Minor safety violations, no more than 2 safety violations.
- Zero letters of reprimand, grievances, or formal complaints.

Measurement / Monitoring: Periodic inspection/review of field work. Verify compliance with accepted RD/RA WP, CSS, and UFP-QAPP . Quality control tests/documentation submitted per the QASP for government review. Boundary precision will be determined by evaluation of the sampling footprint as it relates to the reported contaminated/uncontaminated areas in question. Anomaly density profile and other remediation cost driver precision will be verified by QA of methods used.

Task specific Incentives/Disincentives: Satisfactory or greater CPARS rating/poor CPARS rating and/or re-performance of work at contractor’s expense.

Specific Task Requirements:
- Restore all areas to the condition as agreed to by all parties in the approved work plan; all access/excavation holes shall be backfilled.
- Maintain a detailed accounting of all CWM, industrial chemical containers/items, UXO, DMM, MD and CWM-related debris encountered per DID WERS-004.01. This accounting shall include as a minimum: amounts of UXO, DMM and MD; nomenclature; location and depth of CWM, industrial chemicals, UXO/DMM; location of MD; and final disposition. The accounting system shall also account for all hazardous waste disposed off site. Digital photographs of CWM, industrial containers/items, UXO and DMM and examples of MD found during the response action are to be taken.
- All CWM, industrial chemicals, hazardous waste, UXO, DMM and MC encountered during this munitions response shall be processed in accordance with the approved work and safety plans.

- Hazardous Waste (HW) Disposal: The Contractor shall collect, secure, store, and arrange for disposal of chemical agent contaminated media, hazardous waste, and decontamination wastes, etc. generated as a result of field activities. The HW containers shall be staged, secured, labeled, sampled and analyzed (if required) IAW the approved work plan. The Contractor shall recommend appropriate disposal actions for all waste items. The Contractor shall perform the HW disposal in a timely manner.

- Medical Support: The Contractor shall provide a Department of Transportation (DOT) approved ambulance ready to transport decontaminated casualties to the contract hospital during prescribed work hours for the duration of the intrusive response action at intrusive sites. The ambulance shall be staffed by two state or National Registry of Emergency Medical Technician (NREMT), certified in advanced life support measures (paramedics). All paramedics that provide on-site support at intrusive sites shall have completed the Non-stockpile Chemical Medical Training specific to this site within the last year. This course is special medical training in chemical warfare agent casualty care, which is tailored to include instruction in all of the agents of concern at the intrusive site. This course shall be conducted annually, as necessary. Paramedics shall evaluate and treat any casualty received at the decontamination line and they shall be responsible for transporting the casualty to the contract hospital. The paramedics shall also assist with the heat stress program and shall keep a medical health data sheet on each employee. The paramedic/ambulance provider shall be responsible for obtaining the necessary waivers for carrying and administering the necessary antidotes to the casualties. The ambulance shall be equipped with supplies that are normally found on an ambulance, emergency medical equipment and supplies necessary to treat the agents of concern at the intrusive site and appropriate protocols. The ambulance and paramedics shall be onsite during all intrusive activities and will be required to participate in the site-specific training, the table-top exercise and the pre-operational surveys prior to the start of intrusive operations. If a change is made to the work hours of the removal team, the contract with the ambulance service will need to be changed to provide the same work hours as the field team. Information required by DA PAM 50-6 must be included in the contract with the ambulance service. The Contractor shall submit the subcontract with the ambulance service for review by the government. An example of a scope of work for ambulance and paramedic services can be obtained from the USAESCH safety office. The Contractor shall provide the paramedics with a list of chemicals suspected to be onsite to which the workers could be exposed, along with a description of the potential health effects. USAESCH shall provide instructors to the Contractor to train the ambulance personnel in chemical agent casualty care.

- **Hospital Support:** The US Army Corps of Engineer, Baltimore District shall provide hospital medical service for the duration of the intrusive fieldwork and assessment as required. The hospital shall provide treatment of all workers that are associated with the project. Workers include all U.S. Government personnel and contract employees. The hospital shall have available, during the hours of removal operations and assessment, an adequate medical staff that has been trained in Chemical Agent casualty care. The hospital and its staff shall provide required medical care after receiving decontaminated Chemical Agent casualties at the hospital. The hospital shall have available any medical supplies necessary to treat chemical casualties from the project. A hospital representative shall be invited to participate in the tabletop exercise that will be conducted prior the start of intrusive work.

- **Pre-Operational Surveys and Exercise:** The Contractor shall prepare for, coordinate, support as necessary, and participate, as required, in the pre-operational survey and exercises consisting of: (1) Huntsville Survey, (2) the Table-Top Exercise (3) DA Pre-op.
- **Chemical Warfare Materiel (CWM) and Chemical Agent Contaminated Media (CACM) Accountability:** The Contractor shall maintain a detailed accounting of all CWM and CACM encountered. This accounting shall include the amounts of CWM or CACM, the identification and condition, depth located, disposition and location. This accounting shall be a part of an appendix to the Final Report.
- **Disposal of CACM:** All CACM shall be handled in accordance with DoD, DA and USACE regulations.
- **Engineering Controls:** The contractor shall provide engineering controls as needed to protect the public to have minimal disruption to the Public from site operations.
- **Construction Support:** The Contractor is required to provide all necessary construction support to accomplish the objective of this PWS, to include but not limited to driveway permits, construction permits, access road construction, temporary signage, fencing, traffic control, Federal Property equipment laydown areas, gravel pads, and borrow material location. It should be noted that the contractor shall be responsible to obtain all permits required to perform work in Washington DC and in the execution of this contract.

3.3.2 **Environmental Sampling & Analysis:** The contractor shall collect and analyze field, waste disposal characterization, confirmatory samples, and other samples (such as wipe, dust monitoring) and compare to criteria in accordance with the RD/RA WP, CSS, SAP and UFP-QAPP.

Performance Standard: Perform field activities in accordance with the Work Plan and UFP-QAPP. MC analyses shall be performed in accordance with the requirements of the Department of Defense (DoD) Quality Assurance Manual (QAM), WERS-009.01 Munitions Constituents Chemical Data Quality Deliverables, and the approved project specific UFP-QAPP.

AC: Sampling field work and data meets established criteria within the accepted Uniform Federal UFP-QAPP, SAP, and Work Plan.

3.4 Task 4, Remedial Action Closeout Report (RACR): This task is a Firm Fixed Price task
Objective: Prepare, submit and gain acceptance of a RACR report in accordance with DID WERS-013.01.

Performance Standard: The RACR report shall document the results of the RA and be in accordance with DID WERS-013.01.

AC: Acceptance of RACR report with two revisions.

Measurement / Monitoring: Review of RACR report against guidance to verify that the minimum acceptable content has been provided.

Task specific Incentives/Disincentives: Satisfactory or greater CPARS rating/poor CPARS rating and/or re-performance of work at contractor's expense.

Specific Task Requirements:
- Incorporate all RA data and applicable data from previous investigations, historical documents, PA/SI into this RA.
- Recommend changes in realignment of MRS dependent on RA results.
- Prepare, as an appendix to this report, a new or update Munitions Response Site Prioritization Protocol (MRSPP) for each MRS dependent upon RI findings using the MRSPP worksheets, http://www.lab-data.com/MRSPP/ **.**

3.5 Task 5, Community Relations Support: This task is a Cost Plus Fixed Fee task.

Objective: Successfully complete public meetings and support the Baltimore District (CENAB) with community relations. The contractor may also be required to provide technical input and support on the Public Involvement Plan and Public Protection Plan as requested.

Performance Standard: Contractor attends and participates in meetings. Meeting transcripts are accurate. Meeting materials are accepted by the government as required.

AC: Acceptance of meeting materials with two revisions. Meetings held are organized; and professional in nature. Personnel are thoroughly familiar with the project. Zero letters of reprimand, grievances, or formal complaints.

Measurement / Monitoring: Acceptance of required materials for meetings. Government will attend and evaluate contractor's attendance, participation and professional demeanor.

Task specific Incentives/Disincentives: Satisfactory or greater CPARS rating/poor CPARS rating.

Specific Task Requirements:
The Contractor shall provide technical input and support on the Public Involvement Plan and Public Protection Plan as requested to support the remedial action. The Contractor shall attend and participate in project meetings, Partnering meetings, and public meetings as requested. These meetings will be held in Washington DC or Baltimore, MD. Support shall include, but is not limited to: GIS presentations, preparation of presentations and posters, technical support, support of question and answer sessions during public meetings, supply printing services, cost of meeting location, and distribute any correspondence necessary to meet the objectives of this task. The USACE shall approve all correspondence, public notices and other material being presented to the public before use. These actions are independent of the field activities that involve interaction with the community.

Optional Task 6, Removal of 4825 Glenbrook Road Residence: This task is a Firm Fixed Price task.
Objective: Prepare Work Plan and conduct removal and disposition of the 4825 Glenbrook Road residence to include the home, foundations, slabs, all utilities (i.e.to include relocation and replacement), driveway, sidewalks, and landscaping adjacent to the house.
Performance Standard: Perform field activities using innovative technology while meeting the established criteria in tasks 3. Evaluation is supported by data and documented in a letter report that obtains Government QA acceptance with two revisions.

AC: Applicable field work and data meets established criteria within the accepted Uniform Federal UFP-QAPP, SAP, and Work Plan.

Measurement / Monitoring: Period inspection/review of field work, and data. Compliance with accepted RD/RA WP, UFP-QAPP and ESP. Quality control tests/documentation submitted per the QASP for government review.

Incentive/Disincentive: Satisfactory or greater CPARS rating/poor CPARS rating and/or re-performance of work at contractor's expense.

Specific Task Requirements: The contractor shall prepare an addendum to the RD/RA WP or separate RD/RA WP fully describing how the demolition activities shall be conducted with minimal disruption to the community to include equipment and personnel, schedule of activities, utility relocation and replacement, noise, traffic impacts, dust, disposition of debris and restoration of site to include seeding or sodding and final site elevation drawings. Once the RD/RA WP has been approved, then the site demolition activities may be initiated. This demolition may be conducted prior to any hazardous waste field operations at 4825 Glenbrook Road based upon the Contracting Officer's direction. The contractor should note certain demolition may be delayed due to contamination issues adjacent to foundations and slabs. The work plan would be discussed and agreed in the approved work plan addendum.

4.0 Submittals.

4.1 The Contractor shall deliver the specified number of copies shown in Table 4.2 of each report listed in Table 4-1 to the following addressees (addresses to be verified by Contractor):

US Army Engineering & Support Center, Huntsville
Attn: CEHNC-CT-E (Lydia Tadesse)
PO Box 1600
Huntsville, AL 35807-4301
4820 University Square
Huntsville, AL 35816-1822

US Army Engineering & Support Center, Huntsville
Attn: CEHNC-OE-CW (Sherri Anderson-Hudgins)
PO Box 1600
Huntsville, AL 35807-4301
4820 University Square
Huntsville, AL 35816-1822

Commander
U.S. Army of Corps of Engineers, Baltimore District
Attn: CENAB-EN-HN Brenda Barber/ Todd Beckwith

10 South Howard Street, Room 10040-G

P.O. Box 1715
Baltimore, MD 21201

Contractor to obtain and/or verify addresses.

4.2 Submittals and Due Dates.
The Contractor shall submit 1 copy of the entire submittal on a CD with each hard copy of a submittal (Reports, Plans, etc) in accordance with DID WERS-007, latest version. Hardcopies shall be printed on both sides of the paper whenever possible.

Table 4-1 List of Submittals

Submittal	**Due Date (Calendar Days)**
Meeting minutes for Kickoff phone conference	7 days after Kickoff phone conference
Proposed Schedule	7 days after kickoff conference call
Chemical Safety Submission	Separate MACOM approval before intentional physical contact with MEC on Site
Draft Work Plan w/ GIS on CD/DVD	30 days after award
Draft Final Work Plan	14 days after receipt of comments
Final Work Plan	14 days after receipt of comments
Draft RACR Report	TBD
Draft Final RACR Report	14 days after receipt of comments
Final RACR Report	14 days after receipt of comments
Quality Control Documents	**As required by Regulation, guidance, DIDs, QCP, QASP, or agreed to in project schedule, to include the following:**
Daily QC Report for Field Work	Daily during Site Activities
Environmental Sampling Analytical Data	Once Data is evaluated

Submittal for QA Evaluation	
Laboratory Data Submittal	Once Data is evaluated
Final Reports (On CD/DVD)	Upon completion of Project or as requested
Final GIS Files on CD	Upon completion of Project or as requested

4.3 Submittal Quantities

Provide the number of submittals shown in Table 4-2 to the addressees given in Section 4.2. No draft documents shall be released to the regulatory community until reviewed by the government.

Table 4-2 Submittal Guidance

	Draft Documents	Draft Final/Final Documents
KO/COR	1 each	1 each
USAESCH	4	4
Baltimore District	6	6
Others	0	10

4.4 Period of Performance: The Completion Date for this Task Order is 31 December 2014.

5.0 Milestone Payments for firm fixed price tasks: Milestones will be considered met or completed when the required QC documentation has been submitted, QA completed and the submittal and/or product is accepted. Any payment vouchers submitted that do not coincide with the final accepted milestones or do not have the appropriate QC documentation will be rejected. All payments will be made utilizing an agreed upon Payment Milestone Schedule. The Contractor shall provide suggested milestones for payment. Milestones for payment shall be shown on the project schedule.

5.1 The following is a list of potential milestones for payment:
- Final Submittals: upon government acceptance, for example: Final RD/RA WP
- Field Work: for defined units and activities completed and QA review and acceptance, for example: Final QC density data package.
- Meetings: after completion of meetings with government acceptance of meeting minutes, for example: Kick-off meeting minutes.

6.0 REFERENCES:

6.1 Refer to “Base Contract.”

6.2 Data Items Descriptions located at:
http://www.hnd.usace.army.mil/engr/WERS.aspx.
The latest version is applicable for this Task Order.

7.0 GENERAL CONDITIONS: See the Base Contract Section C, Section 10 General Conditions and the following addendums:

7.1 This is a performance based task order. The inclusion of unit prices in the proposal shall in no way be construed to mean that the Government is procuring a specified number of units of any given service.

7.2 Government acceptance of the proposed technical approach and/or price does not relieve the Contractor from full responsibility for the viability, productivity, and efficiency of the approach used to meet the performance requirements of the PWS at the price proposed. The task order is for the provision of services that ultimately meet the performance requirements of this task. If the contractor must adjust its technical approach or perform more field work than anticipated in order to achieve the proposed performance goal then the contractor will do so with no change in task order price.

7.3 If the Government at its sole discretion chooses to modify the performance standard the parties to this task order will assess the impact on the estimated amount of field work required to achieve the new performance standards and will negotiate a price adjustment based upon the unit prices providing as price proposal supporting documentation (See Attachment B).

7.4 The Contractor attests that it applied due diligence in the research and development of its proposal has priced reasonable estimates of the site conditions and the associated risks into the price. The Contractor accepts full and sole responsibility for identifying and considering all factors that may affect the cost to execute the work. The act of signing this task order signifies that the Contractor has been given ample opportunity to assess the conditions under which the work will be performed and the Contractor either fully understands those conditions or has factored the risk into the price.

7.5 The Government provided the Contractor with historical documents and documents from previous site activities. The Contractor attests it interpreted the data utilizing an experienced understanding of how the data of this type is collected, analyzed, interpreted, and presented.

8.0 ARMY CONTRACTOR MANPOWER REPORTING

8.1 Implementation.

8.1.1 The Office of the Assistant Secretary of the Army (Manpower & Reserve Affairs) operates and maintains a secure Army data collection site where the contractor will report contractor manpower information (including subcontractor manpower information) required for performance of this contract. The contractor shall submit all the information required in the format specified at the following web address: **https://cmra.army.mil/default.aspx**

8.1.2 The Contractors shall fill in the required information on the website, fields are shown below:

- Contract Number
- Delivery Order Number (if applicable)
- Task Order Number (if applicable)
- Requiring Activity Unit Identification Code (UIC)
- Command
- Contractor Contact Information
- Federal Service Code (FSC)
- Direct Labor Hours
- Direct Labor Dollars
- Location Information (where contractor and subcontractors (if applicable) performed the services

8.1.3 Reporting period will be the period of performance not to exceed 12 months ending September 30 of each government fiscal year and must be reported by 15 October of each calendar year.

8.1.4 If your particular contract crosses fiscal years, 2 entries must be made to capture the data for the contract period; for example if the contract start date is 1 January 2007 and ends 31 December 2007, the data for the period from 1 January 2007 through 30 September 2007 shall be entered not later than 15 October 2007 and the period 1 October 2007 through 31 December 2007 shall be entered not later than 15 January 2008.

Attachment A

PERFORMANCE METRICS

A.1 Performance Metrics for Performance Assessment Record (PAR)

	Exceptional	**Very Good**	**Satisfactory**	**Marginal**	**Unsatisfactory**
PAR Category: Quality of Product or Service					
Performance indicator: Document reviews					
Draft Plans, Reports, and documents [Plans, documents and reports are considered draft until accepted as final by the Government]	All contract-milestone documents accepted as submitted	No substantive comments (i.e. limited to grammar, spelling, terminology) to any of the documents, but a few exceptions were noted and corrected	Contractor met Acceptance Criteria	One or more documents required revisions to be resubmitted for approval prior to proceeding. Two backchecks were required on one or more documents before original comments were resolved satisfactorily.	One or more documents did not comply with contract requirements, or one or more documents required more than two backchecks before original comments were resolved satisfactorily, or more than one document was rejected.
Performance indicator: Project Execution					
Process Compliance	Zero Corrective Action Requests (CAR) or 948s	1-2 CARs/948s for non-critical violations and no CARs/948 for critical violations	2-3 CARs/948s for non-critical violations and no CARs/948 for critical violations	4-5 CARs/948s for non-critical violations and/or 1 CARs/948 for critical violations	>5 CARS for non-critical violations and/or 2 or more CARs/948s for critical violations
Project Execution	Zero letters of reprimand, grievances, or formal complaints AND 2 or more unsolicited letters of commendation	Zero letters of reprimand, grievances, or formal complaints AND one unsolicited letters of commendation	Contractor met Acceptance Criteria	1 letter of reprimand, grievance or formal complaint that was resolved through negotiation	More than one letter of reprimand, grievance or formal complaint that were resolved through negotiation
Task Completion	Contractor completed all tasks within scope of effort	Contractor completed all major tasks within scope of effort with minor corrections to scope of effort	Contractor met Acceptance Criteria	Contractor completed most tasks within scope of effort	Contractor did not complete all tasks or final data and QC documentation submitted but not accepted
PAR Category: Schedule					
Performance indicator: Timely completion of tasks					
Final Plans and	All document	Project closed	Project closed	Project closed	Project closed

	Exceptional	**Very Good**	**Satisfactory**	**Marginal**	**Unsatisfactory**
Reports, project milestones, T.O. invoices	submittals and task order milestones and invoices complete and accepted by T.O date, project closed out/final invoice approved ahead of schedule	out/final invoice accepted ahead of schedule	out/final invoice accepted on T.O. date	out/final invoice accepted within 30 calendar days after T.O. date.	out/final invoice accepted more than 30 calendar days after T.O. date.
Project status reports accurate			Yes		No
Performance indicator: Impacts to schedule					
Impacts caused by Contractor or other causes identified, in writing to HNC CO/ PM, in a timely manner to apply acceptable corrective actions.			Yes		No
PAR Category: Cost Control (Not Applicable for Firm Fixed Price)					
Performance indicator: No unauthorized cost overruns					
Unauthorized cost overruns			No		Yes
Total Project Costs	Total contract invoices less than 98% of T.O. authorized amount	Total contract invoices greater than 98% but less than 99.99%of T.O. authorized amount	Total contract invoices between 99.99% and 100% of T.O. authorized amount	Total contract invoices greater than 100% but less than 105% of T.O. authorized amount	Total contract invoices greater than or equal to 105% of T.O. authorized amount
Performance indicator: Monthly cost report					
Monthly cost reports accurate			Yes		No
Performance indicator: Impacts to cost					
Impacts caused by Contractor or other causes identified, in writing to HNC CO/PM, in a timely manner to apply acceptable corrective actions.			Yes		No
PAR Category: Business Relations					
Performance indicator: Met contractual obligations					
Corrective Actions taken were timely and effective (Refer to CARs issued to			Yes		No

	Exceptional	**Very Good**	**Satisfactory**	**Marginal**	**Unsatisfactory**
Contractor)					
Performance indicator: Professional and Ethical Conduct					
Meetings and correspondences with Public, project delivery team and other stakeholders	Zero letters of reprimand, grievances, or formal complaints AND one or more unsolicited letters of commendation		Contractor met Acceptance Criteria	One letter of reprimand, grievance or formal complaint that was resolved through negotiation	More than one letter of reprimand, grievance or formal complaint that were resolved through negotiation OR removal of one or more project personnel as a results of a letter of reprimand, grievance or formal complaint.
Performance indicator: Customer has overall satisfaction with work performed					
Customer survey results for rating period	4.0-5.0	3.0-3.9	2.0-2.9	1.0-1.9	<1.0
Performance indicator: Personnel responsive and cooperative					
Key personnel responsive, and cooperative	Always		Most Times		Almost Never
PAR Category: Management of Key Personnel and Resources					
Performance indicator: Personnel knowledgeable and effective in their areas of responsibility					
Personnel assigned to tasks	All key personnel proposed by Contractor were assigned to project, some personnel were substituted by higher qualified individuals.	All key personnel proposed by Contractor were assigned to project, some personnel were substituted by equally qualified individuals.	Most key personnel proposed by Contractor were assigned to project, some personnel were substituted by equally qualified individuals.	Most key personnel proposed by Contractor were assigned to project, some personnel were substituted by equally qualified individuals, Letter of reprimand received for personnel conduct from HNC.	Some personnel proposed by Contractor were assigned to project, some personnel were substituted by lesser qualified individuals or HNC requested, in writing, removal of assigned personnel for poor performance.
Performance indicator: Personnel able to manage resources efficiently					
Instances when resource management had negative impact on project execution	0	1-2	3-4	5-6	>6

	Exceptional	**Very Good**	**Satisfactory**	**Marginal**	**Unsatisfactory**
PAR Category: Safety					
Performance indicator: Accidents and Violations					
*No Class A Accidents, Contractor at fault	No class A accidents IAW AR 385-10	No class A accidents IAW AR 385-10	Contractor met Acceptance Criteria	Less than 2 non-explosive related Class C accidents, or one non-explosive Class B accident, IAW AR 385-10	Any Class A accident IAW AR-385-10, or Any explosive related accident.
*Major safety violations	No accidents or injuries; No safety violations, and commendation letter for safety	No accidents or injuries, No safety violations	Contractor met Acceptance Criteria	Less than 2 non-explosive safety violations.	any violation of procedures for handling, storage, transportation, or use of explosives IAW the RD/RA WP, and all Federal, State and local laws/ordinances.
*Minor safety violations	No safety violations and commendation letter for safety	No safety violations	Contractor met Acceptance Criteria	1-2 minor safety violations	3 or more minor safety violations

Classes of Accidents:

- **Class A:** Fatality or permanent total disability (Government Civilian, Military Personnel, and/or Contractor), or >$2,000,000 property damage.

- **Class B:** Permanent partial disability or impatient hospitalization of 3 or more persons (Government Civilian, Military Personnel, and/or Contractor), $500,000< $2,000,000 property damage.

- **Class C:** Lost Workday (Contractor) or Lost Time (Government Civilians), $50,000< $500,000 property damage.

- **Class D:** $2000 < $50,000 property damage.

* From Section C of Solicitation Number W912DY-04-R-0003, Amendment 0001 (may be included but are not limited to these).

The following guidelines are provided for issuing ratings that are subjective in nature, these ratings will be supported by the weight of evidence documented during the government's surveillance efforts:

Exceptional: Performance *meets* contractual requirements and *exceeds many* to the Government's benefit. The contractual performance of the element or sub-element being assessed was accomplished with *few minor problems* for which corrective actions taken by the Contractor were *highly effective*.

Very Good: Performance *meets* contractual requirements and *exceeds some* to the Government's benefit. The contractual performance of the element or sub-element being assessed was accomplished with *some minor problems* for which corrective actions taken by the Contractor were *effective*.

Satisfactory: Performance *meets* contractual requirements. The contractual performance of the element or sub-element contains *some minor problems* for which corrective actions taken by the Contractor *appear or were satisfactory*.

Marginal: Performance *does not meet all* contractual requirements. The contractual performance of the element or sub-element being assessed reflects a *serious problem* for which the Contractor has *not yet identified corrective actions*. The Contractor's proposed actions appear only *marginally effective or were not fully implemented*.

Unsatisfactory: Performance *does not meet most* contractual requirements and *recovery is not likely* in a timely manner. The contractual performance of the element or sub-element contains *serious problems* for which the Contractor's corrective actions *appear or were ineffective*

Attachment B

Price Spreadsheet

Firm Fixed Price Lump Sum Prices offered and accepted are the sole basis of this contract. Unit Prices included herein have no bearing of the contract price and are proposed only to provide a basis for determining a fair and reasonable price if the Government in its sole discretion chooses to modify the performance requirements of this task order. This is a performance based contract and the inclusion of unit prices in the proposal shall in no way be construed as the Government is procuring a specified number of units of any given service. The contract is for the provision of services that ultimately meet the performance requirements of each task.

Spring Valley				
Task, Title, Type	Qty	Unit	Price	Total
1 RD/RA Work Plan, APP, and CSS, FFP	1.0	LS		
2, GIS, CPFF				
Additional GIS per month, FUP	1.0	EA		
3, Remedial Action Field Activities, CPFF	1.0	LS		
Mob/Demob, Intrusive Team, FUP	1.0	Ea		
Intrusive CWM Team – , per day, FUP	1.0	Ea		
Intrusive HTW Team, per day, FUP	1.0	Ea		
Disposal of Arsenic Contaminated Soil (FUP per CY)	1.0	Ea		
Disposal of agent contaminated soil at TSD incinerator (FUP /drum)	1.0	Ea		
Complete Spring Valley Analytical parameters (FUP per sample)	1.0	Ea		
Contractor can add relevant fixed unit pricing for review and acceptance by the Government.				
4, Remedial Action Closeout Report, FFP	1.0	LS		
5, Community Relations Support, CPFF	1.0	LS		
6, Option Residence Demotion, FFP	1.0	LS		
			Total	

ATTACHMENT A-1
PROBABILITY ASSESSMENT

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, U.S. ARMY CORPS OF ENGINEERS
P.O. BOX 1715
BALTIMORE, MD 21203-1715

REPLY TO
ATTENTION OF
CENAB-EN-H (200-2b)

15 JUN 2012

MEMORANDUM FOR Commander, U. S. Army Engineering and Support Center, P.O. Box 1600, Huntsville, Alabama 35807

SUBJECT: MEC/CWM Probability Assessment, Intrusive Remedial Action at 4825 Glenbrook Road, Spring Valley Formerly Used Defense Site, Washington, D.C.

1. Enclosed is the MEC/CWM probability assessment, dated 8 June 2012, for intrusive remedial action at 4825 Glenbrook Road within the SVFUDS.

2. The proposed remedy in the Proposed Plan for 4825 Glenbrook Road, dated September 30, 2011, was identified as Alternative 5: Remove the house and clean-up to residential standards providing for unrestricted future use of the site.

3. The Proposed Plan designates seven remedial action areas on the 4825 Glenbrook Road site (reference the attached figure). Three of the areas are indentified as high-probability areas, where it is more likely to encounter containerized CWM and agent-impacted soil while conducting the remedial action. These three areas are: the backyard patio area [Area D], the area under the house, including the basement and foundation walls [Area E], and the front yard [Area F]. A site-specific work plan will be prepared to perform this high-probability intrusive activity. Based on site characterization and previous removal activities, MEC is unlikely to be encountered at the site, but is possible.

4. The four remaining areas designated for remedial action are identified as low-probability areas, where it is not likely to encounter MEC or CWM while conducting the remedial action. These four areas are: the backyard area behind the retaining wall that includes Area A, the driveway area [Area B], the Burial Pit 3 area [Area C], and the front sidewalk area bordering Area F.

5. Based on the site-specific data and the conclusions presented in the probability assessment, I concur with the assigned probability of Seldom (Level D) for encountering MEC while conducting the proposed remedial action at the 4825 Glenbrook Road site in the three high-probability areas designated as: the backyard patio area [Area D], the area under the house, including the basement and foundation walls [Area E], and the front yard [Area F]. Intrusive activities in the three high-probability areas designated for remedial action, that are more likely to encounter CWM, but unlikely to encounter MEC, can be performed under low-probability assumptions as they relate to the probability of encountering MEC until such time that MEC is encountered.

6. Also, based on the site-specific data and the conclusions presented in the probability assessment, I concur with the assigned probability of Seldom (Level D) for encountering MEC/CWM while conducting the proposed remedial action at the 4825 Glenbrook Road site in the four low-probability areas designated as: the backyard area behind the retaining wall that includes Area A, the driveway area [Area B], the Burial Pit 3 area [Area C], and the front sidewalk area bordering Area F. Intrusive activities in the four low-probability areas designated for remedial action, that are not likely to encounter CWM or MEC, can be performed under low-probability assumptions until such time that MEC or CWM are encountered.

7. Personnel, trained and experienced in the clean-up of MEC/CWM contaminated sites, will conduct the proposed remedial action at the 4825 Glenbrook Road site. The procedures for high-probability and low-probability intrusive activities have been established by the Spring Valley Partners as described in the Site-Wide Work Plan for the SVFUDS, and will be further defined in the site-specific work plan for the 4825 Glenbrook Road remedial action. The Spring Valley Partners agree that the intrusive activities in the three high-probability areas are more likely to encounter CWM, but unlikely to encounter MEC. The Spring Valley Partners also agree that the intrusive activities in the four low-probability areas are not likely to encounter CWM or MEC.

8. In the unlikely event that a suspect MEC item is encountered while conducting the intrusive activities in the three high-probability areas that are more likely to encounter CWM, but unlikely to encounter MEC, the work will stop and the MEC contingency plan will be initiated. Following confirmation of a suspect MEC item, the work will resume only after a site-specific plan for addressing the MEC has been developed in accordance with the Site-Wide Work Plan for the SVFUDS.

9. Also, in the unlikely event that a suspect MEC/CWM item is encountered while conducting the intrusive activities in the four low-probability areas that are not likely to encounter CWM or MEC, the work will stop and the MEC/CWM contingency plan will be initiated. Following confirmation of a suspect MEC/CWM item, the work will resume only after a site-specific plan for addressing the MEC/CWM has been developed in accordance with the Site-Wide Work Plan for the SVFUD.

10. Questions or comments pertaining to this memorandum may be directed to the undersigned. Detailed information regarding the enclosed probability assessment may be obtained by contacting Ms. Brenda Barber, (410) 962-0030.

Encl

DAVID E. ANDERSON
COL, EN
Commanding

CENAB-EN-H
SUBJECT: MEC/CWM Probability Assessment, Intrusive Remedial Action at 4825 Glenbrook Road, Spring Valley Formerly Used Defense Site, Washington, D.C.

CF:
Commander, Technical Escort Unit, ATTN: Technical Director, Edgewood Chemical
Biological Center, SCBRD-ODC, Aberdeen P.G., MD 21010-5423
Non-Stockpile Chemical Materiel Program, ATTN: SFAE-CD-NM, Bldg. E4405,
Aberdeen P.G., MD 21010-5401
Commander, U.S. Army Corps of Engineers, ATTN: CESO (B. Roberts), 441 G Street, NW,
Washington, D.C. 20314

MEC/CWM PROBABILITY ASSESSMENT

Intrusive Remedial Action
at
4825 Glenbrook Road
Spring Valley Formerly Used Defense Site
Washington, D.C.
June 8, 2012

1.0 INTRODUCTION

1.1 The U.S. Army Corps of Engineers (USACE) plans to perform a remedial action involving the excavation of soil to undisturbed saprolite and off-site disposal at the 4825 Glenbrook Road property located in the Spring Valley Formerly Used Defense Site (SVFUDS). The proposed remedy in the Proposed Plan for 4825 Glenbrook Road, dated September 30, 2011, was identified as Alternative 5: Remove the house and clean-up to residential standards providing for unrestricted future use of the site.

1.1.1 The Proposed Plan designates seven remedial action areas on the 4825 Glenbrook Road site (reference the attached figure). Three of the areas are identified as high-probability areas, where it is more likely to encounter containerized Chemical Warfare Materiel (CWM) and agent-impacted soil while conducting the remedial action. These three areas are: the backyard patio area [Area D], the area under the house, including the basement and foundation walls [Area E], and the front yard [Area F]. Based on site characterization and previous removal activities, Munitions and Explosives of Concern (MEC) is unlikely to be encountered at the site, but is possible.

1.1.2 The four remaining areas designated for remedial action are identified as low-probability areas, where it is not likely to encounter MEC or CWM while conducting the remedial action. These four areas are: the backyard area behind the retaining wall that includes Area A, the driveway area [Area B], the Burial Pit 3 area [Area C], and the front sidewalk area bordering Area F.

1.2 A Probability Assessment determines the probability of encountering MEC/CWM during intrusive activities as required by the Interim Guidance for Chemical Warfare Materiel Responses. The probability of encountering MEC/CWM is ranked in accordance with DA PAM 385-30, Mishap Risk Management.

1.3 MEC is defined as specific categories of military munitions that may pose unique explosives safety risks. The term MEC includes unexploded ordnance (UXO), discarded military munitions (DMM), and munition constituents (e.g., TNT) present in high enough concentrations to pose an explosive hazard. CWM is defined as an item configured as a munition containing a chemical substance that is intended to kill, seriously injure, or incapacitate a person through its physiological effect. The term CWM includes chemical agents in other-than-munition configurations.

2.0 BACKGROUND

2.1 The SVFUDS is located in northwest Washington, D.C. The 4825 Glenbrook Road site, where intrusive activities are to be conducted, is located within an area that was formerly occupied by the American University Experiment Station (AUES) between 1917 and 1920. During World War I, the U.S. Government established the AUES to investigate the testing, production, and effects of noxious gases, antidotes, and protective masks. The AUES was located on the grounds of the present American University (AU) and used portions of adjoining properties to conduct the research and development of CWM, including mustard and lewisite agents; as well as adamsite, irritants, and smokes. Immediately after the war these activities were transferred to other locations, and the property was returned to the owners.

2.2 In 1992, houses were built on the 4825 and 4835 Glenbrook Road properties. During construction excavation (believed to be in the driveway at 4825 Glenbrook Road), a buried 55-gallon drum and obsolete laboratory equipment were encountered. The AU Office of Risk Management retained Environmental Management Systems (EMS) to investigate potentially hazardous conditions. EMS utilized soil gas vapor probes and exploratory hand excavations to determine that there were no hazardous or volatile substances, nor explosive ordnance present at the site. Within a month of the initial EMS investigation, the construction workers experienced eye and respiratory irritation from an unknown source. EMS returned to investigate a white substance in the soil. EMS reported that the physical properties and their laboratory analysis concluded that the suspect material was the herbicide, Silvex. The houses were completed without further documented incident.

2.3 In January 1993, a buried cache of munitions was discovered at a Point of Interest (POI 14) on 52nd Court. The cache contained 141 MEC items, including 43 suspect chemical rounds, and munitions debris (MD). Following the recovery, the USACE completed a remedial investigation (RI) of the SVFUDS in June 1995, and determined that no further action was required. During this investigation, geophysical surveys were conducted on 518 properties centered around identified POIs. As a result of these surveys, more than 1900 anomalies were identified. An Anomaly Review Board (ARB) considered all the data from these surveys, dismissing a number of anomalies that were clearly not MEC-related, while recommending investigation of those that had no explanation. Eight-hundred-and-forty (840) of over 1900 anomalies were intrusively investigated. Overall, three suspect MEC-items and 29 MD-items were recovered. None of these items were discovered at the 4825 Glenbrook Road site where intrusive activities are to be conducted.

2.4 In 1998, the USACE conducted a review of the RI and supplemented this review with further analysis of circa 1918 photos of the AUES. The results prompted additional geophysical investigations of the AUES grounds to locate potential MEC/CWM burial pits, intrusive investigations to characterize potential MEC/CWM burial pits, and environmental sampling at properties adjacent to the potential burial pits. These investigations led to the discovery of three burial pits containing MEC/CWM items believed to be a result of the AUES activities. These burial pits were located on two private properties adjacent to the current AU campus. Two-hundred and ninety-nine (299) MEC items and 19 CWM and CWM-contaminated items were recovered from the two burial pits on the 4801 Glenbrook Road property. The intrusive investigation of the third burial pit, on the property line of 4801 and 4825 Glenbrook Road, recovered a total of 24 CWM-related items and 508 MEC-related items.

2.5 Based on the interim results from the U.S. Environmental Protection Agency (USEPA) Region III sampling, historical information, and the USEPA Region III Draft Risk Assessment, it was determined that the soil of 4801, 4825, and 4835 Glenbrook Road may have been impacted by the AUES activities. To determine the nature and extent of the potential impacts, the USACE initiated a site investigation and used the data for an Engineering Evaluation/Cost Analysis (EE/CA) and Human Health Risk Assessment. The conclusion of this risk assessment was that there was unacceptable risk with regard to exposure to arsenic in the surface soils. This conclusion led to the decision to expand the study area to determine the extent of arsenic-impacted soils from the AUES activities in other areas throughout the SVFUDS.

2.6 During the expanded arsenic investigations, surface soil sampling was performed for each residence or commercial lot within pre-established work areas and where a sampling right-of-entry was received. On many of the residences or lots, subsurface soil borings were also conducted. This sampling was a soil screening performed in general accordance with the USEPA Soil Screening Guidance. Where possible, the soil borings were conducted in areas identified by the USEPA Environmental Photographic Interpretation Center (EPIC) as disturbed earth features based on their interpretation of historical aerial photographs. Low-level detections of thiodiglycol, a non-specific mustard agent breakdown product that can also originate from sources other than mustard agent, were found at concentrations well below health-risk criteria. However, no mustard, or lewisite agent-specific breakdown products were detected in the soil sampling. Arsenic concentrations above the soil screening level of 12.6 mg/kg (based on the 95th percentile of the surface sample background data set) were detected. Subsequently, grid sampling was performed on those properties exceeding the screening level in order to identify grids (typically 20-feet by 20-feet) for removal of soil containing arsenic at concentrations exceeding the removal action clean-up goal of 20 mg/kg. The arsenic clean-up goal of 20 mg/kg was developed jointly May 29, 2002, with the USEPA Region III and the District of Columbia Department of the Environment (DDOE).

3.0 SITE-SPECIFIC DATA

3.1 4825 Glenbrook Road

3.1.1 Burial Pit 3 was located on the 4825 Glenbrook Road site, at the property line with 4801 Glenbrook Road. A total of 18 CWM-related items and 406 MEC-related items had been recovered from Burial Pit 3 between May 2001 and March 2002, when activities were suspended. The intrusive investigation of Burial Pit 3 resumed in October 2007 and was completed in March 2009. Six additional CWM-related items and 102 MEC-related items were recovered in the clearance of the excavation. Burial Pit 3 and the two other burial pits on the 4801 Glenbrook Road property are in the approximate location of POI 24R – Probable Pit.

3.1.2 The 4825 Glenbrook Road property is also located in an area designated as Baker Valley (POI 53). Baker Valley is located near the western perimeter of the original grounds of

AUES on what was the southern slope of the hill where the Spaulding and Captain Rankin Areas shell pits were built.

3.1.3 The 1918, 1922, and 1927 aerial photographs exhibit ground scars on the 4825 Glenbrook Road property. No stressed vegetation is indicated on aerial photographs. Soil cut and fill information indicates that the site varies from 10 feet of cut, to 14 feet of fill, relative to the 1918 ground elevation.

3.1.4 In 1994, the USACE and USEPA collected thirteen split-soil samples when investigating Baker Valley (POI 53). One of the 13 samples was collected on the 4825 Glenbrook Road property. No mustard or lewisite agents, mustard breakdown products of thiodiglycol, dithiane, and oxathiane, or cyanide were detected in the sample collected by the USACE. The USEPA analyzed their sample for specific inorganics (metals), Volatile Organic Compounds (VOCs), Semi-Volatile Organic Compounds (SVOCs), and the pesticide, Arochlor. Except for arsenic, all results were non-detect, or below the USEPA Residential Risk Based Concentrations (RBCs). The arsenic concentration detected was 5.9 mg/kg.

3.1.5 Also in 1994, the USEPA collected seven surface soil samples from the 4825 Glenbrook Road property. The USEPA analyzed the samples for specific inorganics (metals), VOCs, SVOCs, and Arochlor. Except for arsenic, all results were non-detect, or below the RBCs. All seven samples exceeded the arsenic RBC of 0.43 mg/kg, with the highest concentration detected being 241 mg/kg.

3.1.6 In April 1999, as part of a larger investigation, the USACE assisted the USEPA perform X-Ray Fluorescence (XRF) arsenic screening of a soil sample collected from a boring on the 4825 Glenbrook Road property. The XRF screening identified the area in the soil column which had the highest arsenic signature. The soil sample was collected between 38 and 43-inches below the surface. The sample was analyzed for inorganics (metals), and except for arsenic, all the results were below the RBCs. The arsenic concentration detected was 5.3 mg/kg.

3.1.7 In June 1999, the USACE assisted the USEPA by collecting six surface soil samples and conducting three soil borings on the 4825 Glenbrook Road property. Each soil boring was sampled at the surface and the depths of 3 to 4-feet, 6 to 7-feet, and 9 to 10-feet. The samples were analyzed for inorganics (metals), VOCs, SVOCs, pesticides, polychlorinated biphenyls (PCBs), and the mustard breakdown products of thiodiglycol, dithiane, and oxathiane. Except for arsenic, all results in the samples analyzed were non-detect, or below the RBCs. All of the surface and subsurface soil samples exceeded the arsenic RBC, except for four subsurface samples where arsenic was not detected. The highest arsenic concentration detected was 50.4 mg/kg in a surface sample.

3.1.8 Based on the soil sampling, the 4825 Glenbrook Road property was designated for subsequent grid sampling. In September 2000, grid sampling was performed to determine the extent and delineation of arsenic-impacted soil. The grid sampling identified eighteen grids that exceeded the site-specific arsenic clean-up criteria of 16.8 mg/kg.

3.1.9 In January 2001, six subsurface arsenic samples were collected in the driveway of the 4825 Glenbrook Road property. Each soil boring was sampled at the depth of 2 feet. Four samples exceeded the arsenic remediation goal of 16.8 mg/kg, with the highest concentration detected being 520 mg/kg. Based on these elevated boring results and subsequent trenching investigations in the driveway, much of the soil under the driveway was designated for removal.

3.1.10 Between December 2000, and March 2001, a Non-Time Critical Removal Action (NTCRA) consisting of the excavation and off-site disposal of arsenic-impacted soil was conducted on the 4825 Glenbrook Road property under a Remedial Action Design dated November 1, 2000. Factoring in the previous arsenic soil sampling results from USEPA, and lateral sidewall extensions, twenty-five grids (mostly 20-feet by 20-feet) were excavated a minimum of 2 feet in depth. Seven grids exceeded the site-specific floor confirmation remediation endpoint of 41.4 mg/kg, and required additional excavation of another two feet (4 feet total depth). Various types of glassware were encountered during grid excavation activities. Also, one unfuzed, unfired 75-mm projectile, identified as a MD item, was recovered next to a manhole in the southeast corner of the site during the arsenic soil removal.

3.1.11 In May 2001, due to inconclusive results from a geophysical survey completed in February 1999, and the elevated arsenic concentrations in the soil, a test pit investigation was begun in the backyard of the 4825 Glenbrook Road property. Twenty-three (23) test pits and two trenches were excavated in accordance with the Test Pit Investigation Work Plan (Addendum 10 to the Site Safety Submission).

3.1.12 Test Pits 1 through 22, each measuring 3 feet by 6 feet, were excavated on the 4825 Glenbrook Road property under an engineering control structure (tent structure with agent filtration) to a depth of approximately 6 feet below the historic 1918 ground surface, or the maximum depth achievable by the excavation equipment of 12 feet. The pit spacing was 14.9 feet, providing a 95% statistical confidence level of finding a burial pit with dimensions of 10 feet wide by 20 feet long.

3.1.12.1 Trench 01 was excavated along the property line between the 4825 and 4801 Glenbrook Road properties. Trench 01 measured approximately 150 feet in length.

3.1.12.2 Trench 02 was excavated on the upper portion of the 4825 Glenbrook Road driveway to investigate the source of the arsenic concentrations exhibited in some of the driveway soil boring samples. Trench 02 measured approximately 40 feet in length. A drainage pipe was encountered at a depth of five feet. Trench 02 was temporarily backfilled with the excavated soil for later removal and disposal under a subsequent NTCRA.

3.1.12.3 There were no significant findings in these 22 test pits and two trenches excavated on the 4825 Glenbrook Road property.

3.1.13 The Test Pit 23 investigation produced significant findings until work was suspended in March 2002. A Vapor Containment Structure with agent filtration was used as the Engineering Control Structure during the excavation after a MEC item was discovered. Eighteen

CWM-related items and 406 MEC-related items were recovered from Test Pit 23 on the property line between the 4825 and 4801 Glenbrook Road properties.

3.1.14 A soil gas investigation was conducted on the 4825 Glenbrook Road property in March and April 2007 to determine whether off-gassing of contaminants from the contents of Test Pit 23 was occurring, and to evaluate an area of the driveway where construction workers were reportedly impacted by the contents of broken glassware in 1992. Two types of samples were collected for this investigation: active soil gas sampling using a summa canister, and passive soil gas sampling using Gore Sorber modules.

3.1.14.1 The results of the investigation showed no significant concentrations of chemicals migrating up through the soil column from the contents of the Test Pit 23 area.

3.1.14.2 However, one co-located summa canister and Gore Sorber module that was placed in the driveway showed detections of two mustard agent breakdown products (ABPs) by the Gore Sorber. Due to the semi-quantitative nature of these soil gas sampling results, six additional soil samples were collected in this location in June 2007. The soil samples did not confirm the ABPs detections in the driveway.

3.1.15 The intrusive investigation of Burial Pit 3, formerly called Test Pit 23, resumed in October 2007. After several extensions of the engineering control structure, the excavation of Burial Pit 3 was completed in March 2009, and ultimately measured approximately 32 feet by 17 feet by 14 feet in depth. Six additional CWM-related items and 102 MEC-related items were recovered in the excavation and clearance of Burial Pit 3.

3.1.16 A follow-on open air, low-probability test pit investigation for the remainder of the property began on 24 March 2009 after the completion of the Burial Pit 3 investigation. Thirty-nine (39) test pits (TP 95-133) were completed by 17 July 2009, with the exception of TP 120, where mustard, lewisite, and ABPs were detected in the soil.

3.1.17 The investigation of twelve additional test pits (TP 134-145) began on 31 July 2009 and continued until 4 August 2009 when mustard agent and ABPs were detected in a glassware container recovered from TP 138. Three of the 12 test pits were completed prior to the discovery at TP 138. Because agent and ABPs were known to be present in TPs 120 and 138, it was decided to investigate these two test pits under high-probability protocols using an Engineering Control Structure with agent filtration. TP 134 was added to the high-probability investigation based on its close proximity to TP 120.

3.1.18 The high-probability test pit investigation began in November 2009 at TP 138 with the delineation and removal of agent and ABP contaminated soil. No munitions-related items were uncovered from the TP-138 intrusive investigation.

3.1.19 Work moved to TPs 120 and 134 where it continued until March 2010 when several glass containers were recovered from the area. The liquid inside the containers began emitting white smoke and work was halted. Laboratory analysis showed that the liquid was arsenic trichloride. Since this chemical was not addressed in the current work plan, the high-probability test pit investigation was suspended while a thorough review was conducted to ensure that the worker personal protection equipment was adequate and that the chemical agent filtration system would provide proper protection for the public. One unfuzed MEC item with unconfirmed presence of energetics, 35 CWM-related items, and four MD items were recovered during the excavation.

3.1.20 In August 2010, 27 soil characterization samples were collected to confirm the presence or absence of agent/ABPs at 15 locations in the backyard of the 4825 Glenbrook Road property. Lewisite was detected in two samples collected at the depth of 3-feet near the back porch.

3.1.21 Also in August 2010, six geotechnical borings were advanced through the basement floor slab at the 4825 Glenbrook Road property. Saprolite was encountered at depths between 8-inches and 14-inches in all borings. Seven soil samples, including one duplicate, did not detect any agent or ABPs. The soil beneath the house appeared to be native soil. Neither suspected AUES-related debris nor cultural debris was encountered during the investigation.

3.1.22 During the sewer line restoration in January 2011 at the 4825 Glenbrook Road property, one MD item and a glass flask containing a small quantity of brown solids were recovered in the southern portion of the backyard patio area. Both the MD item and AUES-related glassware cleared headspace screening; however, follow-on low level analysis of the flask contents tested positive for Lewisite.

4.0 DESCRIPTION OF AREAS PROPOSED FOR REMEDIAL ACTION UNDER LOW-PROBABILITY PROTOCOLS

4.1 Backyard Area Behind the Retaining Wall

4.1.1 The backyard area behind the retaining wall includes the Area A as designated in the Proposed Plan and extends east to the rear of the site. The remedial action to be conducted under low-probability protocols involves soil removal of Area A to undisturbed saprolite, the investigation of the test pits remaining in the area, the excavation of utility corridors to an approximate depth of ten feet, and removal of the portion of the backyard retaining wall bordering Area A.

4.1.2 The NTCRA excavated arsenic-impacted soil in the backyard area from seven grids to a depth of two feet and five grids to a depth of four feet. Various types of glassware were encountered during grid excavation activities; however, because accurate field logs were not kept specific information regarding the types and locations of the encountered glassware is unavailable. Also, one unfuzed, unfired 75-mm projectile, identified as a MD item, was recovered next to a manhole in Area A during the arsenic soil removal.

4.1.3 Twenty-one (21) test pits were excavated in the backyard area to a depth of approximately six feet below the historic 1918 ground surface. There were no significant findings in the test pits.

4.2 **Driveway Area**

4.2.1 The driveway area is designated as Area B in the Proposed Plan. The area is located on the north side of the house. The remedial action to be conducted under low- probability protocols involves the soil removal of Area B to undisturbed saprolite, excavation of arsenic-impacted soil exceeding the clean-up goal of 20 mg/kg north of TP 109 near where the retaining wall curves, and removal of the retaining walls bordering Area B.

4.2.2 Ten test pits were excavated in the driveway area to a depth of one foot into saprolite. There were no significant findings in the test pits.

4.2.3 Subsequent to the test pit investigation, eight arsenic-impacted grids in the driveway area were excavated to various depths ranging from two to six feet. No AUES-related findings were reported.

4.3 **Burial Pit 3 Area**

4.3.1 The Burial Pit 3 area is designated as Area C in the Proposed Plan. The area is located on the south side of the house. Intrusive investigation of Burial Pit 3 was completed in March 2009. Excavation to undisturbed saprolite in the Burial Pit 3 area ranged from 1-foot to 14-feet in depth. No further action is planned for this area; however, incidental intrusive activities, such as utility line relocation or property line stabilization, may be performed under low-probability protocols in Area C.

4.4 **Front Sidewalk Area**

4.4.1 The front sidewalk area is located between Glenbrook Road and the retaining wall at the western edge of Area F as designated in the Proposed Plan. The remedial action to be conducted under low-probability protocols involves the excavation of soil to undisturbed saprolite in the front sidewalk area. The bordering retaining wall will be removed under high-probability protocols for Area F.

4.4.2 Four test pits were excavated in the front sidewalk area to a depth of one foot into saprolite. There were no significant findings in the test pits.

5.0 DESCRIPTION OF AREAS PROPOSED FOR REMEDIAL ACTION UNDER HIGH-PROBABILITY PROTOCOLS

5.1 **Backyard Patio Area**

5.1.1 The backyard patio area is designated as Area D in the Proposed Plan. The patio area is located on the east side of the house. The remedial action to be conducted under high-probability protocols involves the investigation of two test pits remaining in the area, and soil removal of Area D to undisturbed saprolite.

5.1.2 The NTCRA excavated arsenic-impacted soil in the backyard patio area from two grids to a depth of two feet and another two grids to a depth of four feet. Various types of glassware were encountered during grid excavation activities; however, because accurate field logs were not kept specific information regarding the types and locations of the encountered glassware is unavailable. No munitions-related items were discovered in the backyard patio area during the NTCRA.

5.1.3 Twelve test pits were excavated in the backyard patio area to a depth of one foot into saprolite. There were no significant findings in eleven of the test pits. Mustard agent and ABPs were detected in a glassware container recovered from the remaining test pit at TP-138. A high-probability test pit investigation, using an Engineering Control Structure with agent filtration at TP-138, delineated and removed agent and ABP-contaminated soil. No munitions-related items were discovered during the TP-138 intrusive investigation.

5.1.4 Lewisite was detected in two soil characterization samples collected at the depth of 3-feet near the back porch in the backyard patio area.

5.1.5 A glass flask containing Lewisite and one MD item were recovered in the southern portion of the backyard patio area during the sewer line restoration.

5.2 Area under the House

5.2.1 The area under the basement and foundation walls of the house is designated as Area E in the Proposed Plan. The remedial action to be conducted under high-probability protocols involves the investigation of two test pits remaining adjacent to the south foundation walls, and soil removal of Area E to undisturbed saprolite.

5.2.2 Four test pits were excavated adjacent to the north foundation walls of the house to a depth of one foot into saprolite. There were no significant findings in the test pits.

5.2.3 Subsequent to the test pit investigation, four arsenic-impacted grids adjacent to the north foundation walls of the house were excavated to a depth of three feet. No AUES-related findings were reported.

5.2.4 Six geotechnical borings were advanced through the basement floor slab. Saprolite was encountered at depths between 8-inches and 14-inches in all borings. Seven soil samples, including one duplicate, did not detect any agent or ABPs. The soil beneath the house appeared to be native soil. Neither suspected AUES-related debris nor cultural debris was encountered during the investigation.

5.3 Front Yard

5.3.1 The front yard is designated as Area F in the Proposed Plan. The front yard is located on the west side of the house, and extends west to the retaining wall, or the eastern edge of the front sidewalk area. The remedial action to be conducted under high-probability protocols involves the completion of the investigation of two test pits, and soil removal of Area F to undisturbed saprolite.

5.3.2 The NTCRA excavated arsenic-impacted soil in the front yard from five grids to a depth of two feet and one grid to a depth of four feet. Various types of glassware were encountered during grid excavation activities; however, because accurate field logs were not kept specific information regarding the types and locations of the encountered glassware is unavailable. No munitions-related items were discovered in the front yard during the NTCRA.

5.3.3 Ten test pits were excavated in the front yard to a depth of one foot into saprolite. There were no significant findings in eight of the test pits. Mustard, lewisite, and ABPs were detected in the soil at TP-120, near TP-134. A high-probability test pit investigation, using an Engineering Control Structure with agent filtration at TPs 120 and 134, continued until March 2010 when several glass containers were recovered from the area. The liquid inside the containers began emitting white smoke and work was halted. Laboratory analysis showed that the liquid was arsenic trichloride. Since this chemical was not addressed in the current work plan, the high-probability test pit investigation was put on-hold while a thorough review was conducted to ensure that the worker personal protection equipment was adequate and that the chemical agent filtration system would provide proper protection for the public. One unfuzed MEC item with unconfirmed presence of energetics, 35 CWM-related items, and four MD items were recovered during the excavation.

6.0 CONCLUSIONS

6.1 The Spring Valley Partners have conducted an extensive review of the information available for the 4825 Glenbrook Road site. The information reviewed included historical evidence, archive searches, historical aerial photographs, ground scar data, soil cut and fill figures, soil sampling results, and geophysical investigation reports.

6.2 A substantial amount of investigation and clean-up have been conducted at the 4825 Glenbrook Road property between 1993 and the present. The previously completed activities included multiple soil sampling events, a NTCRA for arsenic-impacted soil, and test pit investigations which resulted in the discovery of a munitions burial pit, as well as scattered MEC/CWM-related items and agent/ABP impacted soil on the site.

6.3 The proposed remedy in the Proposed Plan for 4825 Glenbrook Road, dated September 30, 2011, was identified as Alternative 5: Remove the house and clean-up to residential standards providing for unrestricted future use of the site.

6.4 The Proposed Plan designates seven remedial action areas on the 4825 Glenbrook Road site (reference the attached figure). Three of the areas are indentified as high-probability areas, where it is more likely to encounter containerized CWM and agent-impacted soil while conducting the remedial action. These three areas are: the backyard patio area [Area D], the area under the house, including the basement and foundation walls [Area E], and the front yard [Area F]. A site-specific work plan will be prepared to perform this high-probability intrusive activity. Based on site characterization and previous removal activities, MEC is unlikely to be encountered at the site, but is possible.

6.4.1 Site characterization and previous removal activities in the backyard patio area [Area D] detected agent and ABPs in recovered glassware and also removed agent-impacted soil. It is likely that these AUES-related features will be encountered in the back patio area while conducting the remedial action. One MD item was recovered from the southern portion of Area D during the sewer line restoration. However, MEC has not been discovered in the back patio area, and it is not anticipated to be encountered in Area D while conducting the remedial action.

6.4.2 Site characterization and previous removal activities in the area under the house, including the basement and foundation walls [Area E], have not encountered any AUES-related material. Based on geotechnical borings through the basement floor slab, the slab and gravel subbase material were placed directly on saprolite, making it unlikely that containerized CWM or MEC will be encountered under the house while conducting the remedial action. However, based on the known locations of agent-impacted soil adjacent to the house, agent-impacted soil may be present under the house.

6.4.3 Site characterization and previous removal activities in the front yard area [Area F] have encountered agent-impacted soil, 35 CWM-related items, four MD items, and one unfuzed MEC item with unconfirmed presence of energetics. It is likely that these AUES-related features will be encountered in the front yard area while conducting the remedial action. However, confirmed MEC has not been encountered in the front yard area, and it is not anticipated to be discovered in Area F while conducting the remedial action.

6.5 The four remaining areas designated for remedial action are identified as low-probability areas, where it is not likely to encounter MEC or CWM while conducting the remedial action. These four areas are: the backyard area behind the retaining wall that includes Area A, the driveway area [Area B], the Burial Pit 3 area [Area C], and the front sidewalk area bordering Area F.

6.5.1 Site characterization and previous removal activities in the backyard area behind the retaining wall, that includes Area A, have not encountered any containerized CWM or agent-impacted soil, and these AUES-related features are not anticipated to be encountered in this area while conducting the remedial action. One MD item was recovered next to a manhole in Area A during the arsenic soil removal. However, MEC has not been discovered in the backyard area behind the retaining wall, and it is not anticipated to be encountered in this area while conducting the remedial action.

6.5.2 Site characterization and previous removal activities in the driveway area [Area B] have not encountered any containerized CWM, agent-impacted soil, or munitions-related items, and these AUES-related features are not anticipated to be encountered in Area B while conducting the remedial action.

6.5.3 Site characterization and previous removal activities in the Burial Pit 3 area [Area C] have recovered a total of 24 CWM-related items and 508 MEC-related items. Intrusive investigation of this area was completed in March 2009. No further action is planned for this area; however, incidental intrusive activities, such as utility line relocation or property line stabilization, may be performed in this area. Based on previous removal activities in the Burial Pit 3 area, it is not likely that MEC or CWM will be encountered in Area C while conducting the remedial action.

6.5.4 Site characterization and previous removal activities in the front sidewalk area bordering Area F have not encountered any containerized CWM, agent-impacted soil, or munitions-related items, and these AUES-related features are not anticipated to be encountered in this area while conducting the remedial action.

6.6 Personnel, trained and experienced in the clean-up of MEC/CWM contaminated sites, will conduct the proposed remedial action at the 4825 Glenbrook Road site. The procedures for high-probability and low-probability intrusive activities have been established by the Spring Valley Partners as described in the Site-Wide Work Plan for the SVFUDS, and will be further described in the site-specific work plan for the 4825 Glenbrook Road remedial action. The Spring Valley Partners agree that the intrusive activities in the three high-probability areas are more likely to encounter CWM, but unlikely to encounter MEC. The Spring Valley Partners also agree that the intrusive activities in the four low-probability areas are not likely to encounter CWM or MEC.

6.7 Based on the site-specific data and the conclusions presented in this document, the probability of encountering MEC while conducting the proposed remedial action at the 4825 Glenbrook Road site in the three high-probability areas designated as: the backyard patio area [Area D], the area under the house, including the basement and foundation walls [Area E], and the front yard [Area F], is **Seldom** (Level D). The DA PAM 385-30, Mishap Risk Management, defines Seldom (Level D), the likelihood for the occurrence of a mishap, as "Unlikely but possible to occur." Intrusive activities in the three high-probability areas designated for remedial action, that are more likely to encounter CWM, but unlikely to encounter MEC, can be performed under low-probability assumptions as they relate to the probability of encountering MEC until such time that MEC is encountered.

6.8 Also, based on the site-specific data and the conclusions presented in this document, the probability of encountering MEC/CWM while conducting the proposed remedial action at the 4825 Glenbrook Road site in the four low-probability areas designated as: the backyard area behind the retaining wall that includes Area A, the driveway area [Area B], the Burial Pit 3 area [Area C], and the front sidewalk area bordering Area F, is **Seldom** (Level D). The DA PAM 385-30, Mishap Risk Management, defines Seldom (Level D), the likelihood for the occurrence of a mishap, as "Unlikely but possible to occur." Intrusive activities in the four low-probability areas designated for remedial action, that are not likely to encounter CWM or MEC, can be performed under low-probability assumptions until such time that MEC or CWM are encountered.

7.0 RECOMMENDATIONS

7.1 Personnel, trained and experienced in the clean-up of MEC/CWM contaminated sites, will conduct the proposed remedial action at the 4825 Glenbrook Road site. The procedures for high-probability and low-probability intrusive activities have been established by the Spring Valley

Partners as described in the Site-Wide Work Plan for the SVFUDS, and will be further described in the site-specific work plan for the 4825 Glenbrook Road remedial action. The Spring Valley Partners agree that the intrusive activities in the three high-probability areas are more likely to encounter CWM, but unlikely to encounter MEC. The Spring Valley Partners also agree that the intrusive activities in the four low-probability areas are not likely to encounter CWM or MEC.

7.2 Intrusive activities in the three high-probability areas designated for remedial action, that are more likely to encounter CWM, but unlikely to encounter MEC, can be performed under low-probability assumptions as they relate to the probability of encountering MEC until such time that MEC is encountered.

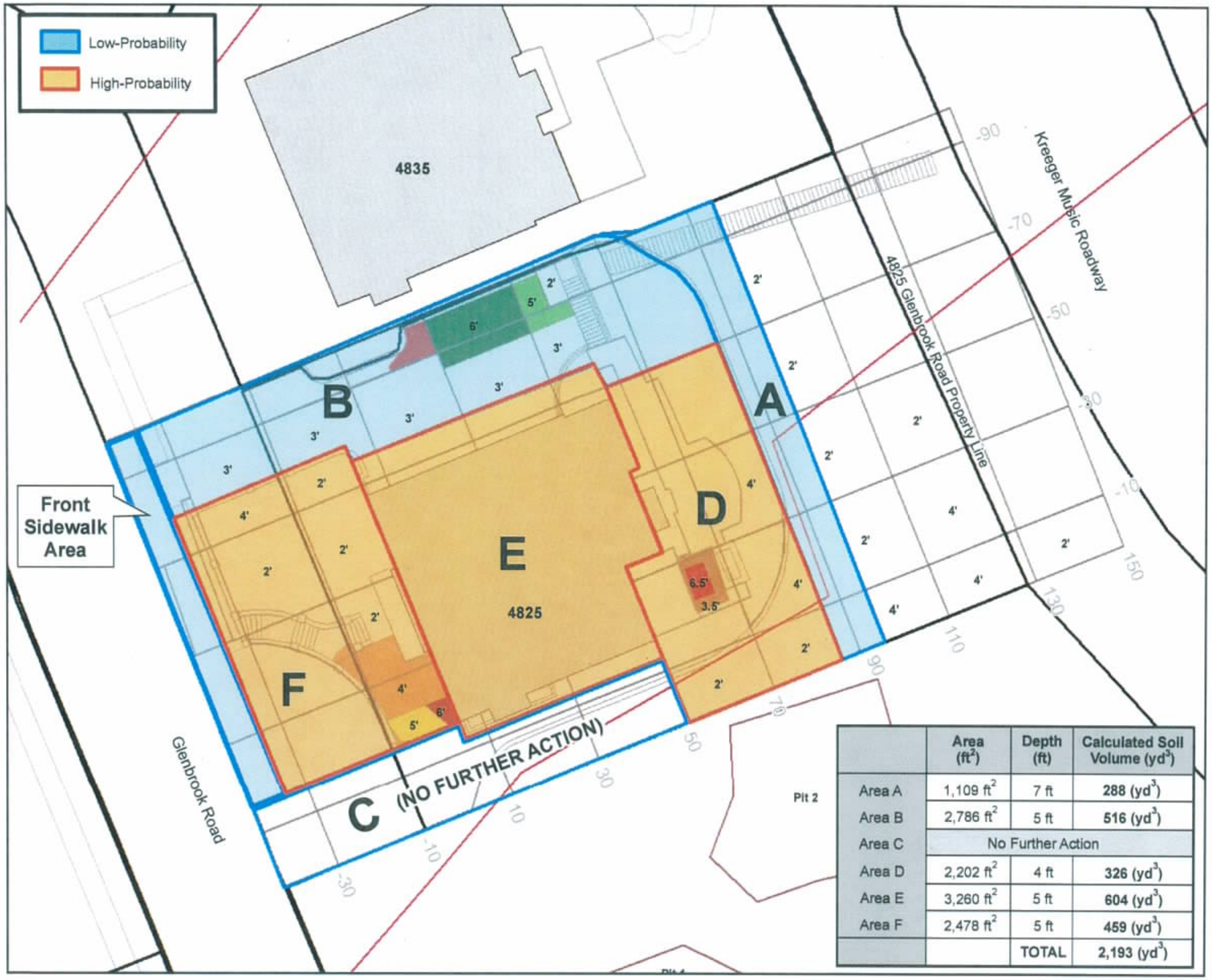
7.3 Also, intrusive activities in the four low-probability areas designated for remedial action, that are not likely to encounter CWM or MEC, can be performed under low-probability assumptions until such time that MEC or CWM are encountered.

7.4 In the unlikely event that a suspect MEC item is encountered while conducting the intrusive activities in the three high-probability areas that are more likely to encounter CWM, but unlikely to encounter MEC, the work will stop and the MEC contingency plan will be initiated. Following confirmation of a suspect MEC item, the work will resume only after a site-specific plan for addressing the MEC has been developed in accordance with the Site-Wide Work Plan for the SVFUDS.

7.5 Also, in the unlikely event that a suspect MEC/CWM item is encountered while conducting the intrusive activities in the four low-probability areas that are not likely to encounter CWM or MEC, the work will stop and the MEC/CWM contingency plan will be initiated. Following confirmation of a suspect MEC/CWM item, the work will resume only after a site-specific plan for addressing the MEC/CWM has been developed in accordance with the Site-Wide Work Plan for the SVFUDS.

Figure 1
High and Low Probability Excavation Areas for the Probability Assessment at 4825 Glenbrook Road

Spring Valley FUDS
Washington, DC



	Area (ft^2)	Depth (ft)	Calculated Soil Volume (yd^3)
Area A	1,109 ft^2	7 ft	288 (yd^3)
Area B	2,786 ft^2	5 ft	516 (yd^3)
Area C	No Further Action		
Area D	2,202 ft^2	4 ft	326 (yd^3)
Area E	3,260 ft^2	5 ft	604 (yd^3)
Area F	2,478 ft^2	5 ft	459 (yd^3)
		TOTAL	2,193 (yd^3)

Legend

- ☐ Property Boundaries
- ▨ Buildings
- ☐ 20' Grid
- — Pit 2 (POI-24R)
- — Sewer Line

Arsenic Soil

- 🟥 Arsenic Grid to be Excavated
- 🟩 Arsenic Grid Previously Removed [6'] (2009)
- 🟩 Arsenic Grid Previously Removed [5'] (2009)

Note: Arsenic Grids Previously Removed that were excavated to 4' deep or less are labeled accordingly.

Soil Excavation

- 🟧 Excavation Depth [3.5'] (2009)
- 🟧 Excavation Depth [4'] (2010)
- 🟨 Excavation Depth [5'] (2010)
- 🟥 Excavation Depth [6'] (2010)
- 🟥 Excavation Depth [6.5'] (2009)

0 10 20 40 Feet
N
1 inch = 20 feet

US Army Corps of Engineers
BUILDING STRONG
ERT

Date: February 2012

APPENDIX B
SITE MAPS

The site maps are included with the associated chapters for easy reference and not included in this appendix. The following Maps can be found in this Work Plan:

APPENDIX C
POINTS OF CONTACT

These contacts should be posted prominently at the site.

Agency/Contact	Activity	Telephone Number
Police	-	911
Fire	-	911
Ambulance	-	On site/911
Emergency Response (Spills/Releases Only)	Emergency Response Coordinator for Area	911
Hospital for Non-Trauma/Non-Chemical	Sibley Hospital	202-537-4000
Hospital for Trauma/Chemical	George Washington University Hospital	202-715-4000
National Response Center	-	800-424-9500
Poison Control Center	-	800-288-9999
Responsible Person	**Telephone Numbers**	
	Work	**Other**
CENAB Site Operations Office – JR Martin	-	410-509-4607 (cell)
CENAB MMRP Project Manager – Brenda Barber	410-962-0030	443-253-3048 (cell)
USAESCH Project Manager – Sherri Anderson-Hudgins	256-895-1522	-
USAESCH Deputy Project Manager – Bruce Whisenant	256-895-1633	256-684-2855 (cell)
USAESCH Safety Specialist – Richard Byrd	-	256-426-0654 (cell)
USAESCH Safety Specialist (Alt.) – Wilson Walters	256-895-1290	256-990-1512 (cell)
Parsons Project Manager - Sean Buckley	202-469-6385	202-744-6970 (cell)
Parsons Site Manager – Scott Wunschel	-	425-577-3808 (cell)
Parsons Project Safety and Health Manager – Ed Grunwald	678-969-2394	678-429-6887 (cell)
Parsons Site Safety and Health Officer – Bobby Nelms	-	940-727-4189 (cell)
TE Emergency Contact – RDECOM* Emergency Command Post	410-436-2148	-
ECBC Emergency Contact – RDECOM* Emergency Command Post	410-436-2148	-

***Research, Development, and Engineering Command**

ACCIDENT PREVENTION PLAN/SITE SAFETY AND HEALTH PLAN FOR THE

4825 GLENBROOK ROAD REMEDIAL DESIGN/REMEDIAL ACTION SPRING VALLEY FORMERLY USED DEFENSE SITE, OPERABLE UNIT 3 SPRING VALLEY, WASHINGTON, D.C.

Prepared for:

U.S. Army Engineering and Support Center, Huntsville

And

Baltimore District
U.S. Army Corps of Engineers

Prepared by:

PARSONS

100 M Street SE
Washington, D.C. 20003

December 2015

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APPROVED BY:

Edward Grunwald

Project Health and Safety Manager – Ed Grunwald, C.I.H.(678-969-2394)

CONCURRENCE BY:

Vice-President – Todd Heino.P.E. (617-449-1405)

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CHAPTER 1
BACKGROUND INFORMATION

1.1 INTRODUCTION

1.1.0.1 Accident prevention is a key program element to achieve compliance and strive towards our ultimate goal of zero safety incidents. Personnel active in site operations will be thoroughly familiar with the programs and procedures outlined in this Accident Prevention Plan (APP) prior to conducting work at the site.

1.1.0.2 This APP and the attached Site Safety and Health Plan (SSHP) (Attachment 1) are appended to the Site-Specific Work Plan (SSWP) that describes the overall methods, safety programs, and procedures to be implemented during field operations for the remedial action at 4825 Glenbrook Road. The SSWP focuses on site-specific objectives, information and requirements, procedural decisions, modifications, and/or omissions from the site-wide documents.

1.2 PROJECT AUTHORIZATION

1.2.0.1 Under Contract No. W912DY-09-D-0062 and Delivery Order 0006, Parsons is serving as the prime contractor to the U.S. Army Engineering and Support Center, Huntsville (USAESCH) for the remedial action activities at 4825 Glenbrook Road. This project falls under the Defense Environmental Restoration Program/Formerly Used Defense Sites (DERP/FUDS). The Project Team will consist of Parsons, USAESCH, and U.S. Army Corps of Engineers (USACE), Baltimore District (CENAB) as well as other government and non-government agencies with specific expertise for implementation of specialized components of the field operations. For purposes of this APP, USAESCH and CENAB are referred to jointly as “USACE.”

1.2.0.2 This APP applies to site-specific activities being conducted at 4825 Glenbrook Road within the SVFUDS. The project will involve removal for possible recovered chemical warfare materiel (RCWM), munitions and explosives of concern (MEC), and munitions constituents (MC) to characterize the site and to identify and quantify any associated risk, while adhering to the highest levels of safety for the public and project staff. Primary project activities will include surveying and mapping, house demolition, intrusive excavation of low probability areas and high probability areas defined in the Decision Document (USACE 2012), sampling, and related activities. The location of the 4825 Glenbrook Road is presented in Figure 1-1 of the SSWP to which this APP is appended.

1.3 HAZARDOUS ACTIVITIES

1.3.0.1 The work at 4825 Glenbrook Road will involve potentially hazardous activities during the course of house demolition and other remedial action operations. Chapter 2 of the SSHP (Attachment 1 to this APP) identifies the hazards associated with the project activities. The Activity Hazard Analyses (AHAs) are presented as Attachment 2 to this APP and detail each activity to be performed during the project and the associated preventative measures for avoiding accidents. Personnel involved with hazardous tasks will be qualified to participate by previous or site-specific training, as applicable.

1.3.0.2 This Site-Specific APP/SSHP includes discussions on procedures and methods for conducting remedial action at both suspected "RCWM" (referred as high probability) areas and "non-RCWM" (referred as low probability) areas at the 4825 Glenbrook Road site. The specific scopes of the remedial action at 4825 Glenbrook Road are to:

- Safely demolition of the house; and
- Excavate to the depth of bedrock or undisturbed saprolite in the excavation boundaries of the low and high probability areas identified in the Decision Document (USACE 2012), which will result in an over-excavation of the soil relative to the cleanup goals based on soil contamination alone; and accomplish the goals of removing any potential RCWM, laboratory waste, and other AUES-related debris.

1.3.0.3 For purposes of the remedial action, the high and low probability areas for 4825 Glenbrook Road were identified in the Decision Document (USACE 2012). The low probability areas were further evaluated and determined by the USACE probability assessment performed for the remedial action at the 4825 Glenbrook Road.

1.3.0.4 It is important to note that areas determined to be "non-RCWM" in this manner may still have chemical agent present and certain measures (e.g., a contingency plan) will still be implemented to protect workers and the public. In the event that evidence of potential MEC/RCWM is encountered during the remediation of a non-RCWM area, the probability assessment will be revisited by USACE to determine whether the previous findings should be revised.

1.3.0.5 The following is a list of potential activities associated with the work being performed at the 4825 Glenbrook Road site:

- Mobilization of personnel and equipment to the site.
- House demolition.
- Land surveying.
- Intrusive excavation of anomalies at low probability areas.
- Intrusive excavation of anomalies at higher probability areas.

- Soil packaging.
- Operation of the Personnel Decontamination Station (PDS).
- Emergency rescue.
- Air monitoring.
- Headspace screening of soil and munitions debris.
- Decontamination of items.
- Suspect item assessment.
- Suspect item packaging.
- Drum/Multiple Round Container handling.
- Item transport to Interim Holding Facility.
- Interim Holding Facility entry.
- X-ray analysis/Portable Isotopic Neutron Spectroscopy.
- Excavation backfill.
- Construction, movement, and testing of the Engineering Control Structure (ECS).
- Demobilization of personnel and equipment from the site.

1.4 PARSONS ACCIDENT EXPERIENCE

1.4.0.1 Parsons has a policy of compliance with all governing safety standards and regulations, and a safety performance goal of zero accidents, operational mishaps, and injuries/illnesses. As of January 1, 2012, Parsons' Experience Modification Rate is 0.54.

CHAPTER 2
STATEMENT OF SAFETY AND HEALTH POLICY

2.1 PARSONS CORPORATE SAFETY AND HEALTH POLICY STATEMENT

2.1.0.1 As an industry-leading engineering, construction, and technical services firm, Parsons is firmly committed to maintaining a safe and healthy working environment at all its offices and project facilities. We share the National Safety Council Safety and Health Code of Ethics as the principles guiding our commitment to safety.

1. We will hold safety and health as our highest core value.
2. Executive management will lead the safety improvement process.
3. Safety will be a responsibility shared by everyone in our organization.
4. Safety performance will be a key indicator of our organizational excellence and will be incorporated into our business processes.
5. We will communicate safety performance openly with employees.
6. All employees will be given the knowledge and skills necessary to safely perform their jobs.
7. We will extend our safety efforts beyond the workplace to include transportation, homes, and communities.
8. We will continually strive to improve our safety and health processes.

2.1.0.2 To meet its health and safety objectives, all Parsons employees are expected to act proactively with regard to health and safety issues. This requires the combined efforts of a concerned management, responsible and knowledgeable supervision, and conscientious, well-trained employees.

2.1.0.3 Parsons will take all reasonable action to meet or exceed the applicable occupational health and safety requirements, domestically and internationally, and will continuously monitor and improve operations, procedures, technologies, and programs that are conducive to maintaining a safe and healthy working environment.

2.2 PARSONS SAFETY, HEALTH, AND RISK PROGRAM

2.2.0.1 Parsons has developed an Environmental, Safety, Health, and Risk Program (ESHARP) for the implementation of key safety initiatives on all Parsons' projects. All Parsons Project

Managers (PMs) maintain a copy of this document to ensure application and conformance on all projects.

CHAPTER 3
RESPONSIBILITIES AND LINES OF AUTHORITY

3.1 LEVELS OF SAFETY RESPONSIBILITY AT PARSONS

3.1.1 Parsons Corporate Safety Personnel

3.1.1.1 Parsons corporate safety personnel are required to develop, communicate, and oversee Parsons health and safety programs at all Parsons business units. These employees will assist Parsons business unit managers regarding health and safety regulations, reporting requirements, safety training, and other related issues. Corporate safety personnel are responsible for monitoring the effectiveness of Parsons Health and safety programs, conduct audits, ensure that all injuries and near misses are fully investigated, and develop Occupational Safety and Health Administration (OSHA) reporting and worker's compensation claim procedures. As part of corporate policy, safety information and statistics will be collected and maintained for all Parsons business units. Parsons corporate safety personnel also keep senior management informed of significant internal and external developments regarding health and safety.

3.1.2 Parsons Management and Supervisory Personnel

3.1.2.1 Supervisors and members of management, at all levels within Parsons, will comply with the Company's Health and Safety Policy and ensure that the applicable health and safety requirements at each domestic and international office and project facility are effectively implemented and monitored at all times. The supervisors and members of management will insure that the policies are effectively integrated with the preparation of proposals, project planning, and project execution. The safety performance of subcontractors will also be monitored in accordance with contract specifications as required by the contract with the client. Safety information and statistics will be reported to Parsons Corporate Safety Manager by personnel serving as supervisors or managers on a consistent and regular basis.

3.1.3 Parsons Employee Responsibility

3.1.3.1 Health and safety is the responsibility of everyone at Parsons. The Parsons employee, to include subcontractors of Parsons, is required to exercise maximum appropriate care and good judgment at all times regarding health and safety, and adhere to safety procedures to prevent accidents and injuries. Any accidents or injuries either suffered by or witnessed by employees will be promptly reported to supervisory personnel. In order to better plan and avoid possible future accidents or injuries, the Parsons employee is required to promptly report any near misses or close calls. The employees are also required to promptly report any unsafe conditions, equipment, or practices to supervisory personnel in order to ensure a safe working environment.

3.2 LINES OF AUTHORITY REGARDING SAFETY

3.2.0.1 It is important for each employee involved with the project to know and understand the lines of authority. The organizational structure of supervisory personnel for this project is outlined in Figure 2-1 of the WP. All personnel will be informed of this organization structure during the training phase of the project. A copy of Figure 2-1 will be posted at the Command Post in order to provide quick references to anyone needing to report or make suggestions regarding safety issues. The résumés of key safety personnel in the organizational structure are provided in Appendix H of the WP.

CHAPTER 4
SUBCONTRACTORS AND SUPPLIERS

4.0.0.1 Table D.4.1 details the vendors and subcontractors currently anticipated to supply equipment or render services to the personnel working at the 4825 Glenbrook Road site. All services and vendors were selected based on government-approved procurement procedures.

4.0.0.2 Each subcontractor is required to abide by all site safety and health regulations. Parsons will work closely with each subcontractor to ensure they are aware of the health and safety regulations that apply to the work site. Personnel arriving on-site to conduct business or provide a service will first attend an initial site-specific safety briefing. If returning to the site, the individual will be required to register and sign in at the office before beginning work. The site-specific safety briefing will inform the individual of the policies and regulations that apply to the subcontractor while on-site. The briefing will also include hazards associated with the individual's area of work, as well as hazards specific to the site. Documentation of the subcontractor's attendance will be generated and the personnel involved will agree to abide by all site regulations.

Table D.4.1
Subcontractors and Suppliers

Subcontractor or Supplier	Service Provided
Total Safety, Inc.	Safety Equipment
Pine Environmental Services, Inc.	Environmental Instrument Rentals
C.P. Johnson and Associates	Site Survey
ACI	Sewer reroute
Demolition Service Inc.	House Demolition
Zimmer Environmental Solutions	Site Support and Waste Disposal
ALS Laboratories	Sample Analysis Laboratory
Rubb	ECS tent
Bunker Hill	General Site Support
Traffic Engineering Services	Traffic Control
EC Ernst	Electrical Services
Kingdom Security	Security
George Washington Hospital	Emergency Hospital and Medical Support Unit

CHAPTER 5
TRAINING

5.0.0.1 Training is addressed in Chapter 4 of the SSHP (Attachment 1 to this APP). This chapter is included as a placeholder only.

CHAPTER 6
SAFETY AND HEALTH INSPECTIONS

6.1 RESPONSIBILITY

6.1.0.1 As part of the Parsons SHARP Management, roles and responsibilities for safety audits, inspections and recordkeeping have been established. For each project, the Parsons PM is responsible for ensuring that routine internal safety inspections are performed, for tracking corrective actions to completion, and performing inspections. The Parsons Project Safety and Health Manager (PSHM) is responsible for developing and implementing the project safety and health inspection program contained in this plan as well as conducting inspections.

6.1.0.2 The Site Safety and Health Officer (SSHO) is responsible for conducting safety and health inspections or walkarounds, identifying and reporting deficiencies, and working with the project team to develop corrections. The SSHO will follow-up on any deficiency in a timely manner and halt operations if necessary in order to ensure that individuals are not exposed to an unsafe environment. Training, documentation, posting and inspections will be performed in accordance with EM 385-1-1. The Site manager and safety will ensure the implementation during the field operations.

6.1.0.3 USAESCH is responsible for leading the Pre-operational Survey (Section 6.4).

6.2 INSPECTIONS

6.2.0.1 Safety and health inspections will be conducted either by the SSHO, the PSHM, or other qualified appointee. Personnel responsible for safety and health inspections will meet the criteria of an OSHA competent person. Safety and health inspections will be conducted at least weekly during field operations or when any of the following events occur:

- The introduction of new substances, procedures, or equipment that presents potential new hazards into the workplace;
- New, previously unidentified hazards are recognized;
- Receipt of complaints of unsafe conditions; or
- In the event of an occupational injury or illness.

6.2.0.2 Safety inspections are conducted by physically walking around the work area(s) and observing conditions for routine and emergency access, evacuation technique, PPE, work practices, site access control, first aid equipment, firefighting equipment, and sanitation. The inspections may include conversations with workers and supervisors and review of certifications and training documentation.

6.2.0.3 All deficiencies or nonconformance will be documented. If safety hazards exist, it may be necessary to stop work until corrections are in place. Many deficiencies can be corrected immediately by placing barriers, installing signs, changing procedures, etc. The status of each deficiency will be tracked by the SSHO to ensure that a correction is made. If necessary, the SSHO will stop work until the deficiency is corrected. Follow-up reporting on deficiencies will be included on succeeding safety and health inspection documentation until the deficiency is resolved.

6.3 RECORDKEEPING

6.3.0.1 A record of each inspection will be maintained in the project files. The record must include the name of the inspector, unsafe conditions and work practices identified, and actions taken to correct unsafe conditions and work practices. A standard safety inspection form has been developed to assist the inspections and provide documentation of safety and health nonconformance. The Safety Inspection form is located in Appendix F of the WP.

6.4 PRE-OPERATIONAL SURVEY

6.4.0.1 The Pre-Operational Survey, or “Pre-Op,” is required by DA Pam 385-61 prior to the startup of any RCWM-related operation. The Pre-Op has been delegated to the Major Army Command level for Spring Valley. The Pre-Op is a two- to three-day exercise that will be conducted on site by representatives of USAESCH and subject matter experts from groups such as the U.S. Army Center for Health Promotion and Preventive Medicine and agencies responsible for executing on-site RCWM activities. The purpose of the Pre-Op is to evaluate the field team’s readiness to perform the MEC/agent operations associated with the RCWM project.

6.4.0.2 It is critical to note that the Pre-Op is not a training exercise for the field team and all necessary training must be accomplished prior to the Pre-Op.

6.4.0.3 The Pre-Op is an evaluation and, as such, is subject to failure. The field team will not be permitted to begin intrusive operations until the Pre-Op has been completed to the satisfaction of the review team. Actual intrusive operations will not begin until approved by USAESCH.

6.4.0.4 A Pre-Op is not required for intrusive operations relating to the investigation of low probability anomalies.

CHAPTER 7
SAFETY AND HEALTH EXPECTATIONS, INCENTIVE PROGRAMS, AND COMPLIANCE

7.1 SAFETY GOALS AND OBJECTIVES

7.1.0.1 As stated in the company's Corporate Safety and Health Policy Statement (Section 2 of this APP), Parsons holds safety and health as our highest core value. It is Parsons' objective to maintain a safe working environment and complete every job with zero accidents.

7.2 PARSONS SAFETY AWARD PROGRAM

7.2.0.1 Project management meets on a regular basis to maintain and support an incentive program based on the safety performance of Parsons and subcontractor employees.

7.2.0.2 It has been established that a necessary tie-in to a meaningful safety program is a program that rewards exemplary conduct. To any true professional, the monetary value of an award is transcended by the recognition given. To present a plaque for demonstrating dedication to creating a safe and healthy environment; to dedicate a prime parking space for the use of the individual who has recognized a hazard and has eliminated it or devised a method of managing it; or to let an individual's or group's peers know, in some way, that individual or group has taken an extra step where safety is involved, is the type of award best appreciated by the professional.

7.3 SAFETY VIOLATIONS

7.3.0.1 In the event of a safety violation, the individual (supervisor, manager, and employee) or company will be notified of the issue and the situation will be documented. After documentation is completed, the safety violator will be required to submit a written plan of action to correct the problem within two days of notification. Failure to comply will result in disciplinary action against the individual or the individual's company. If the violation is such that work on the site is deemed unsafe, work will be stopped until the problem is corrected and the SSHO inspects the site for safety. Once the corrections are in place and the site has been inspected for compliance, the SSHO will notify the Site Manager when work may resume. Examples of Subcontractor Safety Violation and Noncompliance forms are provided in Appendix F of the WP.

7.3.0.2 Each member of the project team will play a part in keeping operations safe. A brief description of each employee's safety responsibility is listed below:

- Senior management is responsible for leadership and support of the safety program, for its effectiveness and improvement, and for providing all the safe guards necessary to assure a safe working environment.
- Supervisors are responsible for developing proper attitudes towards safety in themselves, and in those they supervise. Supervisors must ensure that all operations are performed with the highest regard for the safety of all personnel involved.
- Employees are responsible for genuine cooperation with all aspects of the safety program, including compliance with all policies and procedures. Employees need to continually practice safety while performing their work duties.

7.3.0.3 Parsons holds the Site Manager, PSHM, SSHO and PM accountable for maintaining project safety and health. All of these persons may be subject to safety inspections by Parsons senior management. These inspections are used to measure safety and health performance and to provide feedback.

CHAPTER 8
MISHAP REPORTING AND INVESTIGATION

8.1 MISHAP REPORTING

8.1.0.1 In the event a mishap occurs at the site, the SSHO will investigate the mishap after all emergency actions have been taken. Engineering Form 3394 (Appendix F of the WP) will be completed by the SSHO and submitted to the Parsons PSHM. A verbal notification will also be given to the PSHM that the form is being filled out.

8.1.0.2 In accordance with EM 385-1-1, Section 01, Accident Reporting, paragraph D, all recordable mishaps (property damage greater than $5,000, days away injuries, days away illness, and restricted/transfer injuries) will be reported as soon as possible but not more than 24 hours afterwards to the contracting officer. Parsons will thoroughly investigate the accident and submit the findings of the accident along with the appropriate corrective actions to the contracting officer as soon as possible but no later than five working days following the accident. Accidents will be reported immediately if:

a) There is a fatal injury/illness;

b) There is a permanent totally disabling injury/illness;

c) There is a permanent partial disabling injury/illness;

d) One or more persons are hospitalized as inpatients as a result of a single occurrence;

e) There is property damage of $500,000 or more; or

f) Three or more individuals become ill or have a medical condition suspected to be related to a site condition, or to a hazardous or toxic agent on the site.

8.1.0.3 Parsons will notify OSHA within 8 hours if there is a fatality. Occurrences of in-patient hospitalization, amputation, or eye loss will be reported to OSHA within 24 hours.

8.1.0.4 In accordance with DID WERS-011.01, Parsons will immediately report to the Contracting Officer or government designated authority any accident that could bring adverse attention or publicity to the USACE.

8.1.0.5 Parsons has an online incident reporting tool for internal reporting. This system can be used to file the initial report and the incident detail report; however, it is necessary to have access to the Parsons PWeb in order to use this tool. The incident reporting tool can be accessed at the following link: https://project1.parsons.com/Safety/login.htm.

8.1.0.6 Other lost-time or OSHA recordable accidents will be formally reported (*i.e.*, using a written report) to USAESCH within five working days. The onsite USAESCH representative will be verbally notified within one day of any accident or injury that may require reporting. An OSHA 300 log of work-related injuries and illnesses will be maintained at the site. A copy of the OSHA 300 log is provided in Appendix F of this WP.

8.2 MISHAP INVESTIGATIONS

8.2.0.1 Mishap investigations are an important element of Parsons Safety program because they provide useful information to prevent similar incidents. Mishaps include any unplanned, undesired event that occurs during the work being performed, and includes accidents, incidents, and near misses. All mishaps must be reported to an individual’s supervisor immediately. No supervisor may decline to accept a report of a mishap from a subordinate. Mishap investigations identify root causes, system failures, unsafe acts and conditions, and noncompliance with or inadequacy of the APP. All significant near miss, injury, illness, or major equipment or property damage incidents (including work interruptions) require an investigation.

8.2.0.2 The SSHO must conduct the onsite investigation immediately and prepare an incident investigation report in the event that one is required. The PM is responsible for ensuring all incidents are reported and investigated in a timely manner and that appropriate corrective actions are identified and implemented. The SSHO will usually lead any investigation with the assistance of the Site Manager and PSHM.

8.2.0.3 The general information collected by the accident investigation includes:

- Location, time, and date;
- Description of the operation being performed at the time of the accident;
- Outline of the sequence of events that led up to the accident;
- All personnel associated with the work task and incident; and
- All eyewitnesses.

8.2.0.4 The investigation team will proceed in the following manner:

1. Identify, secure, and document any evidence, tools, or other materials pertinent to the investigation.
2. Identify and interview all involved employees and eyewitnesses.
3. Provide a private place and time for each individual to prepare a written statement.
4. Prepare and issue a written report.

8.3 EXPOSURE DATA

8.3.0.1 Exposure hours will be reported each month for exposure analysis. Exposure hours are defined as the number of hours worked in the field by Parsons personnel plus the hours worked by subcontractors. Exposure hours are reported internal to Parsons by the PM.

CHAPTER 9
MEDICAL SUPPORT

9.0.0.1 Medical support is addressed in Chapter 7 of the SSHP (Attachment 1 to this APP). This chapter is included as a placeholder only.

CHAPTER 10
PERSONAL PROTECTIVE EQUIPMENT

10.0.0.1 PPE is addressed in Chapter 5 of the SSHP (Attachment 1 to this APP). This chapter is included as a placeholder only.

CHAPTER 11
SITE PLANS

11.0.0.1 Work at the 4825 Glenbrook Road site will involve potentially hazardous activities during the course of field operations. In order to prepare for these potential hazards, site plans have been developed and summarized to ensure the prevention of accidents.

11.1 LAYOUT PLAN

11.1.0.1 Details concerning site layout and work zones are described in Chapter 11 of the SSHP (Attachment 1 to this APP).

11.2 EMERGENCY RESPONSE PLAN

11.2.1 Procedures

11.2.1.1 The purpose of the Emergency Response Plan is to define the general procedures to protect human health and the environment both in the event of an accident or emergency during the course of project activities. The Emergency Response and Contingency Plan (ERCP) for the Site are described in Chapter 16 of the SSHP (Attachment 1 to this APP).

11.2.1.2 The ERCP developed for the Site complies with 29 CFR 1910.120(1) and addresses the following elements:

- Pre-emergency planning;
- Personnel roles, lines of authority, training, and communications;
- Posted instructions and emergency contacts;
- Emergency recognition and prevention;
- Criteria and procedures for site evacuation;
- Procedures for decontamination and medical treatment;
- Evacuation routes and procedures;
- Emergency alerting and response procedure; and
- Critique of emergency responses and follow-up.

11.2.2 Spill Plan

11.2.2.1 The Spill Plan for the Site is described in the ERCP located in Chapter 15 of the SSHP (Attachment 1 to this APP).

11.2.3 Firefighting Plan

11.2.3.1 The Firefighting Plan for the Site is described in the ERCP located in Chapter 16 of the SSHP (Attachment 1 to this APP).

11.2.4 Posting of Emergency Telephone Numbers

11.2.4.1 Emergency telephone numbers for the closest hospitals capable of providing emergency service, Poison Control Center, local Police and Fire Department, and key safety and management personnel from CENAB, USAESCH, the United States Army Technical Escort Unit, Edgewood Chemical Biological Centre, and Parsons will be available to the SSHO and will be posted at the SZ Command Post and in other conspicuous locations at the site. The SSHO will be responsible for keeping the list current and for taking necessary action and contacting the appropriate emergency contacts in the event of an emergency. Emergency contact numbers are provided in Appendix C of the SSWP.

11.2.5 Wild Land Fire Prevention Plan

11.2.5.1 Project activities at the Site will not involve prescribed or planned burning of wild lands and, therefore, a wild land fire prevention plan is not required.

11.2.5.2 General fire prevention measures for the site are described in Section 11.28 of this APP.

11.2.6 Man Overboard/Abandon Ship Plan

11.2.6.1 Project activities at 4825 Glenbrook Road will not involve water craft and, therefore, a man overboard/abandon ship plan is not required.

11.3 HAZARD COMMUNICATION PROGRAM

11.3.0.1 Details on hazard communication training are presented in Chapter 4 of the SSHP (Attachment 1 to this APP).

11.4 RESPIRATORY PROTECTION PROGRAM

11.4.0.1 Details concerning respiratory protection are described in Chapter 5 of the SSHP (Attachment 1 to this APP).

11.5 HEALTH HAZARD CONTROL PROGRAM

11.5.0.1 The health hazard controls for the project are described in Chapter 2 of the SSHP (Attachment 1 to this APP).

11.6 LEAD ABATEMENT PLAN

11.6.0.1 The only potential source of lead at the 4825 Glenbrook Road Site is in contaminated soil and based on the analytical data collected at the site to date, the highest reported lead concentration detected in soil is 5,980mg/kg. Assuming this as a maximum concentration in soil and using the OSHA action level for lead of 30µg/m³ (0.03mg/m³), then the maximum concentration of dust permissible during site operations without needing lead abatement measures would be:

$$\text{Dust Action Level} = (\text{Exposure Limit, mg/m}^3) \times (10^6) / (\text{Soil Concentration, mg/kg})$$

Or

$$\frac{0.03\text{mg/m}^3 \times 10^6\,\text{mg/kg}}{5{,}980\text{mg/kg}} = 5.02\text{mg/m}^3$$

11.6.0.2 During site excavation operations that are conducted outside an ECS, dust will be monitored and mitigation measures (i.e., wetting down) will be employed to keep dust levels below 3.0mg/m³. Therefore, the OSHA action level for lead will not be exceeded during activities at 4825 Glenbrook Road and a lead abatement plan will not be required.

11.6.0.3 Dust monitoring methods are described in Chapter 8 of the SSHP (Attachment 1 to this APP).

11.7 ASBESTOS ABATEMENT PLAN

11.7.0.1 Contact with asbestos-containing materials is not anticipated as part of the operations to be conducted at 4825 Glenbrook Road. In the unlikely event that asbestos is encountered during field operations, workers will be required to avoid the area of contamination and consult with the SSHO and Site Manager for further instructions.

11.8 ABRASIVE BLASTING

11.8.0.1 Project activities at 4825 Glenbrook Road will not involve abrasive blasting and, therefore, an abrasive blasting plan is not required.

11.9 CONFINED SPACE ENTRY

11.9.0.1 The confined space entry procedures to be implemented at 4825 Glenbrook Road are provided in Chapter 17 of the SSHP (Attachment 1 to this APP).

11.10 HAZARDOUS ENERGY CONTROL PLAN

11.10.0.1 The hazardous energy control measures (e.g., lockout and tag out procedures) to be implemented at 4825 Glenbrook Road are provided in Section 2.2 of the SSHP (Attachment 1 to this APP).

11.11 CRITICAL LIFT PROCEDURES

11.11.0.1 Crane lift operations at 4825 Glenbrook Road will be conducted in a manner to ensure maximum safety. A critical lift is a non-routine crane lift that requires detail planning and additional or unusual safety precautions. A critical lift of crane operations will be required for lifting and lowering parts of an ECS. Some crane lifts may also be required for moving equipment. The crane operations will be performed following the lift procedures in accordance with EM 385-1-1. All hoisting operations will be preplanned and the exact size and weights of loads to be lifted will be evaluated based on the manufacturing maximum load limits for the entire range of the lift. Lift geometry, including crane position, height of lift, load radius, and boom length and angle, for the entire range of lift will be documented. Crane operators will be checked for qualification with proper certification. The AHA for crane operation is included in Attachment 2 to this APP.

11.12 CONTINGENCY PLAN FOR SEVERE WEATHER

11.12.0.1 Severe weather is defined as high winds, electrical storms, tornadoes, extremely hot weather (> 100°F), or extremely cold weather (< 0°F). In the event that such conditions arise, it is likely that it will be necessary to cease operations and possibly evacuate the site. The SSHO is responsible for monitoring the weather and, should severe weather conditions threaten, the SSHO is responsible for deciding whether site operations should be halted. More information involving severe weather is detailed in Section 2.5 of the SSHP (Attachment 1 to this APP).

11.13 ACCESS AND HAUL ROAD PLAN

11.13.0.1 All roads used at 4825 Glenbrook Road will be maintained in a safe working condition to reduce potential hazards involving vehicles or heavy equipment. The construction of any new roadways at 4825 Glenbrook Road is not anticipated.

11.14 DEMOLITION PLAN

11.14.0.1 Project activities at 4825 Glenbrook Road will involve the demolition of the house. A structural demolition plan is included in Attachment 3 of the APP.

11.15 EMERGENCY RESCUE (TUNNELING)

11.15.0.1 Project activities at 4825 Glenbrook Road will not involve tunneling and, therefore, emergency rescue procedures for tunneling are not required.

11.16 UNDERGROUND CONSTRUCTION FIRE PREVENTION AND PROTECTION PLAN

11.16.0.1 Project activities at 4825 Glenbrook Road will not involve underground construction and, therefore, an underground construction fire prevention and protection plan is not required.

11.17 COMPRESSED AIR PLAN

11.17.1 Purpose

11.17.1.1 The purpose of this procedure is to outline the minimum requirements for safe handling and use of compressed gas and gas cylinders by Parsons employees and subcontractors at 4825 Glenbrook Road. This procedure is an overview of the requirements of 29 CFR 1910.101, .169, and .253. It is anticipated that pressurized cylinders will be used to store and supply Grade D breathing air for PPE Level A and B activities. This procedure is intended to provide procedures for safely handling these cylinders and any other pressurized gases used on this project.

11.17.2 Use of Compressed Air or Gases

11.17.2.1 Compressed air or other compressed gases are not to be used to blow dirt, chips, or dust from clothing.

11.17.2.2 The use of compressed air will be controlled, and proper PPE or safeguards used, to protect against the possibility of eye injury to the operator or other persons.

11.17.2.3 Compressed gases will not be used to elevate or otherwise transfer any hazardous substance from one container to another unless the containers are designed to withstand the pressure with a safety factor of at least four.

11.17.3 Compressed Gas Cylinders

11.17.3.1 Cylinders must never be dropped, struck, or permitted to strike each other violently. Carts or racks will be used to move compressed gas cylinders and correct material handling techniques will be exercised when moving cylinders.

11.17.3.2 Valve protection caps will always be kept on cylinders when they are being moved and stored, or until they are ready for use.

11.17.3.3 Cylinder valves will be kept closed except when gas is being used or when the cylinder is connected to a permanent manifold. Valves of empty cylinders will be closed.

11.17.3.4 Cylinders will never be used as rollers or supports, or for any purpose other than carrying gas.

11.17.3.5 Cylinders of compressed gas will be stored in areas where they are protected from external heat sources such as flame impingement, intense radiant heat, electric arc, or high temperature steam lines.

11.17.3.6 Cylinders will be stored in an assigned area, with full and empty cylinders being kept separated. Stored fuel gases and oxygen cylinders will be separated by at least 20 feet, or by a firewall at least five (5) feet high having a fire-resistance rating of at least one-half (½) hour.

11.17.3.7 Oxygen, nitrogen, helium, or freon cylinders will be stored upright or be transported in a horizontal position with the exception of acetylene cylinders, which will always be kept in an upright position in accordance with EM 385-1-1. All horizontally placed cylinders will be secured by chocks or ties to prevent rolling.

11.17.3.8 Cylinders will be secured to a fixed object by chain or equivalent fastening device whenever they are placed in an upright position. The protective cap will not be removed nor will the cylinder valve be opened until the cylinder is secured.

11.17.3.9 The repair of leaks will never be attempted on a pressurized system. If leaks develop, system pressure will be reduced to atmospheric pressure as rapidly as possible, and the SSHO will be immediately notified.

11.17.3.10 Identification of the gas to be used will always be assured before connecting cylinders for use. All cylinders will be clearly labeled regarding their contents in addition to proper color-coding. Color-coding of cylinders will be posted.

11.17.3.11 Compressed gas cylinders in portable service will be conveyed by suitable trucks to which they are securely fastened. All gas cylinders in service will be securely held in substantial racks or otherwise secured to a rigid structure so that they will not fall and will not be knocked over.

11.17.3.12 Gas cylinders moved by hoist will be handled in suitable cradles or boxes.

11.17.3.13 Cylinders will not be placed where they might form part of an electrical circuit.

11.17.3.14 All cylinders used and stored on site will have been hydrostatically tested within the last 5 years and have the date stamped on the cylinder. Any cylinder not having a current hydrostatic test will be rejected.

11.17.3.15 Compressed gas cylinders will be legibly marked for identifying the gas content with either the chemical or the trade name of the gas. Such marking will be by means of stenciling, stamping or labeling, and will not be readily removable. Whenever practical, the marking will be located on the shoulder of the cylinder.

11.17.3.16 Compressed air and oxygen are not interchangeable as gases. Oxygen will NEVER be used for the following:

- As breathing air.
- To purge pipelines, tanks, or any confined area.
- To supply a head-pressure tank.
- To power pneumatic tools.
- In oil preheating burners.
- To start internal combustion engines.
- Ventilation.
- Cleaning clothing.
- In any other way as a substitute for compressed air.

11.17.3.17 Use of a cylinder’s contents for purposes other than those intended by the supplier will be prohibited.

11.18 FORMWORK AND SHORING ERECTION AND REMOVAL PLAN

11.18.0.1 Project activities at 4825 Glenbrook Road will not involve concrete and masonry construction and, therefore, a formwork and shoring erection and removal plan is not required.

11.19 JACKING PLAN (LIFT)

11.19.0.1 Project activities at 4825 Glenbrook Road will not involve lift-slab operations and, therefore, a jacking plan is not required.

11.20 SAFETY AND HEALTH PLAN

11.20.0.1 The SSHP is included as Attachment 1 to this APP.

11.21 BLASTING PLAN

11.21.0.1 Details specific to explosives operations to be conducted at 4825 Glenbrook Road are presented in Chapters 5 and 6 of the SSWP.

11.22 DIVING PLAN

11.22.0.1 Project activities at 4825 Glenbrook Road will not involve diving operations and, therefore, a diving plan is not required.

11.23 PREVENTION OF ALCOHOL AND DRUG ABUSE

11.23.0.1 Parsons will institute and maintain a program for achieving the objective of drug free workspace. Parsons ensures consistent and uniform application of this policy and, when required interfaces with supervisor and employee to evaluate performance and behavior.

11.23.1 Parsons Corporate Statement of Policy

11.23.1.1 Parsons expects all employees to report to work in a fit condition in order to perform their duties at the utmost levels of safety and efficiency. To that end, Parsons expressly prohibits the unlawful manufacture, distribution, dispensing, possession, use, or sale of a controlled substance or alcohol on its premises at any time. Employees are prohibited from being at work under the influence of these substances. Parsons will reasonably accommodate the efforts of an employee to obtain medical treatment for substance abuse and to return to employment thereafter. However, no provisions of this policy will contravene the provision of the Employee Personal Conduct Policy or preclude the corporation from terminating an employee in accordance with this policy.

11.23.1.2 Parsons has an obligation to safeguard the privacy rights of all employees; however, it is also committed to provide a healthy and safe work environment for all employees and to take reasonable steps to safeguard the health and safety of others and protect the environment in conducting its business.

11.23.2 Safety and Environmental Provisions

11.23.2.1 In some instances employees may be required to undergo random toxicological tests to ensure their continuing fitness for duty to comply with contract mandated requirements or government regulations, or if performing work at locations where the nature of their duties is such that there is the potential for serious physical injury to themselves, to others, or the general public, or potential for significant damage to property or the environment.

11.23.2.2 Assignment of employees to such job sites will be done on a voluntary basis. Employees who refuse to participate in the random testing program and whose job duties would normally expose them to random testing will be considered for placement in other positions not requiring random testing. Every reasonable effort will be made to accommodate such transfers;

however if suitable work for which the employee is qualified is not available, the employee will be subject to termination. A positive test result will lead to immediate removal from the site, in addition to either corrective action in accordance with this policy or the employee's termination in accordance with the Employee Personal Conduct Policy.

11.23.2.3 Searches are another means of protecting the safety of individuals and property at those locations where the nature of the work has the potential for serious injury or damage. Reasonable searches may be conducted of individuals, their personal vehicles, effects, and other areas under the individual's control while at such work sites, or engaged in Parsons business at such sites.

11.23.2.4 Employees will not be detained or searched without their consent. An employee's cooperation in a search at such work sites is a condition of employment. The employee will be required to sign an Acknowledgment and Consent for Random Toxicological Tests and Searches form. Such testing will be performed by the company using qualified contracted agents, or trained employees.

11.23.3 Substance Abuse Testing - Employment Offer

11.23.3.1 No candidate for employment will be subjected to substance abuse testing prior to the receipt of an offer of employment. Offers of employment, regardless of employment category, must contain a contingency regarding satisfactory completion of substance abuse testing. Failure to submit to or pass an examination will result in immediate disqualification from consideration for placement.

11.23.4 Employee Personal Conduct

11.23.4.1 Employees bear the primary responsibility for their own job performance and for taking any action or undergoing treatment necessary to maintain performance at a satisfactory level.

11.23.4.2 In addition, the Corporation may require an employee to submit to a test for alcohol or illegal drugs, based upon reasonable suspicion that the employee's performance or behavior is being adversely affected by use of such substance(s). Reasonable suspicion will be based upon physical manifestations of impairment, or unsatisfactory behavior or job performance (including on-the-job accident or injury) which causes the supervisor and Human Resources Representative to reasonably believe that alcohol or drug abuse may be a contributing factor. Refusal by an employee to take such a test will be viewed as an admission of such use by the employee.

11.23.5 Confidentiality of Records

11.23.5.1 All information concerning an applicant's or employee's medical condition or test results will be kept strictly confidential, with information released only upon a legitimate need-to-know basis.

11.24 FALL PROTECTION PLAN

11.24.0.1 If workers at 4825 Glenbrook Road have the potential to become exposed to fall hazards, proper precautions will be implemented to ensure safety. Standard guardrail, catch platforms, temporary floors, and safety nets will be used based on evaluations by the SSHO and PSHM. In addition, full-body harnesses with a shock absorbing lanyard will be worn by any personnel working at risk of falling more than 6 feet. The lanyard will be adjusted to limit free-fall to no more than 6 feet. Lanyards will be secured to strong structural components (breaking strength of 5,000 pounds per attached employee) or lifelines.

11.25 STEEL ERECTION PLAN

11.25.1.1 Project activities during ECS construction at 4825 Glenbrook Road will involve steel erection and, therefore, a steel erection plan is required and included after the AHA for ECS construction in Attachment D-2 of this APP.

11.26 NIGHT OPERATIONS LIGHTING PLAN

11.26.0.1 All field operations at 4825 Glenbrook Road will be performed during daylight hours (dawn to dusk) and, therefore, a night operations lighting plan is not required.

11.27 SITE SANITATION PLAN

11.27.0.1 Site sanitation measures to be implemented at 4825 Glenbrook Road are provided in Chapter 12 of the SSHP (Attachment 1 to this APP).

11.28 FIRE PREVENTION PLAN

11.28.1 General

11.28.1.1 Sources

11.28.1.1.1 Although fires and explosions may arise spontaneously, they are more commonly the result of carelessness during the conduct of site activities, such as moving drums, mixing/bulking of site chemicals, and during refueling of heavy or hand held equipment. Other potential causes of explosions and fires include:

- Mixing of incompatible chemicals, which cause reactions that spontaneously ignite due to the production of both flammable vapors and heat.
- Ignition of explosive or flammable chemical gases or vapors by external ignition sources.
- Ignition of materials due to oxygen enrichment.
- Agitation of shock- or friction-sensitive compounds.

- Sudden release of materials under pressure.

11.28.1.2 To ensure adequate fire protection, the SSHO will inspect the site to ensure all flammable and combustible materials are being safely stored in appropriately configured storage areas and containers. The SSHO will also ensure that no flammable/combustible materials are stored near any sources of ignition, and that sources of ignition are removed a safe distance from storage areas. If needed, storage areas will be segregated from the remainder of the site through the use of flagging. Portable fire extinguishers will be located on site.

11.28.1.3 Explosions and fires not only pose the obvious hazards of intense heat, open flames, smoke inhalation, and flying objects, but may also cause the release of toxic chemicals into the environment. Such releases can threaten both personnel on site and members of the general public living or working nearby. Site personnel involved with potentially flammable material or operations will follow the guidelines listed below and EM 385-1-1, Section 9, to prevent fires and explosions:

- Potentially explosive/flammable atmospheres involving gases or vapors will be monitored using a combustible gas indicator.
- Prior to initiation of site activities involving explosive/flammable materials, all potential ignition sources will be removed or extinguished.
- Non-sparking and explosion-proof equipment will be used whenever the potential exists for ignition of flammable/explosive gases/vapors/liquids.
- Dilution or induced ventilation may be used to decrease the airborne concentration of explosive/flammable atmospheres.
- Smoking will be prohibited at, or in the vicinity of, operations which may present a fire hazard, and the area will be conspicuously posted with signs stating “No Smoking or Open Flame within 50 Feet.”
- Flammable and/or combustible liquids must be handled only in approved, properly labeled metal safety cans equipped with flash arrestors and self-closing lids.
- Transfer of flammable liquids from one metal container to another will be done only when the containers are bonded.
- The motors of all equipment being fueled will be shut off during the fueling operations.
- Metal drums used for storing flammable/combustible liquids will be equipped with self-closing safety faucets, vent bung fittings, grounding cables and drip pans, and will be stored outside buildings in an area approved by the SSHO.
- Outdoor flammable/combustible materials storage areas will be: lined and surrounded by a dike of 12 inches in height, and of sufficient volume to contain 110 percent of the stored materials; located 50 feet from buildings; and kept free of

weeds, debris, and other combustible materials.

11.28.1.4 In the event of fire, the firefighting procedures will be followed that are described in the ERCP in Chapter 15 of the SSHP (Attachment 1 to this APP).

11.28.2 Fire Extinguishers

11.28.2.1 At minimum, 20lb portable ABC fire extinguishers will be located on site at the PDS and ECS, and in the crew break area or warm-up/cooling shelter. An extinguisher will also be located in the exclusion zone during demolition and low probability excavation operations.

11.28.2.2 The four classes of fire, along with their constituents, are as follows:

Class A	Wood, cloth, paper, rubber, many plastics, and ordinary combustible materials.
Class B	Flammable liquids, gases, and greases.
Class C	Energized electrical equipment.
Class D	Combustible metals such as magnesium, titanium, sodium, and potassium.

11.28.2.3 Examples of proper extinguishing agents are as follows:

Class A	Water or ABC Dry Chemical
Class B	ABC Dry Chemical
Class C	ABC Dry Chemical
Class D	Metal-X Dry Chemical (not anticipated and not on-site.).

CHAPTER 12
CONTRACTOR INFORMATION

12.1 GENERAL

Parsons and its subcontractors will meet the requirements of the applicable sections of this APP by following the SSHP provided in Attachment 1 and the SOPs provided in Attachment 4, of this APP.

12.2 STANDARD OPERATING PROCEDURES

The following SOPs are provided in Attachment 4 of this APP. A printed copy of the SOPs will be maintained onsite during field work.

- Demolition Operations Plan (SOP #1)
- Personal Protective Equipment (SOP #4)
- Hearing Conservation Program (SOP #5)
- Lockout/Tag out Program (SOP #6)
- Medical Surveillance, Control/Access to Employee Medical Records, and Emergency Care (SOP #7)
- Emergency Response and Fire Prevention Plan (SOP #8)
- Hazard Communication Program (SOP #9)
- Electrical Safety (SOP #10)
- Confined Space Entry (SOP #11)
- Heavy Equipment and Vehicle Safety (SOP #12)
- Safety Considerations during Trenching and Excavation (SOP #13)
- Safe Procedures for Handling, Storage and Use of Pressurized Cylinders (SOP #14)
- Respiratory Protection Program (SOP #15)
- Severe Weather Operations (SOP #16)
- Security Officer Operations (SOP #19)
- Soil Sampling Procedures (SOP #20)
- Soil Handling (SOP #21)
- Headspacing Scrapes and Soil (SOP #22)

- Decontamination of Excavator Buckets (SOP #23)
- Crane Operations (SOP #26)
- Procedures for Monitoring Mustard and Lewisite Agent, and Agent Breakdown Products (ABPs) (SOP #31)
- Corrective and Preventive Action (SOP #32)
- Conventional Ordnance (SOP #34)
- MPPEH Handling (SOP #37)

CHAPTER 13
SITE SPECIFIC HAZARDS AND CONTROLS

13.1 HAZARDS ASSOCIATED WITH THE REMDIAL ACTION AT 4825 GLENBROOK ROAD

13.1.1 Potential CWM at the 4825 Glenbrook Road Site includes various AUES related items containing CA such as mustard (H), lewisite (L), and non-persistent chemicals such as hydrogen cyanide (AC), phosgene (CG) and arsenic trichloride ($AsCl_3$). If a suspected AUES related items were recovered during the low probability operations, a low probability contingency plan will be initiated. The low probability contingency plan is included in Attachment 5 of this APP.

13.1.2 Based on previous investigation results, the potential for encountering MEC is unlikely. If a MEC is recovered in an unlikely event at the site, a high probability contingency plan will be initiated. The high probability contingency plan is included in Attachment 6 of this APP.

13.1.3 There is a possibility that chemical agent contaminated media (CACM) may be encountered. Based on current guidance, these are not considered CWM; however, in certain concentrations and under certain site conditions, these media may pose risks to human health and the environment.

13.2 HAZARDS ACTIVITIES ASSOCIATED WITH THE REMDIAL ACTION AT 4825 GLENBROOK ROAD

13.2.1 The remedial action at 4825 Glenbrook Road will involve potentially hazardous activities during the course of operations. Chapter 2 of the SSHP (Attachment 1 to this APP) identifies the hazards associated with the project activities. The AHA for each activity is presented as Attachment 2 to the APP and details each activity and preventative measures for avoiding accidents. Personnel involved with hazardous tasks will be qualified to participate by previous or site specific training, as applicable.

13.2.2 Detailed site specific hazards and controls are provided in the AHAs for each activity conducted during the remedial action activities. The AHAs for the following activities are provided in Attachment 2 of this APP.

- ☐ AHA-1, Demolition Operations
- ☐ AHA-2, Drum Handling
- ☐ AHA-3, Excavation Backfill
- ☐ AHA-4, Explosive Storage and Transportation (ESAT) Operations
- ☐ AHA-5, Fueling Operations
- ☐ AHA-6, General Site Construction Operations

☐ AHA-7, Intrusive Investigations in Conventional/CWM/HTRW Operations, to include Concrete Coring

☐ AHA-8, Land Surveying

☐ AHA-9, Mobilization/Demobilization

☐ AHA-10, Material Potentially Presenting an Explosive Hazard (MPPEH) Inspection and Munition Debris (MD) Turn-in

☐ AHA-11, Portable Hand Held Power Tools, Saws, Grinders, and Pneumatic Tool Operations

☐ AHA-12, Security Operations

☐ AHA-13, Soil Handling in a Chemical or Other Hazardous Environments

☐ AHA-14, Vegetation Removal

☐ AHA-15, Heavy Equipment Operations

☐ AHA-16 Vehicle Heavy Equipment and Utility Vehicle (UTV)

☐ AHA-17, Air Monitoring

☐ AHA-18, ECS and MAC construction

☐ AHA-19, IDW Sampling

☐ AHA-20, Emergency Rescue Operations

☐ AHA-21, Personnel Equipment and RCW Material Decontamination Station

☐ AHA-22, Interim Holding Facility (IHF) Entry

CHAPTER 14
REFERENCES

Site Wide Work Plan for the Spring Valley Formerly Used Defense Site, Spring Valley, Washington D.C., March 2007.

Chemical Safety Submission for 4825 Glenbrook Road Remedial Design/Remedial Action, Spring Valley, Washington D.C., 2012.

SITE SAFETY AND HEALTH PLAN

4825 GLENBROOK ROAD REMEDIAL DESIGN/REMEDIAL ACTION
SPRING VALLEY FORMERLY USED DEFENSE SITE,
OPERABLE UNIT 3
SPRING VALLEY, WASHINGTON, D.C.

Prepared for:

U.S. Army Engineering and Support Center, Huntsville

And

Baltimore District
U.S. Army Corps of Engineers

Prepared by:

PARSONS

100 M Street SE
Washington DC

DECEMBER 2015

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CHAPTER 1
SITE DESCRIPTION AND CONTAMINATION CHARACTERIZATION

1.0.0.1 The Accident Prevention Plan (APP) and this Site Safety and Health Plan (SSHP) are appended to the Site-Specific Work Plan (SSWP) that describes the site-specific objectives, methods and procedures to be implemented during the remedial action intrusive field operations at 4825 Glenbrook Road within the Spring Valley Formerly Used Defense Site (SVFUDS).

1.1 SITE DESCRIPTION

1.1.0.1 A description of the 4825 Glenbrook Road site including location, history, and previous investigations is contained in Chapter 1 of the SSWP.

1.2 CONTAMINATION CHARACTERIZATION

1.2.0.1 Based on historical information and previous investigations at the 4825 Glenbrook Road site, the primary munition of concern is an explosively configured 75mm Mk II chemical projectile. However, after the completion of Burial Pit 3 investigation, the potential for encountering an explosively configured 75 mm Mk II chemical projectile or other munitions and explosives of concern (MEC) items is unlikely in the areas where the remedial action will be performed.

1.2.0.2 The primary chemical hazards at the site are chemical warfare materiel (CWM) including mustard, lewisite, and arsine. Other potential chemical hazards at the 4825 Glenbrook Road site include:

- Agent breakdown products (ABPs):
    - Dithiane, oxathiane, and thiodiglycol, which are ABPs of mustard.
    - Chlorovinylarsenous oxide (CVAO) and chlorovinylarsenous acid (CVAA), which are ABPs of lewisite.
- Other CWM-related and industrial chemicals such as chloroacetophenone (CN), diphenylchloroarsine (DA), hexachloroethane and arsenic trichloride detected in lab containers.
- Gasoline and diesel vehicle fuels.
- Decontamination solutions, such as diluted hypochlorite bleach solution, dilute nitric acid, and isopropyl alcohol.

- Arsenic-contaminated soils.
- Other hazardous and toxic waste (HTW) compounds.

CHAPTER 2
HAZARD AND RISK ANALYSIS

2.1 INTRODUCTION

2.1.0.1 Work activities, natural phenomena, and biological hazards may present a risk to the field team on this project. The level of risk is dependent upon the type of work being conducted. This chapter identifies physical, chemical, and biological hazards associated with the tasks scheduled to be performed on this project and outlines the procedures that are to be employed to prevent accidents, injuries, and illness.

2.1.0.2 Personnel working most directly with intrusive activities will have the greatest chance of encountering chemical hazards, and possible MEC in an unlikely event. However, all project personnel and visitors to the site will be expected to be aware of the guidance provided by this document and comply with all applicable safety and health requirements during all activities.

2.1.0.3 Individual hazard analyses have been performed for the tasks associated with the 4825 Glenbrook Road remedial action. The potential hazards have been identified; control measures have been outlined; training requirements and personal protective equipment (PPE) requirements have been established; and equipment inspection procedures have been established. The following activities are considered in the Activity Hazard Analyses (AHAs):

- Site mobilization/preparation.
- House demolition.
- Property survey and mapping.
- Landscape survey.
- Tree removal and sloping.
- Intrusive investigation, low probability areas.
- Intrusive investigation, higher probability areas.
- Drum/multiple round container handling.
- Personnel Decontamination Station (PDS) operation.
- Emergency rescue.
- Air monitoring.
- HTW-contaminated soil removal and packaging.
- Soil sampling.

- Excavation backfill.
- Cutting and welding/brazing

2.1.0.4 Attachment 2 to the APP contains AHAs for each of the tasks identified for the 4825 Glenbrook Road remedial action, including potential hazards, control measures, training requirements, and PPE requirements.

2.1.0.5 If new operations/tasks are introduced, an AHA will be performed by the Project Safety and Health Manager (PSHM). If operations change significantly during the course of this project, the related AHA will be updated to accommodate these changes. Any changes in PPE or operating procedures will be approved by the PSHM before they are implemented, and will be communicated to field team during daily tailgate safety meetings. It will be the responsibility of the Site Safety and Health Officer (SSHO) to ensure that the required controls are being properly implemented.

2.2 CLASSIC SAFETY HAZARDS

2.2.0.1 The classic safety hazards potentially associated with this project are expected to include:

- Slips, trips, and falls;
- Motor vehicle and heavy equipment operation;
- Trenching/excavation safety;
- Confined spaces;
- Electrical energy, lockout/tagout; and
- Pressurized cylinders.

2.2.0.2 Personnel working most directly with the project activities will have the greatest chance of encountering these hazards; however, all personnel on site will have the possibility of encountering them at one time or another. These hazards at the job site and methods to prevent injury resulting from them are described in the following subsections. Additional physical hazards are addressed in Section 2.5.

2.2.1 Slip, Trip, and Fall Hazards

2.2.1.1 Hazard Identification

2.2.1.1.1 Work sites may contain slip, trip, and fall hazards for site workers, such as:

- Holes, pits, or ditches.
- Slippery surfaces.
- Steep grades.

- Uneven grades.
- Sharp objects, such as nails, metal shards, and broken glass.
- Weather conditions, such as snow, that makes surfaces slippery and obscure visibility.

2.2.1.2 Hazard Mitigation/Prevention

2.2.1.2.1 Site personnel will be instructed to look for these potential safety hazards and immediately inform the SSHO, the United States Army Engineering and Support Center, Huntsville (USAESCH) Safety Specialist or the United States Army Corps of Engineers (USACE), Baltimore District (CENAB) Site Operations Officer about any new hazards. If the hazard cannot be immediately removed, action will be taken to warn site workers about the hazard. Slips, trips, and fall hazards will be a daily tailgate safety briefing item. Operations will cease if weather conditions could cause activities to be hazardous.

2.2.2 Motor Vehicles and Heavy Equipment

2.2.2.1 Hazard Identification

2.2.2.1.1 Site tasks such as site preparation, brush clearing, and excavation may require the operation of vehicles and/or heavy equipment and working around these vehicles and equipment may present a hazard. Injuries can result from being hit or run over by a moving vehicle, from vehicles overturning, or from being struck, burned, or otherwise injured by moving parts.

2.2.2.2 Hazard Mitigation/Prevention

2.2.2.2.1 The following precautions will be taken to help prevent injuries and accidents related to motor vehicles and heavy equipment:

- Operations will often occur in residential neighborhoods so special care will be exercised while operating vehicles and heavy equipment because of narrow streets and residential traffic.
- Brakes, hydraulic lines, light signals, fire extinguishers, fluid levels, steering mechanisms, tires, horn, and other safety devices will be inspected and maintained in good working order throughout the duration of field activities. Whenever any machinery or equipment is found to be unsafe, or whenever a deficiency that affects the safe operation of equipment is observed, the equipment will be immediately taken out of service and its use prohibited until unsafe conditions have been corrected.
- All construction motor vehicles will not be operated in reverse gear unless the vehicle has a reverse signal alarm audible above the surrounding noise level, backup warning lights, and the vehicle is backed up only when a spotter signals it is safe to do so.

- Construction and heavy equipment will be provided with necessary safety equipment including seat belts, rollover protection, emergency shut-off during rollover, backup warning lights, and audible alarms.
- Blades and buckets will be lowered to the ground and parking brakes will be set before shutting off any heavy equipment or vehicles.
- Field support vehicles will be equipped with a first-aid kit and appropriate fire extinguisher.
- All operators will provide proof of competency to the SSHO prior to operation of heavy equipment.

2.2.3 Trenching/Excavation Safety

2.2.3.1 Hazard Identification

2.2.3.1.1 When excavations exceed a depth of 4 feet, potential hazards include:

- Cave-ins.
- Items falling into the excavation.
- Personnel falling into the excavation.

2.2.3.2 Hazard Mitigation/Prevention

2.2.3.2.1 If the excavation exceeds 4 feet in depth and will be entered by workers, a modular panel shoring system or sloping/benching will be used. Designs for these systems have been prepared and sealed by a registered professional engineer and will be kept at the site for the duration of the investigation. The installation of the speed shoring modular system will be performed by a competent person in accordance with design drawings and manufacturer recommendations.

2.2.3.3 Additional Mitigations

- A safe means of egress will be provided if the excavation depth is greater than 4 feet.
- Exit locations will be spaced at lateral intervals of less than 25 feet.
- Water Accumulation. The Occupational Safety and Health Administration (OSHA) standard prohibits employees from working in excavations where water has accumulated or is accumulating unless adequate protection has been taken. If water removal equipment is used to control or prevent water from accumulating, a competent person will monitor the equipment to ensure proper use and operation of the equipment.

- A competent person, as defined by OSHA, will perform daily inspections of excavations for evidence of a potential cave-in. Inspections will also be conducted after every rainstorm.

2.2.3.4 Falls and Equipment

2.2.3.4.1 In addition to cave-in hazards and secondary hazards related to cave-ins, other hazards from which workers must be protected during excavation-related work include exposure to falls, falling loads, and mobile equipment. To protect employees from these hazards, OSHA requires the employer to take the following precautions:

- Keep materials or equipment that might fall or roll into an excavation at least 2 feet from the edge of excavations, or have retaining devices, or both.
- Provide warning systems such as mobile equipment, barricades, hand or mechanical signals, or stop logs, to alert operators of the edge of an excavation. If possible, keep the grade away from the excavation.
- Provide scaling to remove loose rock or soil or install protective barricades and other equivalent protection to protect employees against falling rock, soil or materials.
- Prohibit employees from working on faces of sloped or benched excavations at levels above other employees unless employees at lower levels are adequately protected from the hazard of falling, rolling, or sliding material or equipment.

2.2.4 Confined Space

2.2.4.1 Hazard Identification

2.2.4.1.1 If an excavation is more than 4 feet deep and requires personnel entry, it may present hazards associated with confined spaces. These potential hazards are addressed in Chapter 17 of this SSHP for non-permit-required confined spaces

2.2.4.2 Hazard Mitigation/Prevention

2.2.4.2.1 The hazard mitigation/prevention measures for confined spaces are addressed in Chapter 17 of this SSHP.

2.2.5 Electrical Energy, Lockout/Tagout

2.2.5.1 Hazard Identification

2.2.5.1.1 It is important to be aware of electrical safety to prevent electrical accidents. Accidents occur when electrical equipment is not properly used and/or installed. Accidents also occur when equipment is not properly isolated, shut down, and/or de-energized (i.e., lockout/tagout procedures are not used).

2.2.5.2 Hazard Mitigation/Prevention

2.2.5.2.1 Electrical Energy

- No electrical work will be performed on an energized circuit.
- Only approved, qualified electricians will be permitted to work on electrical equipment or electrical wiring.
- Proper clearance and grounding procedures will be used. All electrical circuits and equipment will be de-energized and lockout/tagout accomplished before maintenance or repair work is started.
- Single-phase electric hand tools and other single-phase portable electrical equipment will be approved by a recognized testing agency and all exposed non-current-carrying metal parts will be grounded or double-insulated.
- Before each use, portable electrical appliances will be examined for obvious defects in the appliance, cord, and plug. If any deficiency is noted, the appliance will not be used.
- Extension cords will be kept clean, dry, free of kinks, and protected from oil, hot or sharp surfaces, and chemicals. Extension cords used outdoors will be equipped with Ground Fault Circuit Interrupters (GFCI).
- Portable electrical tools not provided with special insulating or grounding protection will not be used at 4825 Glenbrook Road.
- Portable electrical appliances and equipment with non-current-carrying metal parts exposed to contact by personnel will be grounded by a continuous conductor from the device to a grounded receptacle. The SSHO will resolve any question as to whether a particular appliance is or should be grounded.
- Grounding of receptacles will be accomplished in one of two ways:
    - A built-in ground wire of green color will be attached to the ground pole of the receptacle, or
    - The conduit system, if installed in an approved manner, will be relied upon for grounding of a receptacle serving single-phase appliances with ratings up to 230 volts.
- At outside locations all single-phase 15- and 20-ampere receptacle outlets (operating at 230 volts or less) that are not part of the permanent wiring of the building or structure will have GFCI for personnel protection. The GFCI will be located at the power source so that all extension cords and tools are protected.
- The outlet box for portable extension cords for outdoor use will be weatherproof and maintained in good condition.

2.2.5.3 Lockout/Tagout

2.2.5.3.1 Lockout/tagout procedures will be used for all maintenance procedures to ensure the equipment is isolated from all potential hazardous energy sources (electrical and mechanical). These procedures include the following:

- The immediate supervisor with jurisdiction over the equipment and all affected employees will be notified that the energy sources are to be deactivated.
- All sources of power that must be locked out, blocked or released will be identified by the immediate supervisor and the employee who will work on the equipment.
- In order to ensure that the equipment cannot be re-energized while maintenance activities are performed, employees will lockout/blank out all potential energy sources. The employees will be assigned padlocks with their names or identification numbers affixed to the locks. The locks will be individually keyed to prevent another employee from removing the lock inadvertently. If more than one employee is assigned to work on the equipment, a multi-lockout hasp will be used so that all employees working on the equipment can apply their locks and ensure their safety.
- A tagout device will be affixed to all components or systems de-energized to indicate that lockout has occurred.
- After the servicing and/or maintenance are complete and the equipment is ready for normal operations, the area around the machine or equipment will be checked. After all tools have been removed from the machine or equipment, guards have been reinstalled, all lockout or tagout devices will be removed. Finally, the energy-isolating devices will be operated to restore energy to the machine or equipment.

2.2.6 Pressurized Cylinders

2.2.6.1 Hazard Identification

2.2.6.1.1 Compressed air and gas cylinders are associated with the supplied air system for breathing air and analytical instruments. Hazards may arise from leaking cylinders and subsequent gas build up (e.g., hydrogen associated with gas chromatographs) or from the rapid release of compressed gases if a valve is broken off the cylinder. Such an accident can propel the cylinder like a missile.

2.2.6.2 Hazard Mitigation/Prevention

- All cylinders will be stored in a well-ventilated location.
- All cylinders will be secured with substantial fixed or potable racks or hand trucks.
- Cylinder valves will be closed and valve caps in place when cylinders are in storage, in transit, not in use, or empty.

- Cylinders transported by crane, hoist, or derrick, will be securely transported in cradles, nets, or skip pans, and never directly by slings, chains or magnets.
- All cylinders will be labeled as to their contents and all storage areas will be properly placarded.
- Cylinders will be protected from physical damage, electric current, and extremes of temperature. The temperature of the cylinders will not be allowed to exceed 130°F.
- Cylinders will only be filled by qualified persons.
- Smoking will be prohibited wherever cylinders are stored, handled, or used.
- Leaking cylinders will be moved to an isolated location out of doors, the valve will be cracked, and the gas will be allowed to escape slowly. Personnel and ignition sources will be kept away and the cylinder will be tagged "DEFECTIVE."
- All cylinders will be stored (full or empty) in an upright position.
- Cylinders will be marked as to "FULL" or "EMPTY" and segregated.

2.2.7 Demolition Safety

2.2.7.0.1 Demolition safety is discussed in the demolition plan included in Attachment 3 of this APP.

2.3 EXPLOSIVE ORDNANCE AND EXPLOSIVE HAZARDS

2.3.1 Hazard Identification

2.3.1.1.1 Owing to the former use of the SVFUDS and based on the results of previous investigations at the site, it is possible that the field team may encounter MEC items that have been fired, disposed of, or abandoned, and that still represent a hazard.

2.3.2 Hazard Mitigation/Prevention

2.3.2.1.1 All field personnel will be given ordnance recognition training prior to working on the site as discussed in Chapter 4 of this SSHP. The training will be verified by signature on the site training form. Personnel will be instructed to be alert for unexploded ordnance (UXO)/MEC and munitions debris.

2.3.2.1.2 The following general precautions concerning suspect MEC will be observed at all times:

- Suspect MEC item(s) WILL NOT be touched or moved regardless of the markings or apparent condition.

- Radios or cellular phones WILL NOT be used in the vicinity of suspect MEC items.
- Areas where the ground cannot be seen WILL NOT be traveled across.
- Vehicles WILL NOT be driven into suspected MEC areas; clearly marked lanes will be used.
- Matches, cigarettes, lighters, or other flame-producing devices WILL NOT be carried on to a munitions response site (MRS).
- Color codes WILL NOT be relied upon for positive identification of MEC items or their contents.
- Suspect MEC items will be approached from the side whenever possible; approaching the front or rear areas will be avoided.
- Personnel will always assume that a MEC item contains a live charge until it can be determined otherwise.

2.3.2.2 The following actions will be taken if ordnance is found:

- Personnel who are not UXO-qualified will leave the immediate vicinity. They WILL NOT touch, move, or otherwise disturb the item.
- Personnel should not be misled by markings on the ordnance item stating or indicating that the item is a practice bomb or inert. Even practice bombs may have explosive charges that are used to mark/spot the point of impact, or the item could be incorrectly marked.
- Immediately upon locating any suspect UXO/MEC, the SSHO and Site Manager will be notified. In turn, the SSHO or Site Manager will notify the Parsons Project Manager (PM), the USAESCH Safety Specialist, and the CENAB Site Operations Officer.
- Operations in the immediate area of the suspect UXO/MEC will be halted and the appropriate Contingency Plan (Section 16) will be implemented.

2.4 CHEMICAL HAZARDS

2.4.1 Hazard Identification

2.4.1.1 Tables D1.2.1a and D1.2.1b list contaminants of concern for both higher probability investigations and low probability areas at the 4825 Glenbrook Road site. The tables list the Threshold Limit Value (TLVs), Permissible Exposure Limit (PELs), Immediately Dangerous to Life or Health (IDLH) value, odor threshold, and health effects for these compounds.

2.4.1.2 The primary contaminants of concern at low probability areas are fuels and decontamination fluids. The latter solutions include nitric acid, bleach solution, and isopropyl alcohol.

2.4.1.3 The primary contaminants of concern at higher probability areas are mustard and lewisite agents and their associated breakdown products, arsenic trichloride and its breakdown products (such as arsenic hexoxide, $As(OH)_3$,and HCl), arsine, ricin, fuels, and decontamination fluids. The latter solutions include nitric acid, bleach solution, and isopropyl alcohol.

2.4.1.4 Arsenic trichloride ($AsCl_3$) is colorless to yellow oily fuming liquid that is irritating to the skin, eyes, and mucous membranes. Its vapor reacts with water vapor to form hydrochloric acid, and arsenic oxide, or arsenous acid (also known as arsenious acid). Therefore, it is unlikely that AsCl3 vapors will persist since it readily reacts to water, if present. If liquid AsCl3 is encountered as a splash hazard during site operations, the excavation team should be aware that pure liquid AsCl3 permeates Tychem F within 38 minutes (from Dupont Permeation guide, test method ASTM F739).

2.4.1.5 Hydrogen chloride (HCl) and arsenic hexoxide (As_4O_6) are formed when arsenic trichloride is exposed to water (see below equation). HCL is a gas with a relative vapor density of 1.3 (i.e. HCL is heavier than air). Exposure to hydrogen chloride is irritating and potentially damaging to the eyes, skin, and respiratory tract. The current threshold limit value for HCL is 2 ppm-Ceiling. The Level B ensemble currently used by the excavation team is protective against exposure to hydrogen chloride (hydrogen chloride permeates slowly through Tychem F and Butyl rubber) up to 400 ppm. As_4O_6, arsenic hexoxide, is a solid and its hydrolyzed form is arsenous acid ($As(OH)_3$), a weak acid. The arsenous oxide reaction product is As_4O_6, hydrated As_4O_6, H_3AsO_3, and/or a solution of H_3AsO_3 depending upon the amount of water vapor present The possible reactions are shown below:

$$4\,AsCl_3 + 6\,H_2O \rightarrow As_4O_6 + 12\,HCl$$
$$AsCl_3 + 3\,H_2O \rightarrow As(OH)_3 + 3\,HCl$$

In addition to the first reaction (i.e., formation of arsenic hexoxie), arsenious acid (as referred to as arsenous acid), $As(OH)_3$, also can form. It is a pale yellow to pale green liquid that is readily soluble in water, forming various arsenic salts. The substance is irritating to the eyes, skin, and the respiratory tract.

2.4.1.6 Arsenic-contaminated soil is likely at both low and higher probability sites but exposures will be limited through dust control measures when necessary. Dust concentrations will be continuously monitored and controlled to $2.34 mg/m^3$. Based on the analytical data collected at the site to date, the highest reported arsenic concentration detected in soil is 4,280mg/kg. Assuming this as a maximum concentration in soil and using the American Conference of Government Industrial Hygienists' TLV® for arsenic of $10 \mu g/m^3$ ($0.01 mg/m^3$), then the maximum concentration of dust permissible during SVFUDS operations would be:

$$\text{Dust Action Level} = (\text{Exposure Limit, mg/m}^3) \times (10^6) / (\text{Soil Concentration, mg/kg})$$

or

$$\frac{0.01\text{mg/m}^3 \times 10^6\,\text{mg/kg}}{4{,}280\text{mg/kg}} = 2.34\text{mg/m}^3$$

Table D1.2.1a
Health Hazard Properties of Contaminants of Concern and Hazardous Materials for Higher Probability Areas
(Chemical Agents, Industrial Chemicals, and Agent Breakdown Products)

Compound	PEL	TLV	IDLH	Physical Description/Health Effects/Symptoms
Mustard (H)	0.0004 mg/m^3 (WPL) 0.003 mg/m^3 (STEL)	NA	NA	Blister agent. Yellow, oily liquid. Garlic odor. Reddening of skin or appearance of blisters may occur several hours after exposure. Conjunctivitis, blindness. Carcinogen.
Lewisite (L)	0.003 mg/m^3 (C)	NA	NA	Blister agent. Dark oily liquid with geranium-like odor. Immediate pain on contact. Affects eyes, lungs, & blisters skin. Acts as systemic poison, causing pulmonary edema, diarrhea, restlessness, weakness, subnormal temperature, & low blood pressure. Experimental teratogen.
Arsine (SA)	0.05 ppm	0.05 ppm	3 ppm	Colorless gas with a garlicky or fishy odor. Nonirritating & produces no immediate symptoms. Symptoms of exposure may develop within several hours & include dizziness, nausea, abdominal pain, & difficulty breathing.
Phosgene (CG)	0.1 ppm	0.1 ppm	2 ppm	Colorless liquid or gas with a sweet odor like hay at low concentrations; sharp, pungent odor at high concentrations. Symptoms of exposure include eye irritation; dry burning throat; vomiting; coughing, foamy sputum, shortness of breath, chest pain; bluish or purplish discoloration of skin, & skin burns.
Ricin	NA	NA	NA	White powder or pellet (though soluble in water or weak acid). Toxic if inhaled, ingested, or injected. Symptoms occur 6-8 hours after exposure & include difficulty breathing, fever, cough, nausea, & tightness in chest (if inhaled), & vomiting & diarrhea (if ingested). Exposure to skin or eyes may cause redness & pain.
Chloroform	50 ppm (C)	10 ppm	500 ppm	Clear, colorless liquid with pleasant sweet odor. Central nervous system (CNS) depressant & carcinogen. Irritation of eyes, skin & respiratory tract. CNS effects include headache, drowsiness, dizziness. Ingestion causes severe burning in mouth & throat, chest pain & vomiting. Individuals with existing skin disorders, eye problems, or impaired liver, kidney or respiratory function may be more susceptible to adverse effects.
Cyanogen Chloride (CK)	NA	0.3 ppm (C)	NA	Colorless gas or liquid (below 55°F) with irritating odor. Symptoms of exposure include irritation of eyes and/or upper respiratory system; coughing or delayed pulmonary edema; weakness, headache, giddiness, dizziness, confusion, nausea, or vomiting; heartbeat irregularities. Exposure to liquid may cause skin irritation.
Chloropicrin (PS)	0.1 ppm	0.1 ppm	2 ppm	Colorless to faint-yellow, oily liquid with an intensely irritating odor. Symptoms of exposure include severe irritation of eyes, skin & respiratory passages; lacrimation, nausea, vomiting, colic, diarrhea, bronchitis & pulmonary edema. May also cause vertigo, fatigue & cough. High level exposures followed by burning of nose & throat, coughing, shortness of breath, dizziness, nausea or vomiting, headache, & extreme eye irritation. Skin contact results in immediate burning or stinging pain followed by redness.
Thiodiglycol	NA	NA	NA	Eye, lung, & skin irritation.
1,4 Dithiane	NA	NA	NA	Eye, lung & skin irritation.
1,4-Oxathiane	NA	NA	NA	Unknown.

Notes: NA - Not available or Not applicable. WPL - Worker Population Limit STEL - Short term exposure limit C - Ceiling

Table D1.2.1a
Health Hazard Properties of Contaminants of Concern and Hazardous Materials for Higher Probability Areas (Chemical Agents, Industrial Chemicals, and Agent Breakdown Products)

Compound	PEL	TLV	IDLH	Physical Description/Health Effects/Symptoms
Arsenic Trichloride ($AsCl_3$)	0.01 mg(As)/m^3 (0.003 ppm) (TWA)	0.01 mg/m^3 (0.003 ppm) (TWA)	5 mg/m^3 (1.63 ppm)	A colorless to pale yellow liquid that has a vapor pressure of 10 mmHg at 24°C. When exposing to air it fumes and when contacting water/moisture it convert rapidly to HCL and $AS(OH)_3$. Arsenic trichloride is a strong irritant. Skin contact with the liquid can cause local irritation, blisters, and severe burns. Similarly inhalation of vapors can cause upper respiratory irritation.
Arsenic Oxide (As_2O_3/As_4O_6)	0.01mg(As)/m^3 (0.003 ppm) (TWA)	0.01mg(As)/m^3 (0.003 ppm) (TWA)	NA	A odorless transparent crystals or white powder. May decompose on exposure to moist air or water. Reaction with acids generates arsine. May cause skin, eye, and upper respiratory tract irritation .
Arsenious acid ($As(OH)_3$)	0.01 mg(As)/m^3 (0.003 ppm)	0.01 mg/m^3 (0.003 ppm)	NA	Pale yellow to pale green liquid that is readily soluble in water, forming various arsenic salts. The substance is irritating to the eyes, the skin and the respiratory tract..
Hydrogen Chloride (HCL)	7 mg/m^3-C (5 ppm)	3 mg/m^3-C (2 ppm)	50ppm	A gas with a relative vapor density of 1.3 (i.e. it is heavier than air). Exposure to hydrogen chloride is corrosive to the eyes, skin and respiratory tract.

Notes: NA - Not available or Not applicable. WPL - Worker Population Limit STEL - Short term exposure limit C – Ceiling
TWA Time Weighted Average

Table D1.2.1b
Health Hazard Properties of Contaminants of Concern and Hazardous Materials for Both Low and Higher Probability Areas
(Fuels, Decontamination Fluids, and Arsenic)

Compound	PEL	TLV	IDLH	Physical Description/Health Effects/Symptoms
Gasoline (fuel)	300 ppm (TWA); 500 ppm (STEL)	300 ppm (TWA); 500 ppm (STEL)	NA	Light yellow to light red liquid with aromatic odor. Overexposure may cause redness of the eyes, redness and/or swelling if skin is contacted, & headache, nausea, vomiting, dizziness, drowsiness, euphoria, loss of coordination, & disorientation if inhaled.
Diesel (fuel)	NA	100 mg/m^3	NA	Yellow-brown liquid. Symptoms of exposure may include nausea, vomiting, cramping, CNS depression, headache, anesthesia, coma, death, irritation, coughing, gagging, dyspnea, skin & eye irritation & substernal distress.
Nitric Acid (decon solution)	2 ppm	2 ppm (TWA); 4 ppm (STEL)	25 ppm	Clear, colorless liquid with pungent odor. Very corrosive on contact with eyes & skin. Very corrosive when inhaled, causing choking, bronchitis, pneumonitis, breathing difficulty, & irritation of the mucous membranes. Causes burning of the esophagus & mouth, irritation, shock or death if ingested.
5% Sodium Hypochlorite (decon solution)	0.5 ppm (TWA); 1 ppm (STEL) as Chlorine	1 ppm (TWA); 3 ppm (STEL) as Chlorine	NA	Pale yellow liquid with chlorine odor. Excessive inhalation of vapors, mists, or fumes may cause bronchial, coughing, labored breathing, nausea, & pulmonary edema. Skin contact may cause severe irritation with blistering & eczema, especially at higher concentrations.
Isopropyl Alcohol (decon solution)	400 ppm (TWA); 500 ppm (STEL)	200 ppm (TWA); 400 ppm (STEL)	2,000 ppm	Colorless liquid with the odor of rubbing alcohol. Symptoms of exposure may include headache, dry, cracking skin, drowsiness, dizziness, & mild irritation of the eyes, nose, & throat.
Arsenic	0.01 mg As/m^3 (TWA)	0.01 mg As/m^3 (TWA)	5 mg As/m^3	Silver-gray or tin-white, brittle, odorless solid. Ulceration of nasal septum, dermatitis, gastrointestinal disturbances, peripheral neuropathy, respiratory irritation, hyperpigmentation of skin, [Potential occupational carcinogen].

Notes: NA - Not available or Not applicable. TWA - Time weighted average STEL - Short term exposure limit

2.4.1.6 Therefore, as long as dust concentrations are continuously monitored and controlled to 3mg/m³ or less, arsenic is not a contaminant of concern.

2.4.2 Hazard Mitigation/Prevention

2.4.2.1 The potential hazards from chemical agents and other chemicals of concern will be minimized through the use of proper PPE (Chapter 5 of this SSHP) and appropriate air monitoring (Chapter 8 of this SSHP). Details on hazard communication training are presented in Chapter 4 of this SSHP.

2.5 PHYSICAL HAZARDS

2.5.0.1 The primary physical hazards potentially associated with this project are expected to include:

- Underground utilities;
- Severe weather;
- Lightning;
- Hazardous noise;
- Heat stress; and
- Cold stress.

2.5.0.2 These hazards and mitigation actions are discussed in the following subsections.

2.5.1 Underground Utilities

2.5.1.1 Hazard Identification

2.5.1.1.1 Underground utility lines may be present at 4825 Glenbrook Road that may pose hazards during the intrusive operations, including both manual and mechanized excavations. The specific hazards include, but are not limited to, utilities such as sewers, telephone, cable, fiber optic, water, fuel, gas, and electrical lines.

2.5.1.2 Hazard Mitigation and Prevention

2.5.1.2.1 The local utility locating hotline (i.e., Miss Utility) will be contacted to identify the locations of buried utilities before subsurface activities are allowed to commence. Prior to commencing any intrusive activities, the Parsons Site Manager will obtain a digging clearance if appropriate, and document phone calls, correspondence, and confirmation numbers. Site personnel will not enter underground utilities. In the event the local utility service cannot access all areas of the site where utilities may be located, geophysical instruments and utility locators will be used to scan for buried utilities.

2.5.2 Severe Weather

2.5.2.1 Hazard Identification

2.5.2.1.1 During the course of field operations, severe weather may be encountered, including thunderstorms, rainstorms, and other unsafe weather conditions (i.e., high winds and tornadoes). Criteria indicating that severe weather conditions may exist include:

- High winds (greater than 40 miles per hour – depending on the tree cover and other site specific conditions),
- Tornado watch or warning in place for an area including the site,
- Visible lightning,
- Extreme temperatures (e.g., greater than 100°F or less than 0°F), or
- Heavy rainfall or ice storms that makes footing treacherous and visibility difficult.
- Muddy or soft ground restricts the movement of rescue teams and emergency vehicles.

2.5.2.2 Hazard Mitigation and Prevention

2.5.2.2.1 In the event of severe weather, it may be necessary to cease operations and evacuate the site. The SSHO will be responsible for being aware of local weather forecasts and monitoring the weather. Should severe weather threaten, the SSHO will be responsible for deciding in conjunction with the CENAB Site Operations Officer and USAESCH Safety Specialist whether site operations should cease.

2.5.2.2.2 In the event that work is suspended, the SSHO will notify personnel who have radios or cellular telephones. These individuals will be responsible for relaying the work suspension to other personnel in their areas. All personnel will render the workplace temporarily closed and move to designated assembly areas for further instruction.

2.5.2.2.3 Once the severe weather hazard has passed, the SSHO will notify personnel that work may resume. The SSHO will monitor weather forecasts and reports of current weather conditions both before and during field activities to determine if severe weather is forecast or is imminent. When medical support is onsite, the medics will monitor the emergency radio for local severe weather conditions.

2.5.3 Lightning

2.5.3.1 Hazard Identification

2.5.3.1.1 Lightning's distance from a given person’s position can be estimated by noting the time from its flash to the bang of the associated thunder. For each 5-second count from flash to bang (F-B), lightning is 1 mile away. Thus, an F-B of 10 means that lightning is 2 miles away and an F-B of 15 means that lightning is 3 miles away, and so on. Because the distance from Strike A to Strike B to Strike C can be 0.5-1.5 miles apart, it is suggested that the lightning safety evacuation plan be implemented at a count of at least 50 (10 miles), or as soon as thunder is heard. Under some weather conditions, thunder will only be heard when the lightning is 3 to 4 miles away. Therefore, lightning detector may be used as stated in SOP.

2.5.3.2 Hazard Mitigation and Prevention

2.5.3.2.1 If a lightning storm is expected or observed, all outdoor site activities will cease and personnel will seek safe shelter. A safe shelter may consist of:

- Fully enclosed metal vehicles with windows up,
- Enclosed buildings, or
- Low ground.

2.5.3.2.2 Unsafe shelter areas include all nearby outdoor metallic objects such as flag poles, fences, high mast light poles, gates, etc. Trees, water, and open fields will be avoided, and personnel will avoid using the telephone.

2.5.3.2.3 Feeling one’s hair standing on end and/or hearing "crackling noises" are signs of being in lightning's electric field. Persons experiencing these signs will immediately remove objects containing metal or metal parts (including baseball caps), place their feet together, duck their head, and crouch down with their hands on their knees. A waiting period of at least 30 minutes from the last nearby lightning strike will be observed before resuming activities.

2.5.3.2.4 People who have been struck by lightning do not carry an electrical charge and are safe to handle. Cardiopulmonary resuscitation (CPR) will be performed immediately on victims of a lightning strike by someone qualified to do so. Additionally, emergency help will be sought promptly.

2.5.4 Hazardous Noise

2.5.4.1 Hazard Identification

2.5.4.1.1 Planned activities may involve the use of heavy equipment, such as bobcats and forklifts, and other noise-producing equipment such as the air filtration system. The unprotected exposure of site workers to this noise during activities could result in noise-induced hearing loss.

2.5.4.1.2 A hazardous noise condition exists when communication between individuals separated by three feet requires shouting.

2.5.4.2 Hazard Mitigation/Prevention

2.5.4.2.1 Personnel working at this site will receive an audiogram (hearing test) during their annual physical. The PSHM or SSHO will verify that these requirements have been met for each site worker.

2.5.4.2.2 Hearing protection will be required at any time the noise level reaches 85 decibels (dbA) or greater, or when communication between individuals separated by 3 feet requires shouting. Double protection will be required at any time noise levels exceed 104 dbA. The SSHO will ensure that either earmuffs or disposable foam earplugs are available to, and used by, all personnel near sources of hazardous noise.

2.5.4.2.3 For sites where engineering controls or other equipment generate high levels of continuous or semi-continuous noise, the PSHM or designate will conduct a noise survey to assess noise levels and evaluate whether additional mitigation measures are required.

2.5.5 Heat Stress

2.5.5.1 Hazard Identification

2.5.5.1.1 There is a potential for heat stress and related injuries during intrusive investigation, especially when heavy manual labor-intensive activities are performed with semi-permeable and impermeable PPE. Potential hazards include:

- Heat rash
- Heat cramps
- Fainting
- Heat exhaustion
- Heat stroke

2.5.5.2 Hazard Mitigation/Prevention

- Workers will be trained to recognize the symptoms of heat-related injuries and illnesses.
- Heat-related injury and illness recognition and prevention measures will be emphasized during safety tailgate meetings when the potential for such injuries and illnesses exists.
- Cool beverages will be available on site. Workers will be encouraged to drink fluids.
- The SSHO will monitor workers for signs of heat stress and track Wet Bulb Globe Temperature (WBGT) readings whenever the weather report for the day predicts temperatures of 80°F or greater.

- Heart rate and temperature will be monitored when workers are wearing Level B PPE.

2.5.5.3 A more detailed discussion of heat stress symptoms, mitigation, and prevention is provided in Chapter 9 of this SSHP.

2.5.6 Cold Stress

2.5.6.1 Hazard Identification

2.5.6.1.1 There is a potential for cold-related injuries and illnesses. Exposure to low temperatures presents a risk to employee safety and health both through the direct effect of the low temperature on the body and collateral effects such as slipping on ice, decreased dexterity, and reduced dependability of equipment. Specific potential hazards include:

- Frostbite
- Hypothermia

2.5.6.2 Hazard Mitigation/Prevention

- Workers will be trained to recognize the symptoms of frostbite and hypothermia.
- Cold injuries and illnesses recognition and prevention measures will be emphasized during safety tailgate meetings when the potential for cold injuries and illnesses exists.
- Work will cease under unusually hazardous conditions.
- A heated shelter will be available on site.
- Insulating dry clothes will be available.
- Ambient temperature will be recorded on site.
- Warm beverages will be available on site.

2.5.6.3 A more detailed discussion of cold stress symptoms, mitigation, and prevention is provided in Chapter 9 of this SSHP.

2.6 IONIZING RADIATION

2.6.0.1 Known sources of ionizing radiation are from X-ray and PINs at 4825 Glenbrook Road and, therefore, radiation hazards resulting from ionizing radiation are anticipated to occur.

2.7 BIOLOGICAL HAZARDS

2.7.0.1 Biological hazards may include encounters with mammals, insects, snakes, spiders, ticks, plants, parasites, and pathogens. Potential biological hazards present at 4825 Glenbrook Road include hazardous plants, insects, and spiders. Additional information about individual biological hazards is presented in the following subsections.

2.7.1 Hazardous Plants

2.7.1.1 Hazard Identification

2.7.1.1.1 Because most of the area is urban residential with associated landscaping, the potential for hazardous plants will mainly be in unimproved areas. Most skin reactions following contact with offending plants are allergic in nature and are characterized by:

- General symptoms of headache and fever;
- Itching;
- Redness; and
- Rash.

2.7.1.1.2 Some of the most common and severe allergic reactions resulting from contact with hazardous plants are caused by poison ivy, poison oak, and poison sumac. Contact with the poisonous sap of these plants produces a severe rash characterized by redness, blisters, swelling, and intense burning and itching. In some cases the victim may develop a high fever and may become very ill. Ordinarily, the rash begins within a few hours after exposure, but it may be delayed for 24 to 48 hours.

2.7.1.1.3 The most distinctive features of poison ivy and poison oak are their leaves, which are composed of three leaflets. In certain seasons, both plants also have greenish-white flowers and berries that grow in clusters. Images of poison ivy, poison oak, and poison sumac are shown in Figure D1-2-1.

2.7.1.2 Hazard Mitigation/Prevention

2.7.1.2.1 Avoiding contact with the plants or their sap is the only effective means of preventing the poisoning. A person experiencing symptoms of hazardous plant poisoning should remove contaminated clothing and wash all exposed areas thoroughly with soap and water. Apply calamine or other poison ivy/oak lotion if the rash is mild. Seek medical advice if a severe reaction occurs, or if there is a known history of previous sensitivity. Thorough washing of skin and clothing after site work or after potential exposure can also reduce severity of irritation.

Figure D1-2-1
Poison Ivy/Poison Oak/Poison Sumac

2.7.2 Ticks/Lyme Disease

2.7.2.1 Hazard Identification

2.7.2.1.1 The Center for Disease Control has noted the increase of Lyme disease and Rocky Mountain Spotted Fever (RMSF), which are caused by bites from infected ticks that live in and near wooded areas, tall grass, and brush. Ticks are small, ranging from the size of a printed comma up to about one quarter inch. They are sometimes difficult to see. The tick season extends from spring through summer. When embedded in the skin, they may look like a freckle.

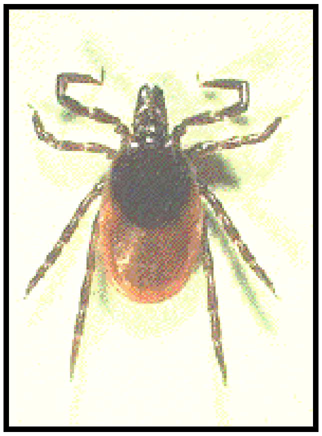
2.7.2.1.2 Lyme disease has occurred in 43 states, with the heaviest concentrations in the Northeast. It is transmitted by deer ticks and lone star ticks. Female deer ticks are about one quarter inch in size, and are black and brick red in color. Male deer ticks are smaller, and completely black. Lone star ticks are larger and chestnut brown in color. A female deer tick is shown in Figure D1-2-2.

2.7.2.1.3 The first signal of Lyme disease infection may appear in a few days or a few weeks after the tick bite. Typically, a rash starts as a small red rash that sometimes appears as a bulls-eye. Other symptoms include headache, weakness, joint and muscle pain and other flu-like symptoms.

2.7.2.1.4 RMSF has occurred in 36 states, with the heaviest concentrations in Oklahoma, North Carolina, South Carolina, and Virginia. It is caused by Rocky Mountain wood ticks and dog ticks that have become infected with rickettsia. Both are black in color. The first symptoms of RMSF are also flu-like chills, fever, headache, dizziness, fatigue, stiff neck, and bone pain.

2.7.2.1.5 In both cases, if immediately treated by a physician, most individuals recover fully in a short period of time. If not treated, more serious symptoms can occur.

Figure D1-2-2
Female Deer Tick



2.7.2.2 Hazard Mitigation/Prevention

2.7.2.2.1 If you believe a tick has bitten you, or if any of the signs and symptoms noted above appears, contact the SSHO, who will authorize you to visit a physician for an examination and possible treatment.

2.7.2.2.2 Standard field gear (work boots, socks, and light-colored coveralls) provides good protection against tick bites, particularly if the joints are taped. However, even when wearing field gear, the following precautions will be taken when working in areas that might be infested with ticks:

- When in the field, check yourself often for ticks, particularly on your lower legs and areas covered with hair.
- Apply DEET (vapor-active repellent) to any exposed skin surface (except eyes and lips) and apply the permethrin repellent spray to field clothing (Note - allow the permethrin to dry before using the treated clothing).
- When walking in wooded areas, wear a hard hat, and avoid contact with bushes, tall grass, or brush as much as possible.
- If you find a tick, remove it by pulling on it gently with tweezers. Do not squeeze the tick's body. Grasp it where the mouthparts enter the skin and tug gently, but firmly, until it releases its hold on the skin.
- DO NOT use matches, a lit cigarette, nail polish, or any type of chemical to "coax" the tick out.
- Be sure to remove all parts of the tick's body, and disinfect the area with alcohol or a similar antiseptic after removal.

- For several days to several weeks after removal of the tick, look for the signs of the onset of Lyme disease, such as a rash that looks like a bulls-eye or an expanding red circle surrounding a light area, frequently seen with a small welt in the center.
- Also look for the signs of the onset of RMSF, such as inflammation that is visible in the form of a rash comprising many red spots under the skin, which appears 3 to 10 days after the tick bite.

2.7.3 Bees and Other Stinging Insects

2.7.3.1 Hazard Identification

2.7.3.1.1 Contact with stinging insects may result in site personnel experiencing adverse health affects that range from being mildly uncomfortable to life threatening. Therefore, stinging insects present a serious hazard to site personnel, and extreme caution must be exercised whenever site and weather conditions increase the risk of encountering stinging insects. Poisonous insects and insect-like creatures that may be encountered at 4825 Glenbrook Road include the following:

- Bees (killer bees, honeybees, yellow jackets, bumble bees, wasps, and hornets);
- Scorpions; and
- Fire ants.

2.7.3.2 Hazard Mitigation/Prevention

2.7.3.2.1 Site personnel will comply with the following work practices:

- Personnel with a known hypersensitivity to bee, wasp, or hornet stings will inform the SSHO of this condition prior to performing site activities.
- Personnel with a known hypersensitivity condition will keep emergency medication in their possession.
- All personnel will remain vigilant for the presence of these stinging insects. Discovered nests will be flagged and their position reported to other site personnel.
- If stung, personnel will immediately inform the SSHO in order that they are able to receive appropriate treatment.

2.7.3.2.2 Some of the factors that are related to stinging insects that increase the degree of risk associated with accidental contact are as follows:

- The nests for these insects are frequently found in remote wooded or grassy areas and hidden in cavities.
- The nest can be situated in trees, rocks, bushes, or in the ground, and are usually difficult to see.
- If a site worker accidentally disturbs a nest, the worker may be inflicted with multiple stings, causing extreme pain and swelling which can leave the worker incapacitated and in need of medical attention.
- Some people are hypersensitive to the toxins injected by a sting, and when stung, experience a violent and immediate allergic reaction, resulting in a life-threatening condition known as anaphylactic shock.
- Anaphylactic shock manifests itself very rapidly and is characterized by extreme swelling of the body, eyes, face, mouth, and respiratory passages.
- The hypersensitivity needed to cause anaphylactic shock can, in some people, accumulate over time and exposure, therefore, even if someone has been stung previously, and not experienced allergic reaction, there is no guarantee that they will not have an allergic reaction if they are stung again.

2.7.4 Snakes

2.7.4.1 Hazard Identification

2.7.4.1.1 The only common venomous snake in the general vicinity of 4825 Glenbrook Road is the copperhead, which prefers rocky habitats. Also potentially present are the eastern diamondback and coral snakes. None of these snakes are considered likely to be encountered in residential areas.

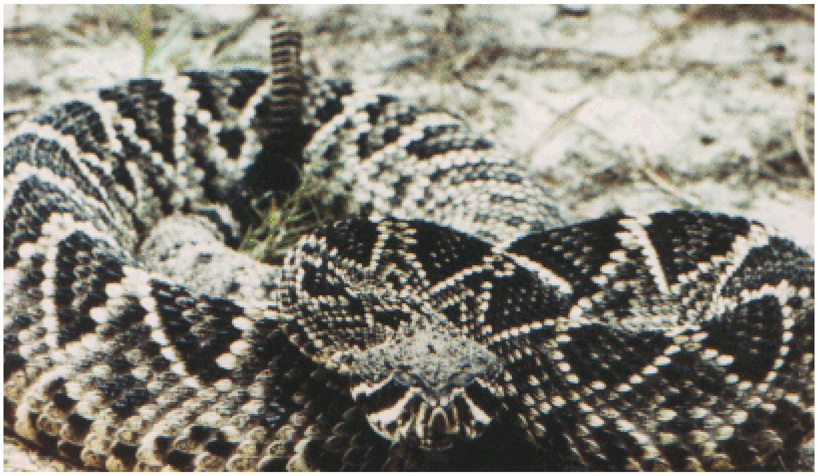
2.7.4.1.2 Illustrations of these snakes are shown in Figures D1-2-3a through D1-2-3c, and descriptions provided below:

- Copperheads (Figure D1-2-3a) are commonly found near water sources in wooded areas. They are generally less than four feet in length and are not particularly aggressive. Coloration ranges from golden brown to tan. These snakes have a banded pattern.

Figure D1-2-3a
Copperhead

- The Eastern Diamondback Rattlesnake (Figure D1-2-3b) is the largest snake native to North America, reaching 6 feet long. It has brown, black, and beige diamond marks on its back. This snake lives in forests near palmetto bushes and makes its home in old animal burrows (holes in the ground). It is a good swimmer and can live near fresh or salt water. The eastern diamondback does NOT always rattle before it strikes.

Figure D1-2-3b
Eastern Diamondback Rattlesnake



2.7.4.1.3 A bite from a poisonous snake is usually characterized by extreme pain and swelling at the site of the bite; the presence of one or more puncture wounds created by the fangs; and a general skin discoloration. The manifestations of the bite include general weakness; rapid pulse; nausea and vomiting; shortness of breath; dimness of vision; tingling or numbness of the tongue, mouth or scalp; and shock.

2.7.4.1.4 Physical reactions are aggravated by acute fear, anxiety, the amount of venom injected, the speed of absorption of the venom into the victim's circulatory system, the size of the victim, protection provided by clothing (including shoes and gloves), quick anti-venom therapy, and the location of the bite.

2.7.4.2 Hazard Mitigation/Prevention

2.7.4.2.1 The best snakebite mitigation measure is avoidance. The following measures will help in this process:

- Personnel will review the types of poisonous snakes most common to the general vicinity of 4825 Glenbrook Road. This will be reviewed during site-specific safety training. Regardless of type, all snakes will be avoided.
- Personnel will wear long pants and work boots as protection.
- Personnel will be careful where they sit and where they place their hands and feet.
- Personnel will avoid rock piles, stacks of old boards, and brush piles in wooded areas. If it is necessary to move these items, personnel will use a remote means to initially relocate the material. Prior to entering a heavily wooded or brushy area, personnel will look and listen carefully.
- Personnel will never handle "dead" snakes, as they may not be completely dead.
- Personnel will not attempt to capture or kill ANY snakes. According to the Centers for Disease Control and Prevention, most snakebites are the direct result of handling or harassing snakes, which bite as a defensive measure.

2.7.4.2.2 First aid rules that will be followed in the event that someone is bitten by a snake are:

- DO NOT make an incision through the fang marks; this procedure is too hazardous to underlying structures and, at best, removes only 20% of the venom, and will intensify the effect of the venom.
- DO NOT apply suction to the wound since this has a minimal effect in removing venom.
- DO NOT apply a tourniquet since this will concentrate the venom and increase the amount of tissue damage in the immediate area of the wound.
- DO NOT use cold compresses, ice, dry ice, chemical ice packs, spray refrigerants, or other methods of cold therapy.

- If possible, try to get a good look at the snake so it can be identified for proper selection of anti-venom; but do not try to capture or kill it.
- DO NOT allow the victim to run for help, since running increases the heart rate and will increase the spread of the venom throughout the body.
- Keep the victim calm and immobile, and reassure him/her.
- Have the victim hold the affected extremity lower than the body while waiting for medical assistance.
- Do not delay evacuation. Transport the victim to medical attention immediately.

2.7.4.2.3 In addition to the above guidelines, several other factors will be considered by the caregiver in selecting the appropriate actions:

- **Shock:** The victim will be kept in a comfortable, prone position and body temperature will be stabilized.
- **Breathing and heartbeat:** if breathing stops, mouth-to-mouth resuscitation will be administered. If breathing stops and there is no pulse, CPR should be performed by a trained individual.
- **Cleaning the bitten area:** The bitten area may be washed with soap and water and blotted dry with sterile gauze. Dressings and bandages may be applied, but only for a short period of time.
- **Medicine to relieve the pain:** The victim will not be given alcohol, sedatives, or any medicine containing aspirin. Some painkillers may be given after consulting with a doctor or medical personnel for specific medications that may be used.
- **Snakebite kits:** Kits will be kept accessible for all outings in primitive areas or areas known or suspected to be snake infested. All directions will be followed precisely.

2.7.5 Spiders

2.7.5.1 Hazard Identification

2.7.5.1.1 A large variety of spiders may be encountered during site activities. While most spider bites merely cause localized pain, swelling, reddening and in some cases, tissue damage, there are a few spiders that, due to the severity of the physiological affects caused by their venom, are dangerous. The SSHO will brief site personnel as to the identification and avoidance of these dangerous spiders. These species include the black widow and the brown recluse or violin spiders.

2.7.5.1.2 The black widow spider (Figure D1-2-4a) is a coal-black, bulbous spider ¾ to 1½ inches in length, with a bright red hourglass on the under side of the abdomen. The black widow is usually found in dark moist locations, especially under rocks, rotting logs and may even be found in outdoor toilets where they inhabit the underside of the seat. Victims of a black widow bite may exhibit the following signs or symptoms:

- Sensation of pinprick or minor burning at the time of the bite.
- Appearance of small punctures (but sometimes none are visible).
- After 15 to 60 minutes, intense pain is felt at the site of the bite which spreads quickly, and is followed by profuse sweating, rigid abdominal muscles, muscle spasms, breathing difficulty, slurred speech, poor coordination, dilated pupils and generalized swelling of face and extremities.

Figure D1-2-4a
Black Widow Spider

2.7.5.1.3 The brown recluse or violin spider (Figure D1-2-4b) is brownish to tan in color, rather flat, 1/2 to 5/8 inches long. Of the brown recluse spider, there are three varieties found in the United States that present a problem to site personnel. These are the brown recluse, the desert violin, and the Arizona violin. These spiders may be found in a variety of locations including trees, rocks or in dark locations. Victims of a brown recluse or violin spider bite may exhibit the following signs or symptoms:

- Blistering at the site of the bite, followed by a local burning at the site 30 to 60 minutes after the bite.
- Formation of a large, red, swollen, postulating lesion with a bull's-eye appearance.
- Systemic affects may include a generalized rash, joint pain, chills, fever, nausea and vomiting.
- Pain may become severe after 8 hours, with the onset of tissue necrosis.

Figure D1-2-4b
Brown Recluse Spider

2.7.5.2 Hazard Mitigation/Prevention

2.7.5.2.1 The field team will avoid spiders and webs during the course of field activities. An individual who believes he/she has been bitten by a black widow or brown recluse spider will be immediately transported to a hospital. The spider will be collected (if possible) for confirmation of the species. Extreme caution will be used when lifting logs and debris, since spiders are typically found in these areas.

2.7.5.2.2 The best spider bite mitigation measure is avoidance. The following measures will help in this process:

- Personnel will review the types of harmful spiders most common to the general vicinity of 4825 Glenbrook Road. This will be reviewed during site-specific safety training. Regardless of type, all insects will be avoided.
- Personnel will wear pants either tucked into boots or taped to boots and long sleeved shirts as protection.
- Personnel will watch where they sit and where they place their hands and feet.
- Personnel will avoid rock piles, stacks of old boards, and brush piles in wooded areas. If it is necessary to move these items, personnel will use a remote means to initially relocate the material. Prior to entering a heavily wooded or brushy area, personnel will look carefully.
- Personnel will never handle “dead” spiders, as they may not be completely dead.

2.7.5.2.3 First aid treatment if bitten is to attempt to positively identify the spider that bit the individual and take the individual to the hospital immediately for treatment.

2.7.6 Blood-borne Pathogens

2.7.6.1 Hazard Identification

2.7.6.1.1 Blood-borne pathogens enter the human body through punctures, cuts, or abrasions of the skin or mucous membranes. They are not usually transmitted through ingestion (swallowing), through the lungs (breathing), or by contact with whole, healthy skin. However, under the principle of universal precautions, all blood will be considered infectious, and all skin and mucous membranes will be considered to have possible points of entry for pathogens.

2.7.6.1.2 Potential blood-borne pathogen exposures include:

- Contact with contaminated medical equipment or medical waste or sharps.
- Medical emergency response operations, such as administering first aid or CPR.
- Contact with human wastes such as domestic sewage.
- Accidental contact with blood from cuts and scratches incurred during field operations such as brush clearing, excavation, or clearance of munitions debris.

2.7.6.2 Hazard Mitigation/Prevention

2.7.6.2.1 Whenever there is a potential for exposure, personnel will wear the proper PPE (including gloves and masks when appropriate) to prevent exposure to blood-borne pathogens. If exposure to blood-borne pathogens is suspected, the SSHO will be informed and immediate medical attention will be sought.

2.8 ACTION LEVELS AND MITIGATION METHODS

2.8.1 Implementation of Engineering Controls and Work Practices

2.8.1.1 Engineering controls and work practices will be implemented as necessary based on the criteria discussed in the hazard mitigation and prevention sections above.

2.8.2 Upgrades/Downgrades in levels of PPE

2.8.2.1 The level of PPE needed to protect employees from site hazards and the situations that would dictate an upgrade or downgrade in PPE is discussed in Section 5 of the SSHP.

2.8.3 Work Stoppage and/or Emergency Evacuation

2.8.3.1 All employees have the right and obligation to request a work stoppage if they observe an unsafe condition or behavior. The SSHO will determine if an emergency evacuation is necessary in addition to a work stoppage.

2.8.4 Prevention and/or Minimization of Public Exposure

2.8.4.1 The prevention and/or minimization of public exposure to hazard created by site activities is discussed below in Section 10.6.

CHAPTER 3
STAFF ORGANIZATION, QUALIFICATIONS, AND RESPONSIBILITIES

3.0.0.1 Chapter 2 of the SSWP provides detail on the project team, qualifications, and responsibilities of the different organizations and staff involved in this project. Figure 2-1 of the SSWP shows the project organizational structure.

3.0.0.2 The Parsons PM, Site Manager, SSHO, and the PSHM are collectively responsible for formulating and enforcing health and safety requirements and for implementing the APP/SSHP. This section outlines the specific safety responsibilities, accountability, and lines of authority for key Parsons personnel during the course of project activities.

3.0.0.3 All site personnel and subcontractors performing duties or working in areas where there is a potential for exposure to hazardous material will meet the training requirements of OSHA 29 CFR §1910.120 before working on the site.

3.1 PARSONS PROJECT MANAGER

3.1.0.1 The Parsons PM is responsible for all Parsons personnel and Parsons' subcontractors onsite, and designates duties to the on-site personnel.

3.2 PROJECT SAFETY AND HEALTH MANAGER

3.2.0.1 The PSHM is responsible for oversight and direction to ensure full compliance with all health and safety issues at the project site. The PSHM will oversee all aspects of site safety, including the preparation of the APP/SSHP, and any audits of site operations and records to verify OSHA, USACE, and APP/SSHP compliance.

3.2.0.2 The PSHM responsibilities include the following.

- Oversee the development, maintenance, and implementation of the APP/SSHP.
- Visit the project site(s) as needed to audit the effectiveness of the APP/SSHP.
- Remain available for project emergencies.
- Develop modifications to the APP/SSHP as needed.
- Evaluate occupational exposure monitoring data/air-sampling data and adjust the APP/SSHP requirements as necessary.
- Serve as a Quality Control staff member.
- Approve the APP/SSHP by signature.

3.3 SITE SAFETY AND HEALTH OFFICER

3.3.0.1 At a minimum, the SSHO will have completed the 30-hour OSHA Construction safety class. The SSHO will also have at least one year of experience implementing safety and occupational health procedures at cleanup operations and have the training and experience to conduct exposure monitoring/air sampling, and select and adjust PPE. A UXO Safety Officer (UXOSO) who meets these qualifications may also serve as the SSHO. The training and experience criteria of the SSHO will be certified by in writing and filed on site.

3.3.0.2 The SSHO will be present during all operations at 4825 Glenbrook Road, is responsible for implementing the APP/SSHP on site, and has the following additional responsibilities:

- Be present during operations covered by the APP/SSHP.
- Inspect site activities, identify any safety and occupational health deficiencies, and correct any deficiencies found.
- Coordinate changes and modifications to the APP/SSHP with the PSHM, PM, Site Manager, and USACE Contracting Officer.
- Conduct site-specific training and audits.

3.3.0.3 The SSHO has stop work authority is designated as the first responder for medical emergencies or minor injuries and is the on-scene commander in the event of an emergency.

3.3.0.4 The SSHO for 4825 Glenbrook Road is identified in the SSWP.

CHAPTER 4
TRAINING

4.1 GENERAL

4.1.1 Initial Training

4.1.1.1 Prior to arriving on the site, all personnel will receive training from their employers complying with, but not necessarily limited to, those requirements specified by the USACE in EM 385-1-1 and 29 CFR 1910.120 (Hazardous Waste Operations and Emergency Response, or HAZWOPER), 29 CFR 1910.1200 (Hazard Communication), 29 CFR 1910.1030 (blood-borne pathogens), and 29 CFR 1910.134 (respiratory protection).

4.1.1.2 Copies of certificates of completion for HAZWOPER training (initial 40-hour or refresher course, supervisor training, etc.), medical status, first aid and CPR, and when appropriate UXO, certification for all personnel working on site will be maintained on site by the SSHO. These requirements are summarized in Table D1.4.1.

4.1.1.3 In addition to the initial training above, site-specific training including topics on safe work practices and equipment use (including heavy equipment), PPE, medical surveillance, decontamination, and emergency response will be conducted upon mobilization.

4.1.1.4 Personnel conducting site preparation, surveying, or other similar non-intrusive activities are not subject to HAZWOPER training requirements under the following conditions:

- No intrusive operations occur while those personnel are on site;
- There is no potential for those personnel to be exposed to hazardous contaminants;
- The personnel receive the daily/visitor’s site safety briefing prior to commencing work.

4.1.1.5 HAZWOPER training will be required for demolition operations.

Table D1.4.1
Training Requirements

Training Content	Duration (If specified)	Frequency (If specified)	Personnel Categories				
			Supervisors	Field Teams	Operational Support	Visitors within EZ or CRZ	Other Visitors
HAZWOPER – 29 CFR 1910.120	40-Hours	Once	☑	☑	☑	☑	
HAZWOPER (Refresher) – 29 CFR 1910.120	8-Hours	Annually	☑	☑	☑	☑	
Health and Safety for Supervisors – HAZWOPER, 29 CFR 1910.120	8-Hours	Once	☑				
Supervised Field Experience	3-Days	Once	☑				
Construction Safety Training (to comply with EM 385-1-1 01.A.17.)	30-Hours	Once	☑[1]				
Site-Specific Training (see Section 4.2 for training contents)	-	Once[2]	☑	☑	☑	☑	
Hazard Communication, Hazards of Materials Used/Encountered Emphasis on Chemical Agents & Industrial Chemicals	-	Once[2]	☑	☑	☑	☑	
First Aid and CPR - Equivalent to American Red Cross Training	-	Every 3 years for First Aid; every two years for CPR	☑[3]	☑[3]	☑[3]		
Bloodborne Pathogen – 29 CFR 1915.1030: Protective Equipment, Containment and Disposal of Waste	-	Annually	☑	☑			
Visitor Training - Operational Activities & Hazards, Boundaries of Work Area and Entry/Exit, Emergency Site Evacuation & Assembly Points, PPE	-	Per visit					☑
Tailgate Safety Meetings - Potential Hazards & Risks, Encounters with Hazardous Materials to Date, Daily Activities	-	Daily, prior to operations	☑	☑	☑	☑	

Note 1	SSHO is the only person required to have this training.
Note 2	Site-Specific and Hazard Communication training will be updated when there is a significant change in operations or chemical usage.
Note 3	A minimum of 2 trained personnel on site. Any of the personnel categories may have workers trained in First Aid/CPR.

4.1.2 Supervisory Training

4.1.2.1 The SSHO and individuals responsible for supervising personnel engaged in site work will also have at least eight additional hours of specialized training on managing such operations. This specialized training includes the employer's safety and health program and the associated employee training program, PPE program, and health hazard monitoring procedures and techniques. These supervisory personnel will also each have a minimum of three days of field experience under the supervision of a trained, experienced supervisor.

4.1.2.2 In addition, the SSHO will have completed the 30-hour OSHA construction safety class or meet equivalent training requirements specified in EM 385-1-1 Paragraph 01.A.17. This requirement must be met by the SSHO.

4.1.3 Refresher Training

4.1.3.1 All site workers will complete eight hours of refresher training annually on the items covered in the 40-hour initial training program.

4.2 SITE-SPECIFIC TRAINING

4.2.0.1 Site-specific training will be provided for all employees, contractors, and subcontractors who plan to work on site and who have met the requirements of Section 4.1.1. Training will be conducted prior to the job start-up or, for new or replacement personnel, prior to starting work, and as needed thereafter. The PSHM and/or the SSHO will conduct initial site-specific training prior to job start-up to ensure that employees have a thorough understanding of the SSHP, the overall project, standard operating procedures (SOPs), and all of the potential safety hazards at the site. The site-specific training will be conducted as necessary when new employees enter the site. Topics covered in the site-specific health and safety training will include:

- Site history and background.
- Names of employees and their duties.
- Persons responsible for safety and health.
- Employee rights and responsibilities under OSHA.
- Review of the APP/SSHP and AHAs.
- Air monitoring procedures.
- SOPs prepared specifically for various aspects of this project.
- Site control measures.
- Fire prevention measures.
- Emergency response procedures.
- Locations of medical facilities/hospitals.

- Engineering controls, such as dust suppression techniques.
- Medical surveillance program.
- PPE.
- Discussion of action levels for changing site PPE or evacuating the site.
- Heat and/or cold stress prevention, treatment, and monitoring.
- Proper use of heavy equipment and machinery.
- Other physical hazards such as slips, trips, and falls, noise, electrocution, being struck by something, and being caught in or between something.
- Proper lifting techniques.
- Personal cleanliness and restrictions on eating, drinking, and smoking.
- Site-specific UXO training.

4.2.0.2 Employees will also be instructed in the use of the "buddy system," which is a method of organizing work groups so that there is someone that is always available to:

- Provide his or her partner with assistance in an emergency,
- Observe his or her partner for signs of chemical or physical exposure,
- Periodically check the integrity of his or her partner's PPE, and
- Notify the emergency response personnel when an emergency occurs.

4.2.0.3 Any emergency response training during a project will be conducted by qualified instructors (SSHO and/or onsite EMTS). The qualifications are relative to the specific emergency response operation being conducted and are outlined in EM-385-1-1.

4.2.0.4 All employees will be made aware of the project emergency assistance network, the most probable route of evacuation from the site in the event of an emergency, and other emergency procedures included in the project plans. All employees will be briefed on the procedures and hazards specific to the site.

4.2.0.5 At the completion of site-specific training, all employees will be required to sign forms that state they have received site-specific training, and read, understood, agreed with, and will abide by the health and safety procedures outlined in the APP. Appendix F of the WP contains a Plan Acceptance Form and the Site-Specific Training Form.

4.3 TAILGATE SAFETY MEETINGS

4.3.0.1 All personnel who plan to enter the site during investigation activities will attend the daily tailgate safety meeting. This meeting, conducted by the SSHO, will cover specific health and safety issues, site activities for that day, changes in site conditions, topics covered in the initial health and safety meeting as they apply to daily activities, PPE, personnel and equipment decontamination, potential physical hazards, emergency warning signal, rally point, etc. Issues discussed in the daily tailgate meeting will be documented on a form, which will be signed by all the attendees and retained by the SSHO. A sample Tailgate Safety Meeting Form is provided in Appendix F.

4.4 BLOODBORNE PATHOGENS AND CPR/FIRST AID TRAINING

4.4.0.1 Personnel assigned to conduct fieldwork for this project will not conduct first aid or CPR as a primary job function. Rather, selected employees have been trained in CPR and first aid for emergency use only. Acting in the capacity of a designated emergency first aid provider is not mandatory and anyone who is uncomfortable with the possibility of being so designated should notify the SSHO. In accordance with EM 385-1-1, at least two persons currently certified in CPR and first aid will be present on site at all times during site operations.

4.4.0.2 An indoctrination to the bloodborne pathogens standard (29 CFR 1910.1030) will be provided to all employees either during their first aid training, and/or during the initial site health and safety meeting. Hepatitis B and Acquired Immune Deficiency Syndrome (AIDS), among other pathogenic microorganisms, can be contracted during emergency first aid and CPR through contact with blood. Therefore, it is important to recognize the concept of “universal precautions.” Universal precautions require one to assume that all blood and bodily fluids contain pathogens and require the use of protective barriers to prevent exposure. Latex gloves and CPR barriers will be available in the first aid supplies stored at each site and should be used prior to attending to a victim’s needs. Additionally, washing any body part or surface that has been contaminated with blood is an important part of the universal precautions. The SSHO should be notified of any potential contact with blood or bodily fluids resulting from first aid or CPR administered on the job.

4.4.0.3 A vaccine exists for Hepatitis B. Should employees trained in first aid and CPR desire the vaccine, their employer will arrange to have the employee receive the series of inoculations. The Hepatitis B vaccine can also be effective when administered after exposure to blood containing the Hepatitis B virus, though this method is less efficient than vaccination.

4.5 EMERGENCY RESPONSE TRAINING

4.5.0.1 All employees will be made aware of the project emergency assistance network, the most probable route of evacuation from the site in the event of an emergency, and other emergency procedures included in Chapter 16 of this SSHP.

4.6 HAZARD COMMUNICATION TRAINING

4.6.0.1 In accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200 and CFR 1926.59), copies of all Safety Data Sheets (SDSs) for hazardous chemical materials that are planned for use during site operations or that are present on-site will be available on site from the SSHO. Additionally, a written Hazard Communication Program has been prepared and will be maintained at the site by the SSHO.

4.6.0.2 Hazard communication training in accordance with 29 CFR 1910.1200 and 29 CFR 1926.59, Interim Guidance for Chemical Warfare Material (CWM) Responses (April 1, 2009), and EM 385-1-1 will be presented during the initial training to address site-specific hazards. Training will include, but not be limited to, all hazards or potential hazards associated with site activities, and any hazardous chemical materials brought to or found on site. SDSs for chemicals potentially present will be maintained on site by the SSHO.

4.7 RECOVERED CHEMICAL WARFARE MATERIEL TRAINING

4.7.0.1 Recovered Chemical Warfare Materiel (RCWM) training will be provided for all on-site personnel in accordance with Interim Guidance for Chemical Warfare Material (CWM) Responses (April 1, 2009). Training will be conducted prior to job start-up and as needed thereafter. Topics covered will include:

- Chemical agent exposure routes and potential health effects.
- Methods of detecting a chemical agent release (i.e., monitoring instruments, agent odor, and symptoms of exposure).
- Emergencies and emergency procedures, including: reasons to evacuate and evacuation procedures, proper use of escape breathing apparatus, decontamination, emergency equipment, first aid, hospital routes, emergency contacts, etc.
- Safe work practices (e.g., use of the buddy system, contaminant control procedures, etc.).

4.8 VISITOR TRAINING

4.8.0.1 All visitors to the site will check in with the SSHO and receive a visitor’s safety briefing that will include the following:

- Location and description of potential hazards and risks;
- Emergency warning alarms, evacuation procedures, and location of the rally point;
- Chemical and physical hazards found on-site;
- Areas of the site that are closed to visitors;
- Other topics as deemed appropriate.

4.8.0.2 All visitors will be required to sign the Visitor’s Log.

4.8.0.3 Site visitors wishing to enter the work area during site operations will be subject to the same documentation and training as specified for site workers.

4.9 UXO TRAINING

4.9.0.1 All UXO personnel and the UXOSO working at the site will have completed Explosive Ordnance Disposal training that details procedures for evaluation and disposal of UXO/MEC. Copies of applicable training certificates will be provided to the SSHO.

4.10 SITE-SPECIFIC TEAM TRAINING

4.10.1 Team Training Activities for House Demolition and Remedial Action Activities for Low Probability Areas

4.10.1.1 Prior to initiating house demolition and intrusive activities at a low probability area, site-specific team training will be conducted under the direction of the SSHO or PSHM. The objective of this training will be to prepare field personnel for the operations to be carried out at that specific site. The training will address the following topics:

- Site layout.
- General site operations.
- Hazard communication.
- Emergency procedures.
- Health and safety measures.

4.10.2 Team Training Activities for Remedial Action Activities for High Probability Areas

4.10.2.1 Prior to initiating intrusive remedial action activities in the high probability areas including Areas D, E, and F described in the SSHP at the site, site-specific team training will be conducted under the direction of the SSHO or PSHM. The objective of this training will be to prepare field personnel for the operations to be carried out at the site. The training will address the following topics:

- Site layout.
- General site operations.
- Hazard communication.
- Emergency procedures.
- Health and safety measures.
- Chemical agent-specific health and safety measures.
- Donning/Doffing of PPE (including escape respirators).

4.10.2.2 Team training activities for the remedial action of the high probability areas will be completed prior to the Pre-Operational Survey (see Section 6.4 of the APP to which this SSHP is attached).

4.10.3 Tabletop Exercise for Remedial Action of the Higher Probability Areas

4.10.3.1 In addition to team training, prior to initiating intrusive remedial action activities at a higher probability area, a "tabletop" exercise will also be conducted. The tabletop exercise will be completed prior to the start of any chemical agent project and is a round table discussion of various possible accident and incident scenarios.

4.10.3.2 The tabletop exercise will be conducted by USACE and participants will include all on-site support agencies and any local responders that are supporting the project. The exercise is generally conducted in a conference room environment and typically should last between two to six hours, depending upon the size and complexity of the project.

4.10.3.3 The tabletop exercise is intended to be an open discussion and will be conducted in a non-threatening environment. It will use simulations to conduct drills of the emergency response to different chemical agent accident and incident scenarios in order to evaluate the effectiveness of the planned responses and to identify deficiencies or omissions in the emergency response plan. The tabletop exercise is also used to establish continuity and coordination between the various response agencies involved in the project.

4.10.3.4 The tabletop exercise for the remedial action of a higher probability area will be completed prior to the Pre-Operational Survey (see Section 6.4 of the APP to which this SSHP is attached).

4.11 TRAINING DOCUMENTATION

4.11.0.1 Documentation of training requirements is the responsibility of each employer. Written documentation verifying compliance with 29 CFR 1910.120 (e)(3), (e)(4) (as applicable) and (e)(8) will be submitted to the SSHO prior to entering the site. Types of training documentation include 40-hour HAZWOPER, 8-hour refresher, supervisor training, 30-hour OSHA construction safety, UXO, bloodborne pathogens, HAZCOM, first aid, CPR, current physician's certificate, respiratory protection training and fit testing, and hearing conservation training. Documentation of all workers' current training credentials will be kept on site. Daily tailgate meetings will be documented using a form similar to the sample form presented in Appendix F of the SSWP.

CHAPTER 5
PERSONAL PROTECTIVE EQUIPMENT

5.1 GENERAL REQUIREMENTS

5.1.0.1 Personnel performing site tasks will wear and use the appropriate level and type of PPE for each individual task in accordance with Table D1.5.1 and as otherwise specified in this plan. This SSHP makes provisions for use of the following levels of PPE in accordance with the hazards and contamination level anticipated for each task or operation: Level D, Modified Level D, Level C, Level B, and Level A. The following sections describe the PPE requirements for activities and locations at the site. Task-specific PPE is presented in Table D1.5.1.

5.1.0.2 The SSHO will ensure that:

- Personnel are trained in the proper wearing, donning, and doffing procedures for all PPE used at the site.
- PPE used is properly fitted.

5.1.0.3 Hazard and risk assessment is a continuing process and will be conducted throughout the duration of the project. Changes in specific PPE, levels of PPE, or respiratory protection may be made in accordance with information obtained from actual implementation of site activities and data derived from the Site-Specific Monitoring Plan. As a general rule, levels of PPE and respiratory protection will need to be reassessed if any of the following occur:

- Previously unidentified or unanticipated chemicals, conditions or hazards are encountered.
- Airborne concentrations of known chemicals exceed the action levels specified in Chapter 8 of this SSHP.
- Ambient weather conditions affect the use of assigned PPE.
- A new task is introduced, or a previously assigned and evaluated task is expanded in scope.

5.1.0.4 If work tasks are added to the project after approval of this SSHP, the SSHO will identify and assess the task hazards and relay that information to the PSHM and USAESCH Safety Specialist. The PSHM will prepare an amendment to the SSHP and submit the amendment for approval from USACE or the Department of the Army Safety (DA Safety), as appropriate. The amendment will be added to the SSHP upon approval.

Table D1.5.1
PPE Requirements by Task

TASK	Level of PPE Required [Note 1]				
	Level A	Level B	Level C	Modified Level D	Level D
House Demolition					✓
Low Probability Areas					
All non-intrusive field activities					✓
All intrusive field activities				✓	
Higher Probability Areas					
Site Management					✓
Mobilization/Site Preparation					✓
Land Surveying/Geophysical Surveying					✓
Soil Sampling				✓	
Soil Packaging				✓	
Intrusive Excavation, Initial		✓	✓		
Intrusive Excavation, Suspect RCWM	✓	✓	✓		
PDS Operations			✓	✓	
Emergency Rescue (Equal or higher level than worker PPE)	✓	✓	✓	✓	✓
Field Monitoring Outside ECS				✓	
Segregation of RCWM			✓		
Packaging Leakers	✓	✓ [Note 2]			
Packaging Non-Leakers			✓		
Monitoring of Scrap Metal and Soil				✓ [Note 1]	
Decontamination of Scrap Metal			✓		
Disposition of Scrap Metal					✓
Disposition of Excavated Waste					✓
Disposition of Drummed Soil					✓
Excavation Backfill					✓
Project Close-Out/Demobilization					✓

Note 1: Masks will be donned when screening soil or scrap.
Note 2: When no splash hazard exists.

5.1.0.5 The SSHO will ensure that PPE and respirator use complies with all applicable OSHA, USACE, and Army regulations. The Level C, Level B, and Level A PPE described in this SSHP is approved for use with lewisite and mustard agent by DA Safety.

5.1.0.6 It is the responsibility of each employee to report to work wearing proper attire and to assemble the necessary PPE prior to donning it. If respiratory protection is to be used, it is the responsibility of employees to report to work clean-shaven to ensure a tight and effective seal with the respirator face piece.

5.2 TASK-SPECIFIC LEVELS OF PPE

5.2.1 Special PPE Considerations

5.2.1.1 The following special considerations will be observed in the selection of PPE:

- Hard hats will be required when working around heavy equipment or when an overhead hazard exists.
- Steel toe/safety toe/shank boots are required during demolition and intrusive operations.
- Safety glasses will be selected that provide site personnel with the best protection from not only physical hazards, such as flying objects, but that also provide adequate splash protection where required.
- The SSHO will continually evaluate site tasks to identify hazards and will provide any PPE necessary to ensure the safety and health of site personnel, regardless of the activity they perform.

5.2.2 Tyvek F Special Considerations

5.2.2.1 When used in any level of PPE, Tyvek F chemical-resistant suits with hoods will be disposed of while processing through the PDS and will not be reused.

5.2.2.2 During intrusive operations, in the event that a worker comes into contact with an object that may result in a tear or abrasion of the Tyvek F material, the worker’s buddy will inspect the suit. If there is a tear in the material, if the gray outer coating of the material is abraded away, or if there is any apparent damage to the suit, the affected worker will leave the Exclusion Zone (EZ) and process through the PDS.

5.2.3 Level D PPE

5.2.3.1 Level D PPE is the minimum level of PPE that will be worn by field personnel at 4825 Glenbrook Road. Level D PPE will not be allowed in areas of the site where atmospheric hazards are known or expected to exist. Level D PPE will also be worn only if the activity in which personnel are engaged does not have the potential for splash, immersion, or any other contact with hazardous substances.

5.2.3.2 Level D PPE will be worn during the site activities as specified in Table D1.5.1 and, at minimum, includes the following:

- Work clothes (i.e., long pants and shirt) or cotton coveralls. Tyvek coveralls may also be worn if handling heavy metal-contaminated soil.
- Leather work boots with safety toe (disposable over boots may also be worn if deemed necessary).
- Safety glasses with side shields or goggles when eye hazards exist.
- Hard hat when working around heavy equipment or when overhead hazard exists.
- Hearing protection when high noise levels are present.
- Leather or canvas work gloves when a scrape or cut hazard exists.
- High visibility vest when working on or adjacent to public roads.
- Chaps and face shield when using chainsaws or other brush-clearing equipment.

5.2.3.3 Level D PPE is sufficient for all mobilization, site preparation, and demobilization activities, house demolition, and for all non-intrusive field activities carried out at low probability areas at 4825 Glenbrook Road.

5.2.4 Modified Level D PPE

5.2.4.1 Modified Level D PPE affords protection from casual contact with contaminated soils and materials, but will not be worn when there is a potential for airborne exposure to hazardous substances.

5.2.4.2 Modified Level D PPE will be worn during the site activities as specified in Table D1.5.1 and, at minimum, includes the following:

- Work clothes (i.e., long pants and shirt) or cotton coveralls. Tyvek coveralls may also be worn if handling heavy metal-contaminated soil.
- Approved respirator, civilian National Institute for Occupational Safety and Health (NIOSH)-approved for CBRN agents, or M40 mask – slung, or NIOSH-approved 10-minute escape respirator.
- Leather work boots with safety toe (disposable over boots may also be worn if deemed necessary).
- Safety glasses with side shields or goggles when eye hazards exist.
- Hard hat when working around heavy equipment or when overhead hazard exists.

- Hearing protection when high noise levels are present.
- Nitrile gloves for soil handling, leather or canvas work gloves when a scrape or cut hazard exists.
- High visibility vest when working on or adjacent to public roads.
- Chaps and face shield when using chainsaws or other brush-clearing equipment.

5.2.5 Level C PPE

5.2.5.1 Level C PPE affords protection from casual contact with contaminated soils and materials, but should be worn whenever there is a potential for airborne exposure to hazardous substances.

5.2.5.2 Level C PPE will be worn during the site activities as specified in Table D1.5.1 and, at minimum, includes the following:

- Tyvek F coveralls with hood.
- Approved respirator, civilian NIOSH-approved for CBRN agents, or M40 mask.
- Chemical-resistant, butyl-rubber safety boot covers.
- Inner surgical gloves.
- Outer chemical-resistant, butyl-rubber gloves.
- Hard hat when working around heavy equipment or when overhead hazard exists.
- Hearing protection when high noise levels are present.
- Chemical Protective Undergarments (CPUs), in a mustard agent environment.

5.2.6 Level B PPE

5.2.6.1 Level B PPE offers superior protection against the inhalation of airborne contaminants because it includes supplied air or self-contained breathing apparatus (SCBA) respirators. However, the type of protective suit used with this level of protection is not air tight and skin exposure to hazardous vapors is still possible. Therefore, this level of protection is not acceptable for use when chemical agent presents a serious safety or health threat via dermal contact (i.e., there is the potential for liquid or vapor contact to the skin). However, Level B PPE can be worn under conditions where: 1) the chemical agent and other chemical hazards of concern are not acutely skin-toxic; 2) there is no potential for liquid contact, and vapor levels are being monitored when working with acutely skin-toxic materials; and 3) it is needed to protect site workers from non- chemical agent hazardous wastes.

5.2.6.2 Level B PPE will be worn during the site activities as specified in Table D1.5.1 and, at minimum, includes the following:

- Tyvek F coveralls with hood.
- NIOSH-approved supplied air respirator (SAR)/SCBA.
- Chemical-resistant butyl-rubber safety boots.
- Chemical-resistant rubber boot covers.
- Inner surgical gloves.
- Outer chemical-resistant, butyl-rubber gloves.
- Hard hat when working around heavy equipment or when overhead hazard exists.
- Hearing protection when high noise levels are present.
- CPUs, in a mustard agent environment.

5.2.7 Level A PPE

5.2.7.1 Level A PPE provides the highest available level of protection against both inhalation and skin contact hazardous exposures. The Level A suit is fully encapsulating but, unlike the Level B encapsulating suit, the Level A suit is airtight and must be tested to ensure that hazardous gases and vapors cannot leak into the suit. Because Level A PPE is typically worn in areas where highly toxic and corrosive materials are known to exist, the Level A suit is constructed of materials capable of resisting degradation and permeation by chemical agents or other hazardous substances of concern. To ensure that the Level A suit to be used on site will resist chemical agents and provide adequate protection, Level A suits proposed for site activities have been approved by the Chemical Agent Safety and Health Policy Action Committee (CASHPAC).

5.2.7.2 Because Level A PPE affords the greatest level of protection to dermal hazards, it will be worn in all instances where potential for contact with liquid chemical agent exists, or when the nature and degree of potential exposure are unknown.

5.2.7.3 Level A PPE will be worn during the site activities as specified in Table D1.5.1 and, at minimum, includes the following:

- NIOSH-approved SAR/ SCBA.
- CASHPAC-approved Level A suit.
- Inner surgical gloves.
- Outer butyl-rubber gloves.
- Chemical-resistant butyl-rubber safety boots.

- Chemical-resistant rubber boot covers.
- Two-way radios (worn inside encapsulating suit), each team member.
- Hard hat when working around heavy equipment or when overhead hazard exists.
- Hearing protection when high noise levels are present.
- CPUs, in a mustard agent environment.

5.2.8 PPE Selection Criteria

5.2.8.1 In addition to the task-specific levels of PPE described in Table D1.5.1, the level of PPE will be selected according to the criteria shown in Table D1.5.2:

5.3 RESPIRATORY PROTECTION REQUIREMENTS

5.3.0.1 The respiratory protection requirements included in this section have been designed to comply with applicable Army regulations and the OSHA and USACE regulations found in 29 CFR 1910.134 and EM 385-1-1.

5.3.1 Respirator Selection

5.3.1.1 The PSHM used available site archival and characterization data, and information related to the physical and toxic properties of site contaminants, to select the respiratory protective equipment for each task. Respirators have been assigned for all tasks where there is a potential for employee exposures in excess of the action levels listed in Table D1.5.2.

5.3.1.2 Except for the M-40 respirator worn by military and DOD civilian workers, only NIOSH-approved respirators, cartridges, supplied air systems or SCBAs, or approved combinations of these, will be used on site. At no time will respirators or their components be altered or combined in a manner that is not NIOSH-approved because this may void the NIOSH respirator approval and significantly affect the performance of the respirator.

Table D1.5.2
PPE Ensemble Selection Criteria

Level of Protection	Criteria for Use[1]
Level D	Initial level of protection for work during all non-intrusive low probability operations and all non-intrusive activities outside the EZ during higher probability operations.
Modified Level D	Use Modified Level D for all intrusive low probability operations and non-intrusive work inside the EZ during higher probability operations unless the upgrade criteria for Level C or B are encountered.
Level C	PPE level for all intrusive operations and other work within the EZ at higher probability areas if: • Air monitoring detects VOCs equal to or above 10ppm but less than 500ppm, or • Suspected RCWM has been encountered, • Air monitoring detects any potential chemical agent; and • Detected compounds are below 1 x STEL for H and L, and CK, if they apply; and • Below 1 x PEL for SA, CG, or PS, if they apply; and • No chemical agent splash hazard exists.
Level B	Upgrade to Level B for personnel working within the EZ at higher probability sites if: • Air monitoring detects VOCs equal to or above 500ppm, or • Suspected RCWM has been encountered; • SA, CG, or PS are detected or indicated equal to or above 1 x PEL; or • Air monitoring indicates detection equal to or above 1 x STEL for H and L, and CK, and • HCl is detected at concentrations above 2 ppm • No chemical agent splash hazard exists.
Level A	Upgrade to Level A for personnel performing excavation at higher probability sites when: • Liquids containing chemical agent are in the excavation and there is a splash hazard; • Air monitoring indicates detection of potential chemical agent equal to or above 10 x STEL[2]. • HCl is detected at concentrations above 400 ppm in air

Note 1: Criteria consist of airborne concentrations exceeding the protective factor of the PPE, exceeds the IDLH, or a chemical not effectively removed by the APR is encountered (see Table D1.2.1a and Table D1.8.1).

Note 2: The MINICAMS are not calibrated or certified at these levels.

Note 3: Definition of a splash hazard: Level A protective ensemble is to be selected when the greatest level of skin, respiratory, and eye protection is required. Operations involving the handling of liquid chemical agent where there is the reasonable potential for exposure (via splashing) to unprotected areas of the skin (in level B ensemble this would involve the splashing of the liquid agent onto the face and neck (gap between facepiece and tychem F) and onto areas where the agent could penetrate through the duct tape (between outer gloves or boots and tychem F).

5.3.2 Respirator Selection Criteria

5.3.2.1 The selection of the proper type of respiratory protection has been and will continue to be based upon the following:

- The type of contaminant(s) expected or known to present a potential for exposure.
- The physical properties, toxicological effects, anticipated exposure concentrations and established exposure limits, and IDLH information for the contaminant.
- The warning properties and initial signs and symptoms of exposure.
- The nature of the operation where exposure may occur.
- The location of the work area in relation to the nearest area having respirable air.
- The period of time for which respiratory protection is needed.
- The characteristics and limitations of the respirator, and/or cartridge.
- The protection factor (PF) and maximum use concentration (MUC) for a given face piece or respirator system.

5.3.3 Special Considerations for Respirator Selection

5.3.3.1 The following special conditions will be considered when selecting the specific type of respiratory equipment to be used for a given task:

- **Verbal Communications.** Talking while wearing a respirator is often difficult and may adversely affect the seal of the face piece. However, clear verbal transmission is often essential while wearing a respirator. For such tasks, radio headsets or throat microphone devices will be used wherever practical.
- **Low-Temperature Environment.** Working in cold temperatures may cause fogging of the respirator lens, leading to a serious visibility and safety problem. Respirators equipped with "nose cups" will normally correct the problem by channeling exhaled air through the exhalation valve without contacting the lens.
- **High-Temperature Environment.** Wearing a respirator in a hot environment creates additional stress on the worker wearing it. Using a respirator that is lightweight and has low breathing resistance, and has a wide lens for good visibility can minimize worker stress.

5.3.4 Task-Specific Respiratory Assignment

5.3.4.1 The SSHO will inform the Excavation Team Leader if site monitoring data indicate the need to upgrade or downgrade the level of respiratory protection for a specific task. Any modifications to the levels of respiratory protection specified in this section will be made in writing, approved by the DA Safety, and issued as an amendment to this SSHP.

5.3.4.2 *SCBA with Level B PPE*: A SCBA, operated in the pressure-demand mode with a full face piece will be worn for conducting tasks where Level B PPE is required, on the conditions that (a) no potential exists for contact with liquid chemical agent and (b) direct reading monitoring is being conducted to determine the vapor concentrations to the IDLH/Airborne Exposure Limit (AEL).

5.3.4.3 *SCBA with Level A PPE*: Level A PPE is designed and selected to provide maximum respiratory and skin protection from exposure to highly toxic materials. Level A PPE with SCBA is also worn for tasks where the nature, degree and duration of exposure is unknown and has yet to be assessed. Therefore, Level A PPE with SCBA has been selected for tasks where it is known that a potential exists for exposure to chemical agent via inhalation or liquid contact. The tasks for which Level A PPE is required are listed in Table D1.5.1.

5.3.4.4 *Supplied Air Systems*: to maximize the amount of time that may be spent inside the EZ, and if other conditions are favorable to its use, a SAR system will be used on site. The SAR system is NIOSH-approved and will only be used in approved configurations. The SSHO will be responsible for ensuring that the air supply initiates in an area of the site that is free of potential contaminants and is properly maintained. The cascade supply system will supply a minimum of 6 cubic feet of air per minute per worker of certifiable Grade D breathing air. Prior to using the SAR system, and as specified by the system manufacturer, certification of the air will be conducted to ensure it is safe for human use.

5.3.4.5 SCBAs and SARs may be linked to allow the SAR to be the primary air source, while using the SCBA for backup and support. In this case, all connectors and hoses will be inspected and approved for use in the linked configuration. All SARs used in potential IDLH atmospheres will have an escape SCBA connected in line on the person, to be used if the primary source of air fails for any reason.

5.3.4.6 A protective mask or a full-face respirator with a CBRN cartridge will be used with Level C PPE.

5.3.5 Emergency Escape Breathing Apparatus

5.3.5.1 Personnel in Modified Level D PPE will carry on their person (slung) an M-40 protective mask or NIOSH-approved civilian equivalent for CBRN agents (see PPE matrices) or NIOSH-approved escape breathing apparatus.

5.3.6 Respirator Training

5.3.6.1 Training in the use of respiratory protective equipment will be conducted by a competent person. Each individual required to use Level C, Level B, and Level A respiratory protection devices or assigned to the Emergency Response Team will be trained in the use of the required respiratory protection devices and complete the U.S. Army 22nd Chemical Battalion (Technical Escort), hereafter referred to as TE, Respirator Training Form.

5.3.6.2 The respiratory training will be conducted in accordance with the provisions outlined in the TE Respiratory Protection Program. Initially, and every 30 days thereafter, personnel designated to use SCBAs will demonstrate proficiency in donning the SCBA to the TE Supervisor or SSHO. All personnel assigned escape SCBAs will be trained in their use by the SSHO prior to entrance into the Contamination Reduction Zone (CRZ).

5.3.7 Respirator Fit-Testing

5.3.7.1 Each member of the field team who is required to use a respirator will be respirator fit-tested at least annually. Quantitative fit-testing will be performed on all positive-pressure respirators. Quantitative fit testing will be performed in accordance with the TE Respiratory Protection Program for military and DoD civilians and 29 CFR 1910.134 for all others.

5.3.7.2 Upon donning the respiratory device or before entering any restricted work area, each respirator wearer will be required to perform a negative- and a positive-pressure test to ensure an airtight seal.

5.3.7.3 Each member of the field team who must wear a respirator will be required to be clean-shaven in the sealing areas of the respirator face piece.

5.4 PPE INSPECTION, MAINTENANCE, CLEANING, AND STORAGE

5.4.1 PPE Inspection

5.4.1.1 All PPE will be inspected prior to use to ensure that it is functional and that its structural integrity has not been compromised. Re-usable PPE (such as safety glasses and hard hats) will also be inspected after each use, prior to storage, and prior to maintenance.

5.4.1.2 If site personnel find that a piece of PPE is defective, it will be reported to the SSHO and the defective article will be repaired or replaced. The procedures listed below will be used during equipment inspection:

- Confirm that the clothing material is correct for the specified task to be performed.
- Visually inspect for imperfect seams, non-uniform coatings, tears, or malfunctioning closures.

- Pressurize gloves and check for pinholes.
- Flex product and check for cracks or other signs of deterioration.
- If previously used, check for signs of chemical attack, such as discoloration, swelling or stiffness.
- Check hardhat for cracks or other evidence of weakness, and check safety glasses for excess lens scratching or cracks.
- During the task, periodically inspect for evidence of chemical attack, closure failure, tears, punctures, and open seams.

5.4.1.3 Any PPE stored and designated as emergency rescue equipment will be inspected at least monthly to ensure that it has not been adversely affected by prolonged storage. Any equipment found to be defective will be replaced immediately. This inspection will be recorded in the appropriate log.

5.4.2 PPE Maintenance, Cleaning, and Storage

5.4.2.1 Maintenance of PPE will be conducted in accordance with the manufacturer's instructions and only be performed by personnel who have received proper instruction in the maintenance of the PPE. Replacement parts will be provided by the manufacturer and at no time will pieces from different brands of PPE be used to “fix” a defective piece of PPE.

5.4.2.2 PPE used inside the EZ will be cleaned in accordance with the site decontamination plan. This cleaning will involve the use of one or more decontamination solutions and a fresh water rinse.

5.4.2.3 All re-usable PPE will be dried, or hung to dry, and stored in a clean environment, free from exposure to chemicals, dust, moisture, sunlight or extreme temperatures. Storage of PPE will include storing in such a way that the natural shape of the PPE is not compromised.

5.5 RESPIRATOR INSPECTION, MAINTENANCE, CLEANING, AND STORAGE

5.5.1 General Requirements

5.5.1.1 All respirators will be inspected prior to use to ensure that they are functional and that their structural integrity has not been compromised. Parts of a respirator that require inspection include the valves, valve covers, nosepiece, straps, eyepiece (for full-face respirators), the face piece and its snaps, cylinders, and canisters.

5.5.1.2 The individual responsible for the cleaning, inspection, maintenance, sanitization, and storage of respirators will be trained by a person competent in the proper methods and procedures. Respirator maintenance, storage, and cleaning will be performed in the decontamination trailer clean room/change room.

5.5.1.3 Each respirator user will store his respirator in a clean and sanitary, sealed plastic bag when not in use, unless the respirator has become contaminated or defective. If a respirator becomes chemically contaminated or malfunctions, it will be replaced with a clean and sanitized respirator and the contaminated/defective respirator will be decontaminated and/or repaired as necessary before reuse. The respirator wearer will then inspect the replacement respirator for proper function and cleanliness.

5.5.2 Escape SCBAs

5.5.2.1 The escape SCBAs will be stored, maintained, and inspected prior to use in the same manner as any other respiratory protective device to ensure its cleanliness and proper working condition. In the event that the mask is used, even if only briefly, it will not be reused until it has been properly decontaminated, sanitized, the air tank refilled, and the unit inspected.

5.5.3 Emergency Respiratory Equipment

5.5.3.1 Any SCBAs designated for emergency response will be inspected at least monthly. This inspection will be documented and will include:

- A determination that the regulator and working devices are functional.
- A check of the air cylinder to ensure that it is fully charged in accordance with the manufacturer's instructions.
- An inspection of all other parts, as specified in Paragraph 5.5.1.1.

5.5.4 Inspection and Maintenance of PPE in HCl environment

5.5.4.1 All PPE must be inspected prior to use to ensure proper functioning. Protective clothing that is reusable (TAP boots, CPUs, etc) must be inspected for tears, punctures, and open seams. Defective articles should be reported to the SSHO and repaired or replaced as necessary. Respirator face masks should be inspected for:

- Cracks, tears, holes, or distortion in face piece;
- Crack in elastomer
- Lack of flexibility in face piece (stretch and massage to restore flexibility
- Breaks and tears in head-straps
- Loss of elasticity in head-straps
- Broken or malfunctioning buckles and attachments
- Cracks, tears, or distortion in the exhalation valve, and

- Missing or defective valve cover

5.5.4.2 Additionally, airline hoses shall be visually inspected daily for cracks, cuts or punctures. At least weekly airline hoses shall be pressure tested (hoses are pressurized and leaks are detected by listening for escaping air and/or checked for leaks by applying bubble solution over the surface of the pressurize hose). Defective equipment must be repaired or replaced.

5.5.4.3 If a liquid $AsCl_3$ contact occurs as a splash hazard during site operations, operations shall be secured and the person shall be decontaminated and shall exit the ECS to change PPE immediately.

CHAPTER 6
MEDICAL SURVEILLANCE

6.0.0.1 Personnel engaged in hazardous waste operations will be enrolled in a medical monitoring program as required by 29 CFR 1910.120(f), 29 CFR 1910.134, and Interim Guidance on Occupational Health Practices for the Evaluation and Control of Occupational Exposures to Mustard Agents H, HD, and HT, November 16, 2012. A letter (signed by a physician) attesting to each individual's fitness for duty will be provided to the SSHO prior to beginning work and will be filed on site.

CHAPTER 7
MEDICAL SUPPORT

7.1 INTRODUCTION

7.1.0.1 The medical support requirements necessary during activities at the site depend upon whether operations are being conducted at a low probability area or a higher probability area. The following sections describe the details of these requirements.

7.1.0.2 The primary hospitals for activities at the site are Sibley Hospital (illness/injury) and George Washington Hospital (traumatic). All personnel with suspected chemical agent injuries will be transported to George Washington Hospital. CENAB has a Memorandum of Agreement with George Washington Hospital for the facility to treat personnel with chemical agent injuries, as the hospital has physicians specially trained to handle these types of injuries. A map showing the transportation route to these hospitals will be included in the SSWP.

7.2 MEDICAL SUPPORT AT LOW PROBABILITY AREAS

7.2.0.1 During remediation at low probability areas, at least two personnel trained in First Aid and CPR will be on site at all times. In the event of a medical emergency, team members will render first aid, while additional medical assistance will be requested by calling 911.

7.3 MEDICAL SUPPORT AT HIGHER PROBABILITY AREAS

7.3.0.1 An ambulance staffed with at least two paramedics or emergency medical technicians (EMTs) will be on site at all times while intrusive activities are being conducted at higher probability areas. The ambulance personnel will be trained and current in certification for chemical warfare casualty care.

7.3.0.2 During non-intrusive operations at higher probability areas (e.g., site preparation activities), medical support requirements will be the same as those for remediation at low probability areas (Section 7.2).

CHAPTER 8
EXPOSURE AIR MONITORING AND AIR SAMPLING PROGRAM

8.1 INTRODUCTION

8.1.0.1 The air monitoring methods employed during activities at 4825 Glenbrook Road depend upon whether intrusive operations are being conducted at a low probability area or a high probability area. The following sections describe the details of these requirements and procedures. The specific air monitoring and sampling requirements for a site will be described in the SSWP.

8.2 AIR MONITORING AT LOW PROBABILITY AREAS

8.2.1 General

8.2.1.1 Air monitoring for dust and arsenic will be conducted during contaminated soil excavation operations. The purpose of this air monitoring is threefold:

- To determine the airborne concentrations of contaminants being released from ongoing site activities and to evaluate the need for additional engineering controls during excavations.
- To determine the airborne concentrations of contaminants to which personnel working on the site would be exposed without PPE or other control measures, and to evaluate the adequacy of PPE or other control measures used by site workers.
- To determine the airborne contaminant concentrations leaving the site during intrusive activities and to evaluate/document potential public exposures.

8.2.1.2 Headspace analysis for mustard and lewisite may be required if the Low Probability Contingency Plan is initiated (Section 16.13).

8.2.1.3 Monitoring for volatile organic compounds (VOCs) will be conducted using a photoionization detector (PID) during intrusive operations at all low probability areas.

8.2.1.4 Additional air monitoring for chemical agent will be conducted at the excavation location, as close to the active excavation as practical, and at the work area perimeter as discussed in Section 8.3 (the definition of the work area perimeter is discussed in Section 11.2). The air monitoring matrix for chemicals of concern is summarized in Table D1.8.1.

8.2.2 Air Monitoring Methods for Low Probability Areas

8.2.2.1 Dust and Arsenic

8.2.2.1.1 When excavation activities are being conducted in known arsenic-contaminated soil, at least one direct reading particulate monitor will be placed downwind of the operation. The monitor alarm will be set for a dust concentration of 3mg/m³. Alternatively, the monitor will be read periodically (approximately every 30 minutes) and the results will be logged. Any reading greater than 3mg/m³ will be reported to the SSHO. This concentration limit will protect workers and the public to below the arsenic TLV® of 0.01mg/m³ for soils.

8.2.2.1.2 Additionally, when excavation activities are being conducted in known arsenic-contaminated soil, total dust will be collected at the construction fence boundary for confirmation sampling. Samples will be collected on pre-weighed 37mm, 5µm pore size, tared PVC filters or matched weight 0.8µm pore size mixed cellulose ester filters at a flow rate of 2.0 liters per minute. During excavation in arsenic-contaminated soil, a minimum of one sample will be collected every day. Samples will be sent to an American Industrial Hygiene Association (AIHA)-accredited lab to be analyzed for total dust and arsenic. Samples will be analyzed in accordance with NIOSH 7300 for arsenic and in accordance with NIOSH 0500 for total particulates.

8.2.2.2 Headspace Analysis

8.2.2.2.1 If required, headspace analysis for mustard and lewisite will be performed by the Air Monitoring Team in accordance with their SOPs.

8.2.2.3 Volatile Organic Compounds

8.2.2.3.1 During all excavation activities at low probability sites, a PID will be used to monitor for VOCs in the breathing zone. If a level of 10 ppm or higher is detected for a duration greater than 10 seconds, all personnel will cease operations and relocate temporarily to a location upwind of the excavation.

8.2.2.3.2 Personnel will wait for a period of 5 minutes to allow potential vapors to dissipate and will then return to the excavation from an upwind direction to take another PID reading in the breathing zone. If readings have subsided to a level below 10 ppm, personnel may continue operations at that location, but will continue to monitor with the PID in accordance with this plan.

8.2.2.3.3 However, if readings are sustained at or above the 10 ppm action level following this 5 minute period, personnel will cease intrusive activities at that location and cover the excavation with plastic sheeting to prevent/reduce further escape of vapors into the atmosphere. Additionally, the excavation location will be secured with tape, cones, etc. to ensure limited access. If approved by the USACE Project Delivery Team (PDT), an air sample will be collected using Summa canisters, which will then be analyzed for VOCs.

8.2.2.3.4 The team will relocate to an area upwind of the excavation if the decision is made to continue work, and an appropriate level of PPE will be determined before work is resumed at the location of concern.

8.3 AIR MONITORING AT HIGH PROBABILITY AREAS

8.3.1 General

8.3.1.1 Air monitoring will be conducted by the Air Monitoring Team during intrusive excavations at higher probability areas. The air monitoring matrix for chemicals of concern is summarized in Table D1.8.1. Specific details concerning analytical methods are presented in the Air Monitoring Team SOPs maintained with the analytical equipment. The purpose of air monitoring is threefold:

- To determine the airborne concentrations of contaminants to which personnel working on the site would be exposed without PPE or other control measures, and to evaluate the adequacy of PPE or other control measures used by site workers.
- To determine the airborne concentrations of contaminants being released from on-going site activities and to evaluate the need for additional engineering controls during intrusive trenching or excavation.
- To determine the airborne concentrations of contaminants leaving the site during intrusive activities and to evaluate/document potential public exposures.

8.3.2 Air Monitoring Methods for High Probability Areas

8.3.2.1 Miniature Continuous Air Monitoring System

8.3.2.1.1 During intrusive investigation activities, the Air Monitoring Team will continuously monitor the EZ (ECS for high probability areas and at the excavation location, as close to the active excavation as practical for low probability areas) for the presence of mustard and lewisite in near real-time (approximately 10 minutes from probe inlet to analytical results) using the Miniature Continuous Air Monitoring System (MINICAMS), a capillary column gas chromatograph that uses either a halogen-specific detector or flame photometric detector to identify mustard, lewisite, phosgene, chloropicrin, and cyanogen chloride. The required responses to MINICAMS alarms are described in Section 8.3.4 of this SSHP.

8.3.2.2 Depot Area Air Monitoring System

8.3.2.2.1 Area air monitoring and Worker Population Limit (WPL) monitoring will also be performed for mustard and lewisite using Depot Area Air Monitoring System (DAAMS) tubes. The DAAMS samples will be used to confirm the results of the near real-time monitors and to

Table D1.8.1
Air Monitoring Matrix for Intrusive Operations at High and Low Probability Areas

	MINICAMS (Near Real-Time)	DAAMS (General Area & WPL)	DAAMS (Confirmation)	Electrochemical Detector (Real-Time)	PID (Real-Time)	Summa Canister (Confirmation)	Dust Monitor (Real-time)
Locations	- Intrusive Site (CAFS) - Medical Monitoring Tent - Soil Headspace - IHF Location - Near intrusive area (if low probability)	- Inside ECS or ECS Ducts to CAFS (for WPL monitoring) - Work area perimeter (if low probability)	- Intrusive Site (CAFS, as reqd. for confirmation)	- CAFS Pre-filter (HCl) - CAFS Mid-bed (SA, HCl) - CAFS Exhaust (SA) - Near intrusive area [SA, HCN, HCL (when no combustion source)] - Downwind perimeter location (low probability only) (SA, HCN, HCL)	- Intrusive Site (inside ECS, or within the EZ in area of excavation if no ECS)	- Intrusive Site (if reqd.)	- Vicinity of excavation (if known arsenic contamination and no ECS)
Sampling Frequency	Continuous On Site $^{/2}$ (during intrusive ops)	Up to 8 hours	Up to 12 hours	Continuous	Continuous	When reqd. after PID detect in EZ	Continuous operation (approx. every 30 mins)
Analysis Time	Approx. 10 minutes	30 to 60 minutes	30 to 60 minutes	Immediate	Immediate	24-48 hours	Immediate
No. of People Required	2 MINICAMS operators	1 GC operator & Sample Technician	1 GC operator & Sample Technician	1 person per suite of instruments	1 person per instrument	1 sampler (& laboratory)	1 Operator
Target Compound(s)	Mustard (H) Lewisite (L) Phosgene (CG) Cyanogen Chloride (CK) Chloropicrin (PS)	Mustard (H) Lewisite (L)	Mustard (H) Lewisite (L)	Arsine (SA) Hydrogen chloride (HCl) Hydrogen cyanide (HCN)	VOCs	VOCs	Dust
Lowest Level of Detection	H: 0.00075 mg/m^3 L: 0.00075 mg/m^3 CG: 0.1 mg/m^3 CK: 0.15 mg/m^3 PS: 0.175 mg/m^3	H$^{/1}$: 0.00008 mg/m^3 L$^{/1}$: 0.00008 mg/m^3	H$^{/1}$: 0.00008 mg/m^3 L$^{/1}$: 0.00008 mg/m^3	20 ppb (SA) 30 ppb (HCl) 100 ppb (HCN)	1 ppm	n/a	0.01 mg/m^3
USAESCH Safety Specialist Notification (Alarm) Level	H: 0.0012 mg/m^3 L: 0.0012 mg/m^3 CG: 0.28 mg/m^3 CK: 0.42 mg/m^3 PS: 0.49 mg/m^3	H: Any Confirmed Detection L: Any Confirmed Detection	H: Any Confirmed Detection L: Any Confirmed Detection	50 ppb for 10 secs 1000 ppb for 30 secs (HCl) 2500 ppb for 30 secs	10 ppm for 60 secs	n/a	3 mg/m^3

Note 1: Detection limit for the DAAMS tubes assumes a 24-liter sample is collected.
Note 2: The MINICAMS collects continuous samples. Soil headspace and IHF samples will be collected when required.

document conditions over time. The DAAMS tubes will be collected with battery sampling pumps and analyzed by the Air Monitoring Team in accordance with the Air Monitoring Plan in Appendix J. Area air monitoring will not be required when an Engineering Control Structure (ECS) is being used, though WPL monitoring and MINICAMS confirmation will still be performed using DAAMS tubes. Area air monitoring will be implemented during low probability operations using DAAMS tubes around the work area perimeter and electrochemical detectors at a downwind work area perimeter location (the definition of the work area perimeter is discussed in Section 11.2).

8.3.2.3 Electrochemical Detector

8.3.2.3.1 During intrusive investigation activities, the Excavation Team will continuously monitor the excavation for the presence of arsine using an electrochemical detector. When excavation activities are being conducted inside an ECS, a second and third electrochemical detector will be installed at the CAFS pre-filter and mid-bed. The required responses to electrochemical detector alarms are described in Section 8.3.5 of this SSHP.

8.3.2.3.2 Personnel performing support operations (morning setup for the excavation team) will use modified level D PPE when hydrogen chloride concentrations inside the ECS are 1 ppm or less. To determine the hydrogen chloride concentration inside the ECS, an electrochemical detector will be used to sample from the pre-filter CAFS port. If no hydrogen chloride is detected, the support team can enter in modified level D. While the support team is working inside the ECS, air monitoring must be performed continuously. While the support team is in the ECS and if there is no combustion engine source, a handheld HCL monitor will be used. Any hydrogen chloride detection above 2 ppm (instantaneous) would result in immediate evacuation and the work would have to be completed utilizing level B PPE. Similarly, the Excavation Team will monitor the excavation for the presence of hydrogen chloride using an electrochemical detector during intrusive investigation activities. However, due to the interference from exhaust, the handheld HCl monitor in addition to the CAFS monitoring, will only be used when digging by hand and there is no combustion engine source. If there is a combustion engine exhaust source inside the ECS, the Excavation Team will rely on the pre-filter HCl monitor only to be indicative of the HCl concentrations inside the ECS. Colorimetric tubes (e.g. Drager tubes) will be used for confirmation of electrochemical detector alarms. In the unlikely event that hydrogen chloride levels inside the ECS exceed 400 ppm, work must stop and the Excavation Team must exit the ECS. Work may continue in Level A protection inside the ECS or in Level B when the HCl levels fall below 400 ppm.

8.3.2.3.3 HCl monitoring in addition to the location of intrusive work will be performed at the pre-filter and mid-bed filter of the CAFS. Based on ECBC filtration study results, the public is protected from the hydrogen chloride vapors by the carbon filters within the CAFS.

8.3.2.4 Photoionization Detector

8.3.2.4.1 When excavation activities are being conducted outside an ECS, the Excavation Team will use a calibrated PID to continuously monitor the excavation for VOCs. The PID will be read periodically and the results logged. If the Excavation Team detects a level of 10 ppm above background for a sustained, 60-second period in the vicinity of the excavation, they will inform the SSHO.

8.3.2.4.2 The SSHO will determine whether work should cease until the source of the elevated reading has been determined. If work is stopped, the immediate area of the suspected source will be mitigated.

8.3.2.4.3 Also, if deemed necessary by the SSHO, a Summa canister sample will be collected at the suspected source of the VOCs. In this case, the Summa canister will be analyzed for the Compendium Method Toxic Organics 15 (TO-15) list of VOCs..

8.3.2.5 Dust and Arsenic

8.3.2.5.1 When excavation activities are being conducted outside an ECS and in known arsenic-contaminated soil, at least one direct reading particulate monitor will be placed downwind of the operation outside the EZ. The monitor alarm will be set for a dust concentration of 3mg/m³. Alternatively, the monitor will be read periodically (approximately every 30 minutes) and the results will be logged. Any reading greater than 3mg/m³ will be reported to the SSHO. This concentration limit will protect workers and the public to below the arsenic TLV® of 0.01mg/m³ for soils containing up to 3,300 mg/kg arsenic.

8.3.2.5.2 Additionally, when excavation activities are being conducted in known arsenic-contaminated soil, total dust will be collected at the construction fence boundary for confirmation sampling. Samples will be collected on pre-weighed 37mm, 5µm pore size, tared PVC filters or matched weight 0.8µm pore size mixed cellulose ester filters at a flow rate of 2.0 liters per minute. During excavation in arsenic-contaminated soil, a minimum of one sample will be collected every day. Samples will be sent to an AIHA-accredited lab to be analyzed for total dust and arsenic. Samples will be analyzed in accordance with NIOSH 7300 for arsenic and in accordance with NIOSH 0500 for total particulates.

8.3.2.5.3 At the discretion of the PSHM, if elevated dust/arsenic levels are of a concern, exposure monitoring may be performed inside the ECS using the method described in the above paragraph. Exhaust monitoring is not necessary for the public protection as airborne inorganic arsenic is captured by the CAFS. Based on Parsons memo on April 26, 2010, the public is protected from these inorganic arsenic particles by dust control and by the HEPA filters within the CAFS if any residues entering the CAFS.

8.3.2.6 Combustible Gas Indicator

8.3.2.6.1 When the excavation meets the criteria for a permit-required confined space, or discolored soil is uncovered, the excavation will be continually monitored with a pre-positioned, pre-calibrated combustible gas indicator (CGI) for the presence of potentially explosive atmospheres as a precaution against uncovering a flammable hazardous material.

8.3.2.7 Colorimetric Tubes

8.3.2.7.1 Colorimetric tubes will be used to confirm detections of arsine and HCl at the intrusive site. Colorimetric tubes may also be used as a mean to confirm MINICAMS detections of Phosgene (CG), Cyanogen Chloride (CK), and Chloropicrin (PS) (Usually, MINICAMS is used for confirmation with 3 consecutive alarms.

8.3.3 Air Monitoring Locations for High Probability Areas

8.3.3.1 Air monitoring for chemical agent will be performed within the EZ (ECS for high probability areas and at the excavation location, as close to the active excavation as practical, for low probability areas). Specific air monitoring locations will be identified and presented on one or more figures included in the SSWP for each site. The general locations are described below.

8.3.3.2 Within EZ (using engineering controls)

8.3.3.2.1 The Air Monitoring Team will perform near-real-time monitoring using MINICAMS at several locations in the Chemical Agent Filtration System (CAFS) to detect mustard and lewisite occurring within the ECS. Typically, these locations will be as follows:

- Before the HEPA filter. This will be the first indication of agent vapors entering the filter bed.
- Between the two charcoal filter beds (if dual bed filtration unit). This will indicate agent breakthrough of the first charcoal filter bed. If agents are detected at this location, public safety protocols will be implemented.
- In the filter exhaust. This will be indicative of chemical agent release to the atmosphere. If agents are detected at this location, public safety protocols will be implemented.

8.3.3.2.2 In addition to near-real-time monitoring during intrusive activities, the MINICAMS units monitoring an ECS will be used to ensure that the environment within the ECS does not exceed the WPL for the chemical agents of concern (STEL-C for mustard and lewisite, and cyanogen chloride) before any personnel enter the ECS in Level D PPE to perform routine, non-intrusive maintenance activities (Section 8.3.5).

8.3.3.2.3 DAAMS tubes will continuously sample the air exhausting from the air filtration system stack. These samples will be analyzed daily regardless of other alarms.

8.3.3.2.4 DAAMS tubes will located in the ductwork exiting the ECS and will be used for area background monitoring to the WPL. In conjunction with WPL monitoring, the SSHO, or designate, will maintain administrative controls to record the amount of time that workers are present in the ECS in Level D PPE (e.g., workers performing routine, non-intrusive maintenance tasks).

8.3.3.2.5 If arsine and HCl were detected at the site, the Excavation Team will continuously monitor the excavation for the presence of arsine and HCl using electrochemical detectors. If excavation activities are being conducted inside an ECS, and arsine and HCl were detected inside an ECS, a second electrochemical detector will be installed at the CAFS exhaust (arsine).

8.3.3.2.6 When the excavation meets the criteria for a permit-required confined space, or discolored soil is uncovered without a ringoff, the excavation will be continually monitored with a CGI. The inlet tube for the CGI will be lowered into the excavation and the meter monitored by the Excavation Team attendant.

8.3.3.3 Within EZ (without engineering controls, under evacuation)

8.3.3.3.1 The Air Monitoring Team will perform near-real-time monitoring for mustard and lewisite in close proximity to the excavation and downwind from the excavation.

8.3.3.3.2 If applicable for the site, the Excavation Team will continuously monitor the excavation for the presence of arsine and HCl using electrochemical detectors.

8.3.3.3.3 The Excavation Team will use a PID to continuously monitor for VOCs at the excavation.

8.3.3.3.4 When the excavation meets the criteria for a permit-required confined space, or discolored soil is uncovered without a ringoff, the excavation will be continually monitored with a CGI. The inlet tube for the CGI will be lowered into the excavation and the meter monitored by the Excavation Team attendant.

8.3.3.4 Within CRZ (decontamination tent)

8.3.3.5 A MINICAMS will be used for chemical casualty monitoring in the medical monitoring tent, if needed (Section 13.4.3).

8.3.3.6 Site Perimeter

8.3.3.6.1 When excavation activities are being conducted without an ECS (i.e., during low probability operations), DAAMS tubes will be collected at a minimum of four locations around the work area perimeter (Section 11.2) and analyzed for mustard and lewisite as needed during intrusive investigation activities. In addition, monitoring using electrochemical detectors for arsine, hydrogen chloride (HCl), and hydrogen cyanide (HCN) will be implemented at a downwind work area perimeter location during low probability operations. A weather station will be used to determine the prevailing wind direction to ensure that the instruments are located downwind from the active excavation. The instruments will be moved as appropriate if the prevailing wind direction changes.

8.3.3.6.2 When excavation activities are being conducted outside an ECS and in known arsenic-contaminated soil, dust monitoring will be performed at the work area perimeter (Section 11.2).

8.3.4 MINICAMS Alarms/Ringoffs

8.3.4.1 Definitions

8.3.4.1.1 For the purposes of this plan, the following definitions are used:

- An “alarm” is any MINICAMS reading above the alarm set point.
- A “ringoff” is three consecutive alarms at a single MINICAMS monitoring position.
- A “confirmed ring-off” is one or more alarms that have been confirmed by DAAMS tube analysis.

8.3.4.2 Immediate Actions

8.3.4.2.1 If an alarm has occurred with no apparent suspect container present and the excavation team is in the proper level of PPE, they will take immediate action to investigate and mitigate the source, as necessary. If they are not in the appropriate level of PPE, the excavation team will exit the EZ, upgrade PPE depending upon the alarm level, and then reenter the EZ and work towards investigating and mitigating the source as necessary. Mitigation will include activities such as removing the contamination and placing it in a Multiple Round Container (MRC) or plastic drum and/or covering the contamination with plastic sheeting and/or soil. If a ringoff/alarm is not confirmed per Section 8.3.4.3, personnel may re-enter the EZ in the same level of PPE.

8.3.4.3 Alarm/Ringoff Confirmation

8.3.4.3.1 The MINICAMS is a very sensitive instrument and will respond to positive interferences. Consequently, the MINICAMS may produce false alarms. The MINICAMS is set to alarm at 0.0012 mg/m^3 for mustard and lewisite, 0.3 mg/m^3 for phosgene, and 0.5 mg/m^3 for cyanogen chloride and chloropicrin.

8.3.4.3.2 Following an alarm, the standard procedure is to cycle the MINICAMS two additional times. Each of these cycles takes approximately 10 minutes. Three consecutive alarms will be considered to be an indication of agent detection (a "ringoff"). Confirmation of this detection is accomplished using DAAMS tubes, which are sorbent tubes that are analyzed by the Air Monitoring Team in accordance with their SOPs. DAAMS tubes can be collected for analysis whenever deemed appropriate by the USAESCH Safety Specialist, CENAB Site Operations Officer, Site Manager, SSHO, or the Air Monitoring Team. One or more MINICAMS alarms that have been confirmed by DAAMS tube analysis are termed a "confirmed ringoff."

8.3.4.4 Alarm/Ringoff Notification

8.3.4.5 Actions will be taken and notifications will be made in response to alarms and ring-offs as shown in Tables D1.8.2a and D1.8.2b. The USAESCH Safety Specialist and CENAB Site Operations Officer will be responsible for implementing agency and public notification, as necessary.

8.3.4.6 If chemical agent is detected in the air the USAESCH Safety Specialist, the CENAB Site Operations Officer, and the PSHM will be notified immediately. Section 16 contains additional information on communication, notification, and other required actions associated with the detection of airborne chemical agent.

8.3.5 Electrochemical Detector Alarms

8.3.5.1 Definitions

8.3.5.1.1 For the purposes of this plan, the following definitions are used:

- An "alarm" is any electrochemical detector reading above 50 ppb for a sustained period of 10 seconds.
- A "confirmed detection" is an alarm that has been confirmed by collection of a colorimetric tube sample.

8.3.5.2 Immediate Actions

8.3.5.2.1 If an alarm has occurred and the excavation team is in the proper level of PPE, they will take immediate action to investigate and mitigate the source, if possible. If they are not in the appropriate level of PPE, the excavation team will exit the EZ, upgrade PPE as necessary, and then reenter the EZ and work towards investigating and mitigating the source if possible. If an alarm is not subsequently confirmed per Section 8.3.5.3, personnel may re-enter the EZ in the same level of PPE.

8.3.5.3 Alarm Confirmation and Subsequent Actions

8.3.5.3.1 Following an alarm, if or when the Excavation Team is in the proper level of PPE, a member of the Excavation Team will collect an arsine 0.05/a Draeger colorimetric tube to confirm the alarm. If the colorimetric tube indicates the presence of arsine, the detection will be deemed to have been confirmed.

8.3.5.3.2 If activities are taking place within an ECS, following a "confirmed detection" of arsine, the SSHO (or designated representative) will begin to monitor for arsine at the CAFS exhaust using the electrochemical detector located there.

8.3.5.4 Alarm Notification

8.3.5.4.1 Actions will be taken and notifications will be made in response to electrochemical detector alarms as shown in Tables D1.8.3a, D1.8.3b, and D1.8.3c. The USAESCH Safety Specialist and CENAB Site Operations Officer will be responsible for implementing agency and public notification, as necessary.

8.3.5.4.2 If arsine is detected in the air, the USAESCH Safety Specialist, the CENAB Site Operations Officer, and the PSHM will be notified immediately.

Table D1.8.2a: Monitoring Alarms: Interpretation and Resultant Actions with ECS

Monitoring Location			Response To Alarm	
ECS (Pre-Filter)	**Mid Bed**	**Outside (Exhaust)**	**Interpretation**	**Action**
📢			Possible agent presence	Verify workers have adequate PPE. Locate and mitigate source. Continue working.
📢📢			Possible agent presence	Pull DAAMS tube at pre-filter, mitigate if obvious source, continue working.
📢📢📢 or 📢📢 & DAAMS			Confirmed agent presence	Confirmed agent presence: Notify Partners of agent detection. Continue working to locate and mitigate source. **Note:** Agent is contained within the ECS.
📢📢📢 or 📢📢 & DAAMS	📢		Possible agent breakthrough	Confirmed presence, continue mitigation. **Note:** Agent has **<u>NOT</u>** been released to the environment.
📢📢📢 or 📢📢 & DAAMS	📢📢		Possible agent breakthrough	Pull DAAMS tube at mid-bed. Continue to locate and mitigate source. **Note:** Agent has **<u>NOT</u>** been released to the environment.
,📢📢📢 or 📢📢 & DAAMS	📢📢📢 or 📢📢 & DAAMS		Confirmed agent breakthrough	Implement agency notification, and notify residents within AEGL-2 Hazard Distance to shelter-in-place as per PPP; continue to locate and mitigate source. **Note:** Agent has **<u>NOT</u>** been released to the environment.
📢📢📢 or 📢📢 & DAAMS	📢📢📢 or 📢📢 & DAAMS	📢	Probable release to environment	Pull DAAMS tube at the exhaust. Maintain shelter-in-place within the AEGL-2 Hazard Distance as per PPP. Continue to locate/mitigate source.
📢📢📢 or 📢📢 & DAAMS	📢📢📢 or 📢📢 & DAAMS	📢📢	Probable release to environment	Pull DAAMS tube at the exhaust. Maintain shelter-in-place within the AEGL-2 Hazard Distance as per PPP. Continue to locate/mitigate source.
📢📢📢 or 📢📢 & DAAMS	📢📢📢 or 📢📢 & DAAMS	📢📢📢 or 📢📢 & DAAMS	Confirmed agent release to environment	Maintain shelter-in-place within the AEGL-2 Hazard Distance as per PPP; continue to locate/mitigate source.
🔇🔇🔇	🔇🔇🔇	🔇🔇🔇	All Clear	If there has been a confirmed breakthrough, replace charcoal filters and test CAFS prior to resuming operations.

📢 MINICAMS Alarm 🔇 Clear MINICAMS cycle

DAAMS Confirmed DAAMS tube result for H & L (confirmation for CG, CK, & PS is considered to be three consecutive alarms)

Table D1.8.2b: Monitoring Alarms: Interpretation and Resultant Actions without ECS

Monitoring Location	**Response To Alarm**	
Outside	**Interpretation**	**Action**
📢	Possible agent presence	Exit area through PDS if workers not in adequate PPE. If/when in appropriate PPE, begin investigating source and mitigating as appropriate
📢📢	Possible agent presence	If in appropriate PPE, continue investigating source and mitigating as appropriate. DAAMS tubes may be sampled and replaced based on MINICAMS results as determined by air monitoring personnel.
📢📢📢 or 📢📢 & DAAMS	Confirmed agent presence	If in appropriate PPE, continue investigating source and mitigating as appropriate. Notify Partners of agent detection.
~~📢📢📢~~	All Clear	Agent no longer present. Secure site and exit area through the PDS. The SSHO, USAESCH Safety Specialist, and CENAB Site Operations Officer, in consultation with the PDT, will evaluate the situation to determine whether engineering controls are required to continue the investigation. DAAMS tubes may be replaced based on MINICAMS results as determined by air monitoring personnel.

📢 MINICAMS Alarm ~~📢~~ Clear MINICAMS cycle

DAAMS Confirmed DAAMS tube result for H & L (confirmation for CG, CK, & PS is considered to be three consecutive alarms)

Table D1.8.3a: Arsine Electrochemical Detector Monitoring Alarms: Interpretation and Resultant Actions with ECS

Monitoring Location			Response To Alarm	
Inside ECS (Dig Site)	**CAFS Mid-bed**	**Outside (CAFS Exhaust)**	**Interpretation**	**Action**
✓			Possible arsine presence	Verify workers have adequate PPE. Collect colorimetric tube sample. Locate and mitigate source. Continue working.
✓ + CT			Confirmed arsine presence	Notify Partners of arsine detection. Continue to locate and mitigate source. **Note:** Arsine is contained within the ECS.
✓ + CT	✓		Possible arsine breakthrough	Collect colorimetric tube sample. Locate and mitigate source. Continue working. **Note:** Arsine has **NOT** been released to the environment.
✓ + CT	✓ + CT		Confirmed arsine breakthrough	Implement agency notification and notify residents within MCE Hazard Distance to shelter-in-place as per PPP; continue working to locate/mitigate source. **Note:** Arsine has **NOT** been released to the environment.
✓ + CT	✓ + CT	✓	Probable arsine release to environment	Maintain shelter-in-place as per PPP; continue working to locate/mitigate source. Collect colorimetric tube sample at exhaust.
✓ + CT	✓ + CT	✓ + CT	Confirmed arsine release to environment	Maintain shelter-in-place as per PPP; continue working to locate/mitigate source.
NFD	NFD	NFD	All Clear	Arsine no longer present. If there has been a confirmed breakthrough, replace charcoal filters and test CAFS prior to resuming operations.

✓ Arsine Alarm (i.e., > 50 ppb for 10 sec) CT Confirmed colorimetric tube result for arsine. NFD No further detection.

Table D1.8.3b: HCl Electrochemical Detector Monitoring Alarms: Interpretation and Resultant Actions with ECS

Monitoring Location		Response To Alarm	
ECS (Pre-Filter)	**CAFS Mid-bed**	**Interpretation**	**Action**
0-1 ppm	0	Possible HCl presence	Verify workers have adequate PPE. Locate and mitigate source in Modified Level D. Be prepared to put on the slung mask and exit immediately if the concentration is detected at 1 ppm or greater.
1-100 ppm	0	Possible HCl presence	Verify workers have adequate PPE. Continue working in Level B.
	>0.5 ppm	HCl presence	Locate and mitigate source (cover the excavation with plastic sheeting) in Level B if CAFS mid-bed has detections of more than 0.5 ppm.
	>2 ppm	HCl presence	Implement agency notification and notify residents within MCE Hazard Distance to shelter-in-place as per PPP; continue working in Level B to locate/mitigate source.
100-400 ppm	0	Possible HCl presence	Verify workers have adequate PPE. Continue working in Level A.
	>0.5 ppm	HCl presence	Locate and mitigate source (cover the excavation with plastic sheeting) in Level A if CAFS mid-bed has detections of more than 0.5 ppm.
	>2 ppm	HCl presence	Implement agency notification and notify residents within MCE Hazard Distance to shelter-in-place as per PPP; continue working in Level A to locate/mitigate source.
0	0	HCl no longer present	If there has been a confirmed breakthrough, replace charcoal filters and test CAFS prior to resuming operations.

Table D1.8.3c: Electrochemical Detector Monitoring Alarms: Interpretation and Resultant Actions without ECS

Monitoring Location	Response To Alarm	
Outside (Dig Site)	**Interpretation**	**Action**
✓	Possible arsine presence	Verify adequate worker PPE, check for possible sources, mitigate if obvious source, collect colorimetric tube sample, continue working.
✓ + CT	Confirmed arsine presence	Continue to mitigate source. Notify Partners of arsine detection. **Note:** Members of public & personnel outside associated MCE hazard distance are not at risk.
NFD	All Clear	Arsine no longer present. Secure site and exit area through the PDS. The SSHO, USAESCH Safety Specialist, and CENAB Site Operations Officer, in consultation with PDT, will evaluate the situation to determine whether engineering controls are required to continue the investigation.

✓ Arsine Alarm (i.e., > action level for 10 sec) CT Confirmed colorimetric tube result for arsine. NFD No further detection.

8.3.6 WPL Monitoring

8.3.6.1 This section describes the necessary steps to be followed with regard to air monitoring at a higher probability site when it is necessary for workers to enter an ECS in modified Level D PPE to perform routine, non-intrusive maintenance activities.

8.3.6.2 Pre-Entry Air Monitoring

8.3.6.2.1 Before personnel in modified Level D PPE are permitted to enter the ECS, the structure will be monitored by the Air Monitoring Team for at least two full MINICAMS cycles to ensure that the chemicals of concern are not present above the detection level. If no chemicals of concern are detected, the SSHO will be notified and the workers in modified Level D PPE may enter the ECS. If chemicals of concern are detected above the alarm level, the SSHO will be notified and the Higher Probability Contingency Plan (Section 16.14) will be initiated.

8.3.6.2.2 Monitoring with the MINICAMS will continue while workers are within the ECS in modified Level D PPE. In the event of a MINICAMS alarm, the personnel in modified Level D PPE will be instructed to leave the ECS via the PDS and the Site Manager and SSHO will initiate responses to the MINICAMS alarm, as described in Section 8.3.4.

8.3.6.2.3 Electrochemical monitoring for HCl and Arsine

8.3.6.3 Worker Population Limit Monitoring

8.3.6.3.1 While personnel in modified Level D PPE are within the ECS, area background monitoring to the WPL will be conducted inside the structure. This will be conducted using two or more DAAMS stations, which will be used to collect air samples while the personnel in modified Level D PPE are inside the ECS.

8.3.6.3.2 The WPL DAAMS stations will be positioned as close as possible to the planned work area and, if multiple crews are working in different locations within the structure, placement of additional stations will be considered. Analysis of the associated DAAMS tubes for mustard and lewisite will be completed by the Air Monitoring Team within 24 hours of sample collection and the results will be reported to the SSHO. WPL monitoring is not required for phosgene, cyanogen chloride, or chloropicrin.

8.3.6.3.3 In the event that DAAMS analysis indicates that the WPL was exceeded while personnel were within the ECS in modified Level D PPE, the potentially affected workers will be examined by the onsite medical personnel for symptoms of exposure. Additionally, the potential exposure will be documented in their medical file and with the Parsons occupational physician. Finally, in the event of a potential exposure, the Parsons PM and the SSHO will complete a Parsons on-line incident report (see Chapter 8 of the APP to which this SSHP is attached).

8.3.6.4 Administrative Controls

8.3.6.4.1 When personnel in modified Level D PPE are within the ECS, the SSHO or designate will record the duration that each worker spends inside the structure. These records will be kept in the SSHO's file on site for the duration of the project.

8.3.6.4.2 During the daily safety briefings, workers will be instructed that they are required to inform the SSHO prior to any entry into the ECS and that they must receive the SSHO's concurrence before any such entry.

CHAPTER 9
HEAT AND COLD STRESS

9.1 HEAT STRESS

9.1.1 General

9.1.1.1 Sweating does not cool the body unless the sweat is evaporated from the body. The use of some PPE can reduce the body's ability to eliminate large quantities of heat because the evaporation of sweat is decreased. The body's effort to maintain an acceptable temperature may become impaired and this may cause heat stress. Increased body temperature and physical discomfort also promote irritability and a decreased attention to the performance of hazardous tasks. If semi-permeable and impermeable PPE is used at the site, heat stress is a MAJOR HAZARD to involved site workers.

9.1.1.2 Heat stress related problems include heat rash, fainting, heat cramps, heat exhaustion, and heat stroke. Heat rash occurs because sweat is not evaporating, making the skin wet most of the time. Standing erect and immobile allows blood to pool in the lower extremities. As a result, blood does not return to the heart to be pumped back to the brain and fainting may occur. Heat cramps are painful spasms of the muscles as a result of excessive salt loss from profuse sweating. Heat exhaustion occurs because of the large fluid and salt loss from profuse sweating. A person's skin is clammy and moist; and nausea, dizziness, and headaches may occur.

9.1.1.3 Heat stroke occurs when the body's temperature regulatory system has failed. Skin is hot, dry, red, and spotted. These skin color changes may not be readily evident in darker skinned individuals and other signs must be relied upon. The affected person may be mentally confused, delirious, and convulsions may occur. A person exhibiting signs of heat stroke should be removed from the work area to a shaded area immediately. The person should be soaked with water and fanned to promote evaporation. Medical attention must be obtained immediately. EARLY RECOGNITION AND TREATMENT OF HEAT STROKE ARE THE ONLY MEANS OF PREVENTING BRAIN DAMAGE OR DEATH.

9.1.2 Early Symptoms of Heat Stress Related Problems

9.1.2.1 Workers should recognize the early symptoms of heat stress. These symptoms include:

- Decline in task performance,
- Lack of coordination,
- Decline in alertness,

- Unsteady walk,
- Excessive fatigue,
- Muscle cramps, or
- Dizziness.

9.1.3 Engineering Controls

9.1.3.1 For site operations where Level C PPE or higher is required, a cool-down area will be made available on site.

9.1.3.2 WBGT will be tracked continuously by the SSHO when temperatures on site exceed 80°F.

9.1.4 Work/Rest Regimens

9.1.4.1 The management of risk for heat stress exposures centers around the principal of job-specific controls. Controls that will be implemented to reduce the potential for worker heat stress includes: use of acclimated workers, providing adequate replacement fluids, educating workers to recognize the early symptoms of heat stress, use of cooling vests, physiological monitoring, and development of a work/rest regimen that will prevent the onset of heat stress.

9.1.4.2 Work-rest regimens will be implemented in accordance with the limits specified in Table D1.9.1, for Level D and Modified Level D PPE, and Table D1.9.2, for Level C PPE and higher) unless modified as described below.

9.1.4.3 Work schedules may be adjusted in accordance with heat stress monitoring results.

9.1.4.4 If the core body temperature exceeds 38°C (100.4°F) for any team member, then the next lower work-rest regimen will be instituted.

9.1.4.5 If no team member's core body temperature exceeds 37.5°C (99.5°F), then the next higher work-rest regimen may be instituted.

9.1.4.6 The SSHO and site medics will track WBGT readings and compare these to the highest core body temperature for each team. These trend data will used to establish initial work-rest regimens. For example, if PPE is upgraded to Level C (from Modified Level D PPE) and the WBGT is 76°F, the work-rest regimen per Table D1.9.2 is 50%/50%. However, if trend data indicate that personnel have been in Level C PPE at WBGT 76°F and have maintained core body temperatures <37.5°C (99.5°F), then the initial work-rest regimen will be 75%/25%. If the core body temperature exceeds 38°C (100.4°F) for any team member, then the next lower work-rest regimen will be instituted.

Table D1.9.1
Permissible Heat Exposure Threshold Limit Values [°C and (°F) WBGT] when Level D or Modified Level D PPE is worn

Work-Rest Regimen	Workload		
	Light	Moderate	Heavy
Continuous work	29.5 (85.1)	27.5(82)	26 (77)
75% Work 25% Rest, each hour	30.5 (87)	28.5 (82)	27.5 (78)
50% Work 50% Rest, each hour	31.5 (89)	29.5 (85)	28.5 (82)
25% Work 75% Rest, each hour	32.5 (90)	31 (88)	30.0 (86)

NOTE:	The workload category may be established by ranking each job into light, medium, or heavy categories on the basis of type of operation:
Light:	(up to 200 kcal/hr or 800 Btu/hr): e.g., sitting or standing to control machines, performing light hand or arm work.
Moderate:	(200-350 kcal/hr or 800-1400 Btu/hr): e.g., walking about with moderate lifting and pushing.
Heavy:	(350-500 kcal/hr or 1400-2000 Btu/hr): e.g., pick and shovel work.

Table D1.9.2
Permissible Heat Exposure Threshold Limit Values [°C and (°F) WBGT] when Level C, B, or A PPE are worn

Work-Rest Regimen	Workload		
	Light	Moderate	Heavy
Continuous work	24.5 (76.1)	22.5 (72.5)	21 (69.8)
75% Work 25% Rest, each hour	25.5 (77.9)	23.5 (74.3)	22.5 (72.5)
50% Work 50% Rest, each hour	26.5 (79.7)	24.5 (76.1)	23.5 (74.3)
25% Work 75% Rest, each hour	27.5 (81.5)	26 (78.8)	25 (77)

9.1.4.7 Whenever a new team member begins work on site, that member's entire team will use the appropriate table for establishing the work-rest regimen until the new team member is acclimated.

9.1.4.8 Use of cooling vests by team members may also modify the work-rest regimen or the time of stay for continuous work. In this event, work-rest regimens will be modified as described in Paragraphs 9.1.4.3 through 9.1.4.6.

9.1.5 Prevention of Heat Stress

9.1.5.1 Proper training and preventive measures will aid in averting loss of worker productivity and serious illness. Heat stress prevention is particularly important because once a person suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat related illnesses. To avoid heat stress, the following steps should be taken:

- Adjust work schedules.
    - Modify work/rest regimens as described above.
    - Mandate work slowdowns as needed.
- Perform work during cooler hours of the day, if possible.
- Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods.
- Ensure workers are acclimated to weather conditions and have extensive experience in the selected level of PPE. Workers can be acclimatized by gradually increasing the workload over a period of days.
- Worker heart rate and temperature will be monitored and tracked when workers are wearing Level C PPE or higher.
- Maintain worker's body fluids at normal levels. This is necessary to ensure that the cardiovascular system functions adequately. Daily fluids intake must approximately equal the amount of water lost in sweat, e.g. 8 fluid ounces (0.23 liters) of water must be ingested for approximately every 8 ounces (0.23 kg) of weight loss. The normal thirst mechanism is not sensitive enough to ensure that enough water will be drunk to replace lost sweat. When heavy sweating occurs, encourage the worker to drink more. The following strategies may be useful:
    - Maintain water temperature at 50° to 60°F (10° to 16.6°C).
    - Provide small disposable cups that hold about 4 ounces (0.1 liter).
    - Have workers drink 16 ounces (0.5 liters) of fluid (preferably water or diluted drinks) before beginning work.
    - Urge workers to drink a cup or two every 15 to 20 minutes, or at each monitoring break. A total of 1 to 1.6 gallons (4 to 6 liters) of fluid per day are recommended, but more may be necessary to maintain body weight.

- Train workers to recognize the symptoms of heat-related illnesses.
- Provide potassium supplements (banana or potassium chloride tablets).
- Rotate personnel and alternate job functions.

9.2 COLD-RELATED ILLNESS

9.2.1 General

9.2.1.1 Exposure to low temperatures presents a risk to employee safety and health both through the direct effect of the low temperature on the body and collateral effects such as slipping on ice, decreased dexterity, and reduced dependability of equipment. Work conducted in the winter months can become a hazard for field personnel as a result of cold exposure. All personnel must exercise increased care when working in cold environments to prevent accidents that may result from the cold. The effects of cold exposure include frostbite and hypothermia. Wind increases the impact of cold on a person's body. Systemic cold exposure is referred to as hypothermia. Local cold exposure is generally labeled frostbite. Recognition of the symptoms of cold-related illness will be discussed during the health and safety briefing conducted prior to the onset of site activities.

9.2.1.2 Hypothermia is a life-threatening condition in which the core body temperature falls below 95°F. Hypothermia can occur at temperatures above freezing particularly when the skin or clothing becomes wet. During exposure to cold, maximum shivering occurs when the core temperature falls to 95°F. As hypothermia progresses, depression of the central nervous system becomes increasingly more severe (Table D1.9.3). This accounts for the progressive signs and symptoms ranging from sluggishness and slurred speech to disorientation and eventually unconsciousness.

Table D1.9.3
Progressive Clinical Symptoms of Hypothermia

Core Temperature	Clinical Signs
95°F	Maximum shivering
87°F - 89°F	Consciousness clouded; blood pressure becomes difficult to obtain; pupils dilated
84°F - 86°F	Progressive loss of consciousness; muscular rigidity; respiratory rate decreases
79°F	Victim rarely conscious
70°F - 72°F	Maximum risk of ventricular fibrillation

9.2.1.3 Frostbite is both the general and medical term given to areas of cold injury. Unlike hypothermia, frostbite rarely occurs unless environmental temperatures are less than freezing and usually less than 20°F. Frostbite injuries occur most commonly on the distal parts of the body (nose, earlobes, hands, and feet) that are subject to intense vasoconstriction. The three general categories of frostbite are:

- **Frostnip** - A whitened area of the skin that is slightly burning or painful.
- **Superficial frostbite** - Waxy, white skin with a firm sensation but with some resiliency. Symptomatically feels "warm" to the victim with a notable cessation of pain.
- **Deep frostbite** - Tissue damage deeper than the skin, at times, down to the bone. The skin is cold, numb and hard.

9.2.2 Preventing Cold Exposure

9.2.2.1 In preventing cold stress, the SSHO must consider factors relating to both the worker and the environment. Training, medical screening, establishment of administrative controls, selecting proper work clothing, and wind-chill monitoring all contribute to the prevention of hypothermia and frostbite.

- **Training** - Recognizing the early signs and symptoms of cold stress can help prevent serious injury. Therefore, workers will be trained to recognize the symptoms of hypothermia and frostbite and have appropriate first-aid instruction. When the air temperature is below 50°F, the SSHO will inform workers of the proper clothing requirements and any work practices that are in effect to reduce cold exposure.

- **Administrative Controls -** The SSHO will establish a work/rest schedule based upon worker monitoring. At the first sign of uncontrollable shivering the worker will be rested in a heated shelter. Work will stop when the air temperature reaches 0°F.
- **Clothing** - Workers will be encouraged to layer clothing when air temperature is below 50°F. Clothing that has a high insulation value will be worn under protective garments. Insulated gloves will be worn when the wind chill index is below 32°F.

CHAPTER 10
STANDARD OPERATING PROCEDURES AND WORK PRACTICES

10.1 GENERAL SAFETY

10.1.0.1 The following are considered standard safe work practices:

- Eating, drinking, chewing tobacco, smoking, and carrying matches or lighters are prohibited in a contaminated or potentially contaminated area, or where the possibility for contamination transfer exists.
- Wearing cosmetics and/or contact lenses is not authorized within the EZ.
- Contact with potentially contaminated substances or materials will be avoided. Walking through puddles, pools, mud, or handling soils without protective gloves, etc., will be prohibited. Whenever possible, kneeling on the ground, leaning or sitting on equipment or the ground will be avoided. Monitoring equipment will not be placed on potentially contaminated surfaces (e.g., ground, etc.).
- All field crew members will be alert to all potentially dangerous situations (e.g., the presence of strong, irritating, unusual, or nauseating odors).
- Field crew members will be familiar with the physical characteristics of the site during intrusive investigations, including:
  - Wind direction in relation to nearby buildings.
  - Accessibility to associates, equipment, vehicles, and communication.
  - The EZ location and boundaries.
  - Site access.
  - Nearest water sources.

- Site workers will use PPE as specified in this SSHP during the initial site reconnaissance and follow-on geophysical activities.
- Use of heavy equipment on site (e.g., trucks and bobcats) may be hazardous to site workers. All field crew members will stay clear while heavy equipment is being operated.
- Wearing PPE may result in the impaired ability to operate site equipment. All field crew members will pay specific attention to decreased performance capabilities resulting from wearing PPE, such as poor tactile skills when wearing

certain types of gloves. Prior knowledge of limitations imposed by the use of such equipment will allow the worker to assess the decrease in his or her capability to perform field operations safely.

- Wearing jewelry, such as rings and loose bracelets and necklaces, will be prohibited in order to avoid their entanglement in site machinery.
- Overhead power lines, downed electrical wires, and buried cables may pose a danger of shock or electrocution in the event workers contact or sever them during site operations.
- Buddy system procedures will be enforced during site operations.
- Site personnel will perform only those tasks that they are qualified to perform.
- Site visitors will be escorted by qualified personnel at all times.
- Running and horseplay will be prohibited in all areas of the site.
- The number of personnel in the EZ will be the minimum number necessary to perform work tasks in a safe and efficient manner.

10.2 CHEMICAL AGENT AND ORDNANCE SAFETY

10.2.0.1 The following measures will be observed by personnel working in areas suspected of being contaminated with chemical agent:

- Clothing will be changed at the beginning and end of each work shift. Personal clothing will be removed and replaced with issued clothing. Clothing issued for work on site will be coveralls, T-shirt, underwear, socks, and PPE outer garments.
- A decontamination tent will be used for showering. Showers will be taken as needed (e.g., ring-off, suspected contact with contamination) by all personnel that crossed the Hot Line during intrusive activities at suspect RCWM sites.
- Issued clothing will be laundered by the respective organizations. Personnel are responsible for laundering their personal clothing.
- Open sores or wounds will be evaluated by first aid personnel prior to admittance to the EZ.
- Areas where chemical agent is suspected of being present will be clearly identified to all site personnel. Personnel will be reminded of the possible presence of chemical agent during morning safety meetings.
- The SSHO will designate safe locations (separated from the work areas) where eating, drinking, chewing, and smoking will be allowed.
- Supplies of decontaminating solutions (5% bleach) and emergency flushing devices for personnel decontamination will be located in work areas where intrusive activities are in progress.

- In the event of a ring-off, each worker will be examined for signs of chemical agent exposure before leaving the work site. If signs of possible exposure are detected, the individual will be immediately transported to the George Washington Hospital for further examination.

10.2.0.2 The following measures will be observed by personnel working during an unlikely event when a suspect MEC is encountered:

- MEC will be avoided, and will not be touched, handled, or moved under any circumstances except by UXO Technicians when applicable.
- MEC that have been exposed to fire and detonation will be considered as extremely hazardous.
- Outer or undergarments made of wool, silk, or synthetic textiles such as rayon and nylon will not be worn while working in a UXO-contaminated environment. These materials can generate a sufficient static charge to ignite fuels or initiate explosives. Any UXO technician needing to touch a UXO item will ground themselves prior to touching it.
- Any practice UXO will be assumed to contain a live charge until it can be determined otherwise.
- Unnecessary personnel will not be present in the vicinity of UXO. Personnel exposure time will be limited. Operations will always be based upon minimum exposure consistent with efficient operations.
- Inhalation of and skin contact with smoke, fumes, and vapors associated with any explosives, smoke, or other associated materials will be avoided.
- Color-coding of UXO will not be relied on for positive identification of contents. Munitions having no, incomplete, or improper color-coding have been encountered.
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10.2.0.3 Workers at a low probability area who encounter suspect AUES-related debris will stop work immediately and implement the Low Probability Contingency Plan (Section 15.13).

10.2.0.4 Workers at a higher probability area who encounter suspect MEC will stop work immediately and implement the Higher Probability Contingency Plan (Section 15.14).

10.3 ENGINEERING CONTROLS

10.3.0.1 Intrusive investigations at higher probability sites will be performed either by evacuating the public or by performing work using engineering controls. For the purposes of operations at 4825 Glenbrook Road, engineering controls consist of a containment structure that is exhausted by a CAFS of sufficient size to maintain negative pressure. Air-conditioned or heated air may be supplied to control the temperature within the ECS for worker safety. This system will be continually monitored with the near real-time MINICAMS.

10.3.0.2 The ECS selected for the high probability areas remedial action activities is dependent upon the selected Maximum Credible Event (MCE). The ECS will be a vinyl tent with steel tubing frame. This ECS has been successfully used when there is no possibility for a detonation. This ECS will not contain a detonation but offers easier portability and greater adaptability for uneven surfaces.

10.3.0.3 While the engineering controls are functioning as designed, the boundary of the ECS will be considered to be the EZ for an investigation and will be entered only by persons wearing the appropriate PPE.

10.3.0.4 Prior to starting excavation activities, all ECS doors will be secured, the CAFS will be functional, and air monitoring measures will be in place and operating.

10.3.0.5 Further details concerning the types of ECSs that will be used at 4825 Glenbrook Road are included in Appendix M to the SSWP.

10.3.0.6 The specific details on engineering controls used at the site are described in the SSWP.

10.4 CHEMICAL AGENT FILTRATION SYSTEM

10.4.0.1 If an ECS is used, it will be maintained under negative pressure using a CAFS that is specifically designed to remove chemical agent vapors and particulates. The filter system will be continually monitored using the near real time MINICAMS.

10.4.0.2 The CAFS filter assembly comprises:

- Pre-filters,
- A HEPA filter to remove particulates,
- A charcoal filter bed, and
- An exhaust stack.

10.4.0.3 Any CAFS used will be adequately sized to maintain a negative pressure inside the ECS when the potential exists for encountering chemical agent, as specified in DA Pam 385-61. To maintain the necessary residence time in the filters, the flow rate through the CAFS will not exceed the rated capacity of the filter system.

10.5 VIDEO SURVEILLANCE

10.5.0.1 When circumstances permit it during intrusive activities at higher probability area, activities within the ECS will be monitored using video surveillance from the Command Post in the Support Zone (SZ).

10.6 PUBLIC SAFETY

10.6.0.1 The measures used to ensure safety of the public during activities at 4825 Glenbrook Road depend upon whether intrusive operations are being conducted at a low probability area or a higher probability area. The following sections describe the details of these requirements and procedures.

10.6.1 Public Safety for Remedial Action Activities at Low Probability Areas

10.6.1.1 **General** - The activities conducted at low probability areas including house demolition consist of general construction-type activities. The public will be kept out of the construction site area by using construction fencing or other physical means. In the event that unauthorized personnel inadvertently enter the construction site, work will be stopped immediately. Work will not begin again until the unauthorized person(s) is(are) outside the construction site.

10.6.1.2 **Air Monitoring** - Continuous, real-time air monitoring for dust will be performed by the Parsons sampling team during contaminated soil removal activities to ensure that the TLV for arsenic will not be exceeded (see Section 8.2.2 of this SSHP). Time weighted average samples will be collected for particulates and analyzed for arsenic during contaminated soil removal activities.

10.6.1.3 **Dust Control** - Dust mitigation measures (e.g., wetting down) will be implemented any time that site activities result in a visible dust cloud, that the real-time dust monitors indicate a level of greater than 3 mg/m^3 total dust resulting from site activities, or otherwise at the direction of the Site Manager or SSHO.

10.6.2 Public Safety for Remedial Action Activities at High Probability Areas

10.6.2.1 The MCE is selected for high probability sites based on the maximum release of a chemical agent from a munitions, bulk container, or process that could occur as a result of an unintended, unplanned, or accidental incident. The event must be realistic with reasonable probability of occurrence. Based on the CENAB probability assessment, the MCE identified for operations at high probability areas at 4825 Glenbrook Road is the evaporative release of arsenic trichloride from a 1-liter container. It should be noted that the DDESB approval for the CSS states that the approved MCE is based on a one (1) liter container of the chemical agent Lewisite, which is consistent with Army policy. The selected MCE using arsenic trichloride provides more conservative hazard distances than the DDESB-approved MCE using Lewisite; therefore, the PDT agreed that the arsenic trichloride MCE will be used for this operation.

10.6.2.2 The site-specific MCE and associated Temporary Emergency Exposure Limit (TEEL)-1 distance is selected by USAESCH for the higher probability areas to be remediated. A MGFD was not selected because ordnance is not expected to be located at the specific site.

10.6.3 TEEL-1 Distance, Minimum Separation Distance and EZ

10.6.3.1 The hazard distance for operations at high probability areas at 4825 Glenbrook Road is based on the maximum release of a chemical agent from a munitions, bulk container, or process that could occur as a result of an unintended, unplanned, or accidental incident. The event must be realistic with reasonable probability of occurrence. Based on the probability assessment prepared by CENAB, the MCE identified for the RA is the evaporative release of $AsCl_3$ from a 1-liter container. The Acute Exposure Guideline Level (AEGL)-2 distance for the evaporative release of lewisite from a 1-liter container is 96 feet. The TEEL-1 distance for the evaporative release of $AsCl_3$ from a 1-liter container is 194 feet. The TEEL-1 was used for the $AsCl_3$ model because AEGL-2 was not available for this compound. TEEL is the Department of Energy's (DOE) temporary value until the chemical is reviewed and approved through the AEGL process. Considering the interim nature of the TEEL values, the hazard distance of release from 1 liter of $AsCl_3$ was evaluated using the more stringent TEEL-1 instead of the TEEL-2 value to protect the general population.

10.6.3.2 The EZ for a site is defined as the greater of the MGFD-based minimum separation distance (MSD) and the MCE-based hazard distance. Therefore, the EZ distance for this site would be 194 feet. However, since an ECS will be used for this RA, the EZ will be confined to the limits of the ECS. The work area perimeter, as defined by the SSHO based on worker and public safety, will be used to define the EZ for all low probability excavations (see Section 11.2 of the SSHP).

10.6.4 Public Safety Protocols

10.6.4.1 A Public Protection Plan (PPP) – A PPP has been prepared by CENAB and will be maintained on the site by the CENAB Site Operations Officer. An Evacuation/Shelter-In-Place Plan is included in this PPP.

10.6.4.2 Site Evacuation - To ensure the safety and the protection of the public, prior to beginning intrusive operations all residents within the EZ distance will be withdrawn to a location outside the EZ distance. The EZ distance will be specified in the SSWP. This EZ distance will be based on either the MGFD or MCE, whichever generates the greatest EZ distance, and the type of engineering controls employed if any. If necessary, roads will be blocked by D.C. Metropolitan Police to prevent unauthorized access inside the EZ. When engineering controls are employed to control site hazards, the EZ distance may be reduced to the boundary of the engineering controls.

10.6.4.3 Intrusive Remediation - If suspect RCWM, MEC, or an intact container is discovered, it will be packaged in a MRC and transported to the Interim Holding Facility (IHF) containers at the Federal Property Storage Area. The CENAB Site Operations Officer, in consultation with the USAESCH Safety Specialist, SSHO, Site Manager, and the Spring Valley Partners will decide whether the site will need to be secured and engineering controls established (if not already in place) to complete the investigation or whether the investigation will continue under evacuation.

10.6.4.4 Site Access - If an excavation at a higher probability site cannot be completed within a single day, the area will be secured and guarded 24 hours per day to prevent unauthorized access until the excavation is completed.

10.6.4.5 Air Monitoring - Continuous air monitoring for chemical agents will be performed during intrusive operations at higher probability sites and procedures are in place for response in the event of chemical agent detection. These procedures are discussed in Chapter 8 of this SSHP.

CHAPTER 11
SITE CONTROL MEASURES

11.1 WORK ZONES

11.1.0.1 The purpose of establishing work zones and maintaining site control is to minimize potential contamination of workers, protect the public, and prevent unauthorized entry to work areas. Site control involves the physical arrangement of, and controlling access into, established work zones. Additionally, PPE requirements are specified for each work zone. At 4825 Glenbrook Road, work zones will be established for all activities involving intrusive operations.

11.1.0.2 Zones will be delineated to aid in controlling the flow of personnel and equipment. The establishment of these work zones will help to ensure that personnel are properly protected against the potential hazards present where they are working, that work activities and contamination are confined to the immediate area, and that personnel can be located and evacuated in an emergency.

11.1.0.3 The general work zones designated for 4825 Glenbrook Road are the EZ, the CRZ, and the SZ and are described in greater detail below. The actual boundaries of the work zones are specified in the SSWP.

11.2 EXCLUSION ZONE

11.2.0.1 The EZ is the work area where intrusive activities take place and where contamination does or could occur. The EZ boundary will be physically marked by tape or temporary barriers, the ECS (when engineering controls are used), or otherwise well defined by physical and geographic boundaries. All site personnel will be properly trained in controlling and minimizing access to the EZ.

11.2.0.2 Should an unauthorized person enter the EZ, work will be stopped and the unauthorized person will be escorted out of the EZ and to the PDS where he or she will be met by the SSHO, USAESCH Safety Specialist, or Site Manager in the event there is a need for decontamination or medical assistance. Following any unauthorized entry of the EZ, the event will be recorded in the field logbook and site control measures will be reevaluated immediately with regard to preventing future unauthorized intrusions.

11.2.0.3 For low probability areas, the EZ boundary (or hotline) will typically be established using well defined by physical and geographic boundaries. These boundaries should not be outside the visual range of the field team. The EZ for low probability areas will be the work area perimeter, as defined by the SSHO based on worker and public safety. <u>At minimum</u>, the work area perimeter will be defined by the boundary of the excavation. During the demolition operation, the EZ will be established around the house.

11.2.0.4 For higher probability areas, the EZ boundary will be established by the boundaries and entrances to the ECS when engineering controls are used, or by the EZ distance if the investigation is performed under evacuation (Section 11.3.2).

11.2.0.5 The EZ boundary for the site is defined in the SSWP.

11.3 CONTAMINATION REDUCTION ZONE

11.3.0.1 The CRZ is the transition area between the EZ and the SZ. This zone provides an area to prevent or reduce the transfer of hazardous materials that may have contaminated personnel or equipment leaving the EZ. The organization of the CRZ and control of decontamination operations are described further in Chapter 13 of this SSHP.

11.4 SUPPORT ZONE

11.4.0.1 The SZ is considered to be a clean area and will be located at sufficient distance from intrusive activities to ensure the safety of SZ personnel. The support zone is separated from the CRZ by the contamination control line. Unauthorized access beyond the contamination control line will be prohibited during intrusive operations.

11.4.0.2 The SZ contains the command post and other support supplies. Level D PPE is appropriate apparel within this zone. Contaminated clothing and equipment are not permitted in the SZ. In the event that site activities are being conducted during cold weather, safety equipment susceptible to freezing (such as eye wash and decontamination solutions) will be stored in a heated space.

CHAPTER 12
PERSONAL HYGIENE AND DECONTAMINATION

12.1 INTRODUCTION

12.1.0.1 Personal hygiene or general sanitation requirements are identical for all remedial action activities at 4825 Glenbrook Road including non-intrusive operations such as house demolition and intrusive operations. The personnel decontamination procedures required during intrusive operations depend upon whether the operations are being conducted at a low probability area or a higher probability area. The following sections describe the details of these requirements and procedures.

12.2 GENERAL SANITATION

12.2.0.1 The sanitation provisions specified in Section 2 of EM 385-1-1 will be established and maintained on site as outlined in the following paragraphs.

12.2.0.2 Eating, drinking, smoking, chewing, and application of cosmetics will be restricted to the SZ. However, drinking of replacement fluids will be permitted in designated areas of the CRZ.

12.2.1 Drinking Water

12.2.1.1 Cool, potable drinking water will be provided in sanitary, portable containers at all sites. Where necessary, disposable cups will also be provided and used to drink from the drinking water containers.

12.2.2 Toilets

12.2.2.1 In the event that accessible toilet facilities are not available at a site, one or more chemical toilets will be provided and located in the SZ.

12.2.3 Hand-Washing Facilities

12.2.3.1 Hand-washing facilities or cleaning wipes will be provided in the portable toilet facilities and cleaning wipes will be provided in the crew break area. Field team personnel will wash their hands prior to eating or drinking, and prior to leaving a site.

12.2.4 Designated Smoking Areas

12.2.4.1 Smoking will only be permitted in specific areas designated by the SSHO.

12.3 PERSONNEL DECONTAMINATION AT LOW PROBABILITY AREAS

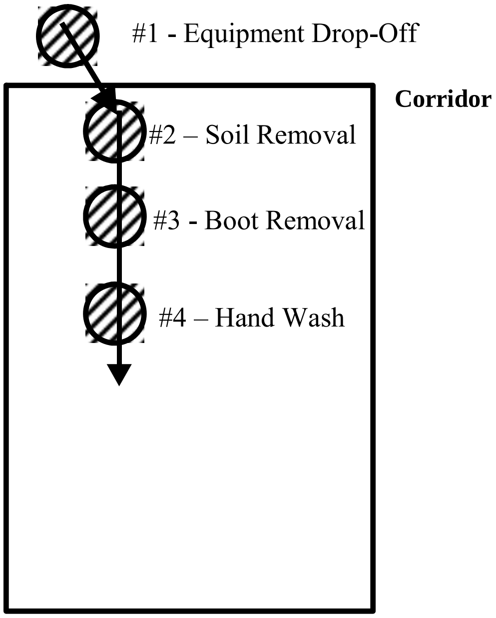
12.3.1 General

12.3.1.1 The following procedures will be implemented during intrusive activities at low probability areas involve the potential for contact with hazardous wastes. These and any other site-specific control methods specified by the SSHO will be used to minimize personnel contamination.

12.3.2 Personnel Decontamination Procedures

12.3.2.1 Prior to exiting the CRZ for the SZ, site personnel will brush any loose dirt from boots or over-boots using a handheld broom. They will then remove over-boots and proceed to the hand washing station. A general layout for the PDS to be used at low probability areas is shown in Figure D1-12-1.

Figure D1-12-1
General PDS Layout for Low Probability Areas



▨ **Stations**

STATIONS	MATERIALS
1	Various Size Containers Plastic Liners Plastic Drop Clothes
2	Pan Brush or Broom
3	Pan 30 Gal. Lined Container
4	2 Plastic Tubs on a table Soapy and clean water

12.3.3 Emergency Decontamination

12.3.3.1 In the event of personnel contamination with fuel or decontaminating agents (e.g., nitric acid or methanol), personnel will be flushed with copious quantities of water from a garden hose attached to a water truck or building, or using water staged in portable containers.

12.3.3.2 A portable eyewash will be located at the PDS.

12.3.4 Contamination Control

12.3.4.1 This section outlines the measures that will be taken to control contamination and to prevent contamination from leaving the EZ.

12.3.4.2 The decontamination procedures described in the preceding sections will be the primary means of contaminant control. Also, all wastewater generated from decontamination procedures will be collected on site, tested, and disposed of accordingly. In addition to these procedures, measures will be taken to limit the movement of dust and vapors that may be generated within the EZ.

12.4 PERSONNEL DECONTAMINATION AT HIGHER PROBABILITY AREAS

12.4.1 General

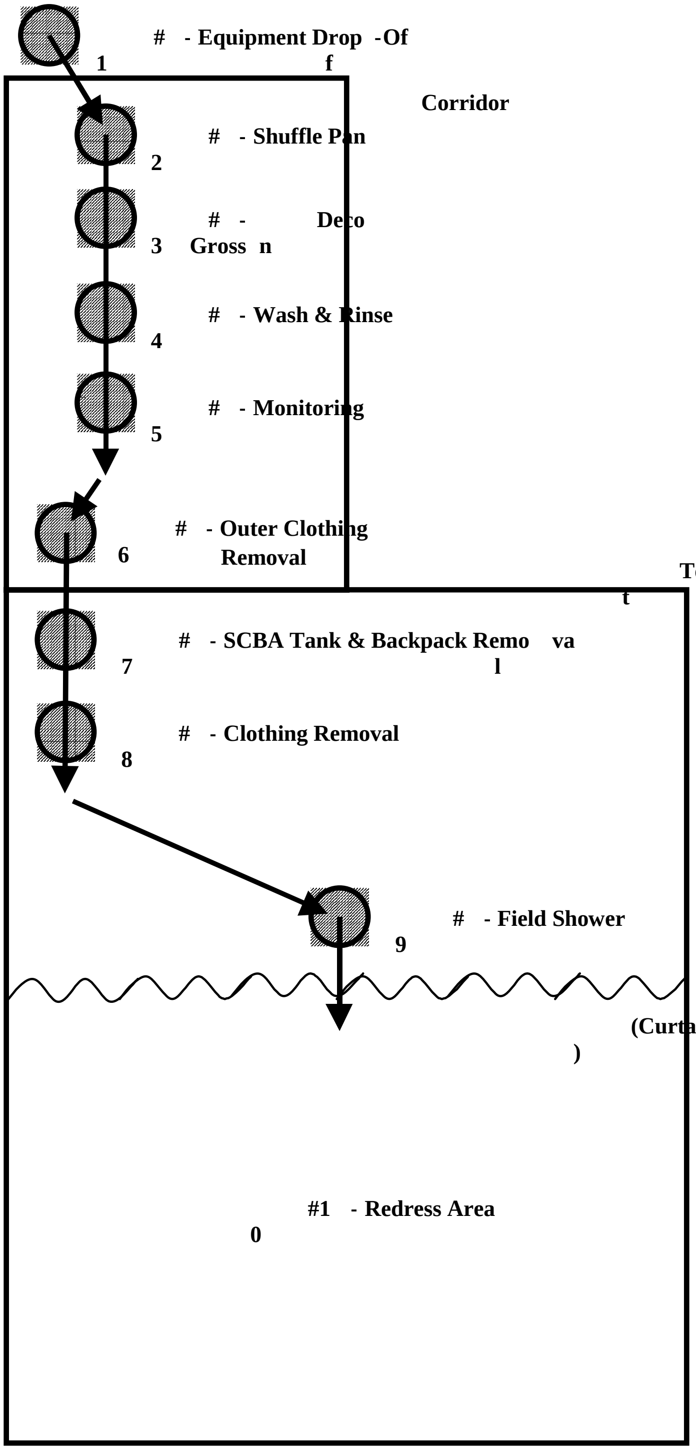
12.4.1.1 The following procedures will be implemented whenever activities at higher probability areas involve the potential for contact with chemical agent or hazardous wastes. These and any other site-specific control methods specified by the SSHO will be used to minimize personnel contamination.

12.4.2 Personnel Decontamination Station

12.4.2.1 A PDS, including an emergency personnel decontamination station (EPDS), will be established to handle decontamination and protective clothing removal, and to prevent EZ personnel from transferring contamination to the SZ. The PDS will be established prior to and used during any site activities involving the potential for personnel to be exposed to the chemical hazards listed in Chapter 2 of this SSHP. The PDS will be located outside the EZ, though the precise PDS location at each specific site will be subject to change based on site-specific conditions.

12.4.2.2 All personnel exiting the EZ will pass through the PDS to ensure removal of contamination. A general PDS layout is shown in Figure D1-12-2. As personnel move through the PDS, PPE will be removed in the order of highest to lowest potential contamination. This “outside-in” removal process should minimize the contamination of inner clothing or the body. The EPDS will be used for the emergency decontamination of personnel who cannot pass through the PDS as a result of injury or illness.

Figure D1-13-2
General PDS Layout for Higher Probability Sites
(May be adapted based on site conditions)



● Stations

STATIONS	MATERIALS
1	Various Size Containers Plastic Liners Plastic Drop Clothes
2	Shuffle Pan Decon solution Long Handle Brush
3	Pans Sprayer with decon sol Soft-Bristles Brushes
4	Buckets Soap Soft Brushes Spray Wand
5	M-8 paper, ICAMS
6	20-30 Gal. Containers Plastic Liners
7	20-30 Gal. Containers Plastic Liners
8	Field Shower Towels & Blankets Shower Shoes
9	Coveralls Chairs

12.4.2.3 Personnel may be required to shower completely (including the washing of hair) before changing into clean clothing prior to exiting the redress area. Personnel will always wash hands, face, and other exposed skin areas immediately after leaving the CRZ for breaks, lunch or at the end of each workday. The shower facility will be a field expedient shower that provides warm water. The shower room will have a deck or mats for walkways and a water capture basin. Captured water will be poured or pumped into a container and sampled by Parsons for chemical agent analysis. The sample results will determine whether the wastewater is to be handled as chemical agent-contaminated wastewater. Towels, washcloths, liquid soap, and shampoo will be provided for personnel. Work clothes worn inside the EZ will be left in the shower/change facility. With the exception of clothing worn for operations in the SZ, company-provided work clothing, shoes, or boots will not be worn off or carried out of the work site. Space will be provided in the clean room for storage of the employee’s street clothes along with benches to facilitate changing of clothing.

12.4.2.4 The TE Supervisor is responsible for ensuring that the PDS is set up each day and ready for operation before site personnel enter the EZ. Personnel exiting the ECS will proceed through the specified wash, rinse, and PPE removal steps relevant to the level of protection they are wearing. The requirements for each level of PPE are specified and described in detail in Chapter 5 of this SSHP.

12.4.2.5 The PDS will be large enough to contain the pans/tubs required for Stations 2 through 4 (see Table D1.12.1), and any spillage, splash or overspray that may occur during the use of these stations. The PDS will be constructed of materials that can be readily decontaminated (e.g., plastic covered surfaces). The pans/tubs will be large enough for a person to stand in and will have at least 12-inch high sides. Water/solutions used for decontamination will be poured or pumped into a container and sampled by Parsons for chemical agent. The sample results will determine if the wastewater is to be handled as chemical agent-contaminated wastewater. The PDS will be decontaminated, and the residue collected if site events dictate the need for increased precautions to prevent the contamination of soil and the spread of chemical agent and/or industrial chemical contamination (i.e., action levels are reached for chemical agents). Upon completion of the project, the contents of the containment system will be tested and disposed of accordingly.

12.4.3 Personnel Decontamination Procedures

12.4.3.1 To minimize the potential for contaminant contact and migration, site personnel will decontaminate thoroughly, carefully remove PPE, and follow the decontamination procedures outlined in the following paragraphs. Site personnel following these procedures must remember and understand that improper decontamination can lead not only to personal contamination, but also to contamination of other site personnel, equipment, personal property, and the general public. The procedures listed in Table D1.12.1 represent the minimum requirements for personnel and equipment decontamination. If deemed necessary based on site activities or conditions, revised or additional procedures may be added to this plan by the SSHO. Prior to implementation, additional or revised decontamination procedures will receive approval of the TE Supervisor, or the PSHM and the USAESCH Safety Specialist.

Table D1.12.1
PDS Stations and Associated Decontamination Activities

Station	Associated Activities
1	Equipment Drop: deposit all reusable equipment on the drop cloth inside the ECS prior to entering the PDS. Turn on tank air using proper SCBA starting procedures. Disconnect supplied airline.
2	Shuffle Pan: step into pan and shuffle boots to remove soil from boots.
3	Outer Garment Gross Decontamination (Chemical Suit, Gloves, and Boots): wash all outer garments with decontamination solution. Start at the head and brush or spray down to soles of boots. Scrub boots, including the bottoms, gloves, and any other part of the suit necessary to remove all dirt, mud or other foreign debris.
4	Outer Garment Wash and Rinse (Chemical Suit, Gloves, and Boots): starting at the head and working down, scrub and/or spray entire surface of outer garments, using a brush and hot soapy water. Starting at the head and working down, use clean water to brush off or spray all soap residue from the outer garment.
5	Monitoring: Monitor decontamination effectiveness using the Chemical Agent Monitor (CAM) or M-8 chemical detection paper.
6	Outer Clothing Removal: this consists of the following steps: • Tape Removal. Remove all tape that would restrict the removal of the outer garments and place it in a plastic-lined disposal container. • Boot/Boot Cover Removal (Boot Rack). Remove boots/boot covers and place on boot rack if serviceable; if not place in plastic-lined container. The PDS attendant may assist from the cold side of Hot Line, and will help ensure that personnel do not place unbooted feet back across the Hot Line. A chair or bench and boot jack will be provided at this station to assist in boot/boot cover removal. • Outer Glove Removal. Remove outer gloves and place on table, if serviceable; if not, place in plastic-lined container. Personnel should exercise extreme caution, and make every effort not to touch the inner gloves with the outside of the outer gloves during their removal. • Outer Suit Removal. Remove outer suit and place on table if reusable. The PDS attendant or buddy will assist in removal of the suit in an inside-out fashion, using caution to touch the outer part of the suit with the inner gloves as little as possible. If suit is unserviceable, put into plastic-lined disposal container.
7	SCBA Tank and Backpack Removal: using proper SCBA shut-down procedures, turn off tank air and disconnect the face piece from the supply hose. Remove tank and backpack and place on table. PDS attendant or buddy will assist.
8	Inner clothing removal: remove inner clothing and place in container.
9	Field Shower (as needed): shower entire body, including hair. Exit shower and redress.
10	Redress Area.

In the event that a chemical agent casualty is suspected, the casualty will be monitored for H and L for one full MINICAMS cycle before they cross the contamination control line. This monitoring will be performed once the casualty has been processed through the PDS. Once monitoring has confirmed adequate decontamination (i.e., no detections above the AEL), transfer of the suspected casualty to the SZ is permitted in order that they can be treated by medical personnel. In the event of a life-threatening condition, decisions concerning adequate decontamination of the chemical casualty will be at the discretion of the SSHO and on-site medical support personnel.

12.4.4 PDS Attendant Duties

12.4.4.1 The PDS attendants ensure that the PDS is set up and operated in a manner to prevent the contamination of site personnel and equipment, and to eliminate the migration of contamination to clean areas of the site. There will be a minimum of three PDS attendants on duty during intrusive investigation activities at higher probability sites. The PDS attendant duties include:

- On a daily basis, after the safety briefing, prepare and direct assembly of the PDS required for the day's operation.
- Assist EZ personnel as they process through the PDS; assist in tank changes for Levels A and B PPE.
- Receive and put away all equipment passed from the hot side of the Hot Line (i.e., within the EZ) after ensuring items have been cleaned and decontaminated thoroughly.
- After the final person has passed through the PDS, retrieve and store reusable equipment that has been previously decontaminated, including respirators, gloves, boots, and suits.
- At the end of each day, secure the PDS and dispose of all materials as required, including securing of disposal containers and transfer of used decontamination solutions to approved containers.

12.4.4.2 The PDS attendants will wear Level C PPE while processing personnel through the PDS. The PDS attendants will wear modified Level D PPE (with Tyvek F) during cleanup of the PDS after processing personnel.

12.4.5 Daily PDS Shutdown Procedures

12.4.5.1 After assisting EZ personnel after the last work period, the PDS attendants will assist each other in securing the PDS using procedures that allow them to simultaneously decontaminate the PDS as it is secured. To do this, the PDS attendants will secure the PDS at the shuffle pan and work back conducting personal decontamination and PDS security at the same time. This will be accomplished using the following general procedures (refer to Figure D1-13-2):

- First, all reusable equipment will be gathered and removed from the PDS and then transferred to the SZ to be stored.
- Then, wearing appropriate PPE (as specified in Chapter 5 of this SSHP), the Hot Line will be crossed, if applicable and, moving from dirtiest to cleanest, decontamination solutions will be transferred to their respective storage containers.
- Attendants will then proceed down the line removing tape, if applicable, and then secure the tape disposal container.
- At Station 6, attendants will remove all outer clothing and gloves, and secure the outer garment disposal container.
- At Station 7, attendants will remove any respirators.
- Then attendants will move to the inner glove removal station, remove gloves, and secure the associated container.
- At Station 8, attendants will remove remaining clothing, secure the associated container, and proceed to shower and redress.

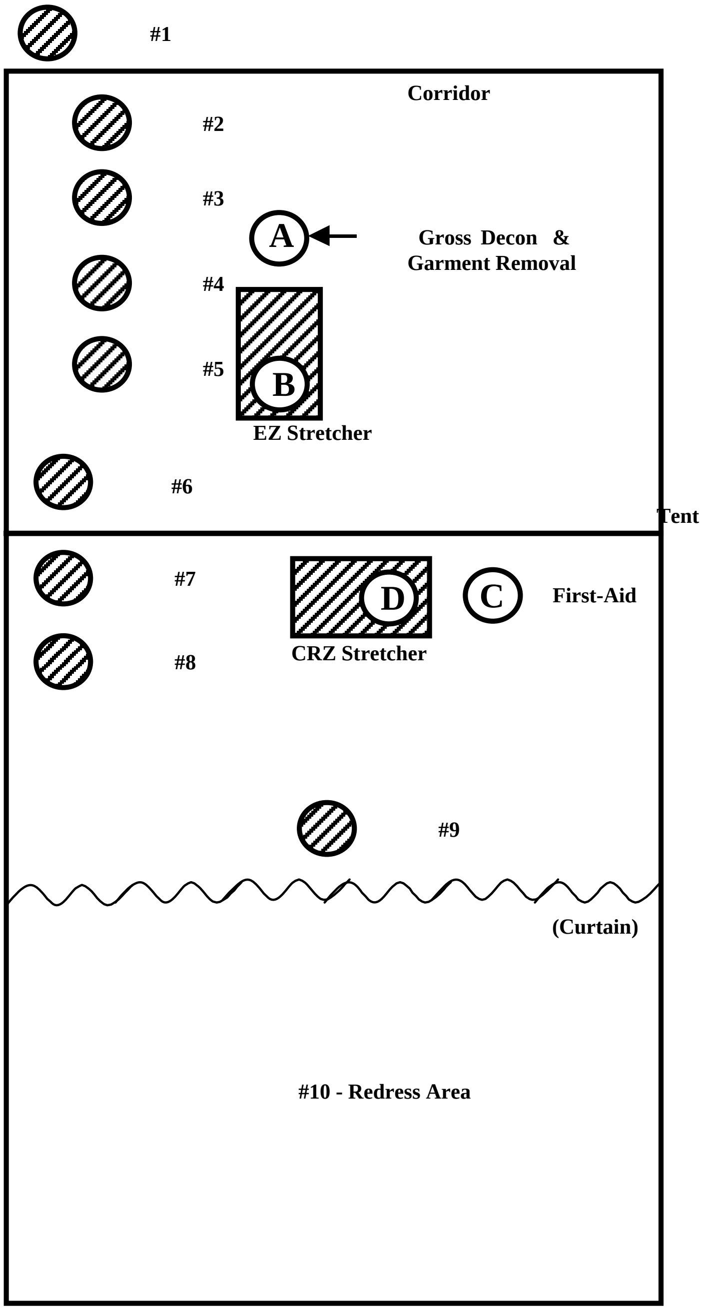
12.4.6 Emergency Decontamination Procedures

12.4.6.1 An EPDS will be set up within the PDS. If an emergency occurs inside the EZ resulting in personal injury or illness that prevents the affected individual from be processed through the PDS, that individual will be processed out of the EZ via the EPDS. The function of the EPDS is to make available all the necessary resources to allow for the combined efforts of first aid and decontamination of personnel.

12.4.6.2 The EPDS will be configured to allow for the rapid decontamination of an injured worker, rapid removal of that worker's PPE, and their subsequent safe transport across the Hot Line. The EPDS will be set up as shown in Figure D1-12-3 and use the following stations and supplies:

- Station A: blunt-nosed scissors for PPE removal. Gross decontamination using the decontamination solution of Station 3 and rinse water of Station 4.
- Station B: porous stretcher for EZ side of the Hot Line.
- Station C: drop cloth for location of first aid kit, eye wash kit, burn blanket, bloodborne pathogen universal controls kit, fire extinguisher.
- Station D: stretcher for the PDS side of the Hot Line.

Figure D1-12-3
General PDS Layout for Higher Probability Areas, with EPDS



▨ **Stations**

STATIONS	**MATERIALS**
1	Various Size Containers Plastic Liners Plastic Drop Clothes
2	Shuffle Pan Decontamination Solution Long Handle Brush
3	Pan Soft-Bristles Brushes Sprayer with Decontamination solution
4	Buckets Soap Soft Brushes Spray Wand
5	M-8 paper, ICAM
6	20-30 Gal. Containers Plastic Liners
7	20-30 Gal. Containers Plastic Liners
8	Field Shower Towels & Blankets Shower Shoes
9	Coveralls Chairs

12.4.7 Contamination Control

12.4.7.1 This section outlines the measures that will be taken to control contamination and to prevent contamination from leaving the EZ.

12.4.7.2 The PDS decontamination procedures described above (Table D1.13.1) will be the primary sources of contaminant control. Also all wastewater generated from decontamination procedures will be collected on site, tested, and disposed of accordingly. In addition to these procedures, measures will be taken to limit the movement of dust and vapors that may be generated within the EZ. Water will not be used in excavations to control dust when chemical agent may be present.

12.4.7.3 Uncontaminated standby personnel assigned to assist personnel working in Level C or Level B PPE will, at a minimum, remove outer and inner gloves, respirator and coverall top, and wash hands prior to drinking replacement fluids. Personnel who may have come into contact with contaminated material (based on air monitoring data) will be processed through the PDS before they are allowed to disrobe, eat, or drink.

12.4.7.4 Personnel who may be required to wear respiratory protective equipment, either on a routine or emergency basis, will shave beards or any other facial hair that may interfere with the proper fit of respirators. Any skin abrasions (cuts, bruises, etc.) will be covered with an adhesive bandage and/or adhesive tape before the operator dons protective clothing.

CHAPTER 13
EQUIPMENT DECONTAMINATION

13.1 INTRODUCTION

13.1.0.1 The equipment decontamination procedures required during activities at 4825 Glenbrook Road depend upon whether intrusive operations are being conducted at a low probability area or a higher probability area. The following sections describe these procedures.

13.2 EQUIPMENT DECONTAMINATION AT LOW PROBABILITY AREAS

13.2.1 Introduction

13.2.1.1 The following procedures will be implemented whenever activities at low probability areas involve the potential for contact with hazardous wastes. These and any other site-specific control methods specified by the SSHO will be used to minimize equipment contamination.

13.2.2 Procedures for Handheld Equipment Decontamination

13.2.2.1 If equipment has contacted hazardous waste (based upon soil disposal analyses), it will be decontaminated by brushing off loose soil, washing with soapy water, and rinsing with water. All decontamination fluids will be collected, containerized, tested, and disposed of properly based upon the analytical results.

13.2.3 Procedures for Heavy Equipment and Vehicle Decontamination

13.2.3.1 To minimize the potential for the spread of contamination, individual heavy equipment will remain inside (e.g., excavator) or outside (e.g., loader) the EZ. Such equipment will not transit from the EZ to the SZ through the CRZ without undergoing decontamination.

13.2.3.2 The Site Manager will inspect, and approve for general cleanliness, all heavy equipment prior to the equipment exiting the CRZ for the SZ. In order for a vehicle or piece of heavy equipment to pass inspection it must be in a broom-clean condition, and be free of loose dirt or stabilized material on tailgates, axles, and wheels. All surfaces that have contacted potentially contaminated materials, including soil, will be washed with a pressure washer. Approval for heavy equipment removal from the CRZ will be based on visual inspection of all exposed surfaces and, if needed, the analysis of swipe samples.

13.2.3.3 Personnel assigned to heavy equipment and vehicle decontamination will wear the protective equipment, clothing, and respiratory protection consistent with the levels of PPE worn for the site activities during which the heavy equipment/vehicle became contaminated. Unless a full-face respirator is worn as part of this requirement, the decontamination personnel will wear a splash shield during the decontamination of heavy equipment/vehicles.

13.3 EQUIPMENT DECONTAMINATION AT HIGHER PROBABILITY AREAS

13.3.1 Introduction

13.3.1.1 The following procedures will be implemented whenever activities at higher probability areas involve the potential for contact with chemical agent or hazardous wastes. These and any other site-specific control methods specified by the SSHO will be used to minimize equipment contamination.

13.3.1.2 In the event that monitoring of air and/or soil indicates the presence or release of chemical agent, equipment decontamination will be performed in three stages, using a primary decontamination solution of 5% household bleach followed by a secondary wash using hot, soapy water, and a final rinse with clean water. If an item is identified as potential RCWM by the excavation team and air monitoring indicates no release, TE will recover, package, and transport the item to the IHF. Decontamination will be performed as necessary by the excavation team.

13.3.2 Procedures for Handheld Equipment Decontamination

13.3.2.1 All hand equipment and tools used inside the EZ will be kept inside the EZ until it is demobilized. Hand tools/equipment used on an RCWM site will, at a minimum, receive a three-stage wash/rinse prior to leaving the EZ. The three stages are as follows:

- First stage: wash using a decontamination solution of 5% household bleach.
- Second stage: wash using hot soapy water.
- Third stage: rinse using clean water.

13.3.2.2 All decontamination fluids will be collected in pans. The fluids will be containerized, tested, and disposed of properly based upon the analytical results. After this three-stage wash/rinse cycle and following inspection/approval by the SSHO or USAESCH Safety Specialist, decontaminated hand tools and equipment can be removed from the EZ. If chemical agents were encountered during their use, these tools will be decontaminated per local procedures and, as required, accepted industrial hygiene practices. Further use of these tools on this project will be allowed. Once all work is completed, these tools will be decontaminated, and may be release for public uses if the tools have been decontaminated to general population limit.

13.3.2.3 Hand tools and equipment with porous surfaces, such as those with wooden or foam covered handles, may allow for the absorption of contamination. If chemical agent contamination is suspected, items of this nature will be kept inside the EZ until they can be tested using headspace analysis (i.e., heated and monitored for chemical agent vapors). These items will be disposed of as potential RCWM or hazardous waste, based upon analytical results.

13.3.2.4 If directed by the USAESCH Safety Specialist, items with potentially absorbed or surface chemical agent contamination will be tested by the Air Monitoring Team once the items have been decontaminated in accordance with the procedure described in Paragraphs 14.3.2.1 and 14.3.2.2. Such items will undergo headspace analysis for traces of chemical agent in accordance with the procedures presented in the Air Monitoring Team's Air Monitoring Plan (Appendix J). Items that show evidence of off-gassing chemical agent will be classified as contaminated and be disposed of in accordance with AR 50-6. Additional testing for contamination from other sources will be performed as necessary following chemical agent decontamination.

13.3.2.5 Whenever possible, equipment that may be contaminated internally or equipment that cannot be washed and rinsed will be encapsulated in plastic prior to being placed inside the EZ. For example, industrial air-monitoring equipment that is not water sealed can be wrapped in plastic (with the exception of the air-sampling inlet). After the air monitor is removed from the EZ, the plastic can be removed, the inlet can be cleaned, and as long as a chemical agent release did not occur during site activities, the monitor can be removed from the CRZ. If a chemical agent release did occur, then any handheld equipment with the potential for internal contamination will be considered chemical agent contaminated and will be double-bagged in plastic and held, pending guidance from USAESCH. This equipment may undergo headspace analysis in accordance with the procedures presented in the Air Monitoring Team's Air Monitoring Plan (Appendix J).

13.3.3 Headspace Procedures

13.3.3.1 All items that are deemed to require headspace analysis will be double-bagged in plastic to prevent transfer of potential contamination outside the EZ. These items will undergo headspace analysis for traces of chemical agent in accordance with the procedures presented in the Air Monitoring Team's Air Monitoring Plan (Appendix J).

13.3.4 Procedures for Heavy Equipment and Vehicle Decontamination

13.3.4.1 To the extent that it is possible, all heavy equipment will remain outside the EZ. In the event that heavy equipment requires decontamination, a decontamination pad will be set up in the vicinity of the PDS.

13.3.4.2 Proper decontamination of equipment is extremely important to ensure that contamination does not spread to uncontaminated portions of the site or to site personnel. To assist in contamination control, seats and flooring in heavy equipment and vehicles used in the EZ will be covered to the extent possible with disposable polyethylene. This layer of protection will be changed as needed to prevent the spread of contamination to surfaces inside the operator area.

13.3.4.3 All equipment requiring maintenance or repair will be staged in the CRZ prior to servicing. The SSHO or USAESCH Safety Specialist will inspect, and approve for general cleanliness, all heavy equipment prior to the equipment exiting the CRZ for the SZ. In order for a vehicle or piece of heavy equipment to pass inspection, it must be in a broom-clean condition, and free of loose dirt or stabilized material on tailgates, axles, and wheels. All surfaces that have contacted potentially contaminated materials, including soil, will be washed/rinse using the procedures described in Section 14.3.2. Approval for heavy equipment removal from the CRZ will be based on visual inspection of all exposed surfaces and, if deemed necessary by the SSHO or USAESCH Safety Specialist, the analysis of swipe samples.

13.3.4.4 Personnel assigned to heavy equipment and vehicle decontamination will wear the protective equipment, clothing, and respiratory protection consistent with the levels of PPE worn for the site activities during which the heavy equipment/vehicle became contaminated. Unless a full-face respirator is worn as part of this PPE, the decontamination personnel will wear a splash shield during the decontamination of heavy equipment/vehicles.

13.3.4.5 Heavy equipment taken into the EZ will be left in the EZ and will be inspected and decontaminated if a confirmed ringoff or contact with suspected chemical agent occurs. The excavation team will perform gross decontamination (i.e., brush off and removal of any visible contamination) and then move the equipment to the decontamination pad. The equipment will then be pressure washed and scrubbed to remove all gross debris, and then be washed with bleach solution and brushes. Finally, the equipment will be rinsed with water and tested using headspace analysis. If no further contamination is detected, the part(s) of the equipment that might have come into contact with liquid agent (e.g., the excavator bucket) will be decontaminated IAW USACE 2009 interim guidance for Chemical Warfare Materiel Responses and Related Activities. If chemical agent is detected, the equipment will be re-cleaned. To perform headspace analysis of heavy equipment, equipment will be placed in an ECS or covered in plastic.

13.3.4.6 Any equipment that came in contact and subsequently contaminated with liquid chemical agents will also be handled in accordance with USACE 2009 interim guidance for Chemical Warfare Materiel Responses and Related Activities.

13.3.4.7 All solutions collected from the equipment decontamination pad will be containerized, sampled by the field team, and then analyzed by the Air Monitoring Team for chemical agent. The sample results will determine whether the waste is to be handled as chemical agent-contaminated waste.

CHAPTER 14
EMERGENCY EQUIPMENT AND FIRST AID

14.1 FIREFIGHTING EQUIPMENT

14.1.0.1 Firefighting equipment requirements are described in Section 11.28.2 of the APP to which this SSHP is appended.

14.2 FIRST AID EQUIPMENT

14.2.1 Equipment for Low Probability Activities

14.2.1.1 A minimum of one first aid kit will be maintained on site by the SSHO. First aid kits used at the site will meet the requirements for Type III, 16-unit kits as described in EM 385-1-1, Paragraph 03.B. First aid kits will be easily accessible to all site workers, protected from the weather, and stored in a manner that keeps the contained items sterile. The location(s) of first aid kits will be clearly marked.

14.2.2 Equipment for Higher Probability Activities

14.2.2.1 First aid kits will be maintained on site by the SSHO at the Command Post, at the PDS, and at the warm-up/cooling shelter. First aid kits used at the site will meet the requirements for Type III, 16-unit kits as described in EM 385-1-1, Paragraph 03.B. First aid kits will be easily accessible to all site workers, protected from the weather, and stored in a manner that keeps the contained items sterile. The location(s) of first aid kits will be clearly marked.

14.2.2.2 Also, during intrusive operations, a fully-equipped ambulance with two trained EMTs will be on standby at the site.

14.3 OTHER EMERGENCY EQUIPMENT

14.3.1 Equipment for Low Probability Activities

14.3.1.1 A minimum of one portable emergency eyewash system will be maintained on site by the SSHO. Emergency eyewash systems used at the site will meet ANSI requirements and have a minimum capacity of one pint. Emergency eyewash systems kept on site will be easily accessible to all site workers.

14.3.2 Equipment for Higher Probability Activities

14.3.2.1 A minimum of two emergency eyewash systems will be maintained on site by the SSHO: one will be available at the warm-up/cooling shelter and one will be available at the PDS. An emergency shower will be maintained at the PDS. Emergency eyewash systems and emergency showers used at the site will meet ANSI requirements.

14.3.2.2 A minimum of two stretchers will be maintained at the emergency PDS.

CHAPTER 15
EMERGENCY RESPONSE AND CONTINGENCY PLAN

15.1 INTRODUCTION

15.1.1 Purpose

15.1.1.1 The purpose of this Emergency Response and Contingency Plan (ERCP) is to define procedures to protect human health and the environment both on and off site in the event of an accident or emergency during the intrusive activities at 4825 Glenbrook Road.

15.1.2 Elements

15.1.2.1 This ERCP complies with 29 CFR 1910.120(1) and includes the following elements:

- Pre-emergency planning.
- Personnel roles, lines of authority, training, and communications.
- Posted instructions and emergency contact list.
- Emergency recognition and prevention.
- Description of the site topography, layout, and prevailing weather conditions.
- Criteria and procedures for site evacuation.
- Procedures for decontamination and medical treatment.
- Evacuation routes and procedures.
- Emergency alerting and response procedure.
- Critique of emergency responses and follow-up.
- PPE and emergency equipment.

15.1.2.2 This ERCP meets the guidelines given in "Guidance on EPA Oversight of Remedial Designs and Remedial Actions Performed by Potentially Responsible Parties," Appendix B, Contingency Plan (EPA, 1990).

15.1.3 Emergency Identification

15.1.3.1 It is essential that site personnel be prepared in the event of an emergency. Emergencies can take many forms, such as exposure to chemical agents of various types, illnesses or injuries, chemical exposure, fires, compressed gas leaks, or sudden changes in the weather. The remaining sections of the ERCP outline general emergency and contingency planning procedures to be followed at4825 Glenbrook Road. Emergency information and instructions will be posted as appropriate.

15.1.4 Emergency Information Documentation

15.1.4.1 The following forms, provided in Appendix F of the SSWP, will be completed by all team members to ensure that they have been instructed in the execution of emergency procedures:

- Plan Acceptance Form (acknowledging receipt and review of this APP/SSHP).
- Daily Tailgate Meeting Sign-off (tailgate meetings are conducted by the SSHO for all site personnel).

15.1.4.2 The SSHO will maintain the completed forms on site.

15.2 PRE-EMERGENCY PLANNING

15.2.0.1 Situations requiring emergency response can be minimized by planning and approaching the circumstances in a calm, deliberate manner. The Evacuation/Shelter-in-Place Plan (contained within the CENAB PPP) outlines whom and what means will be used to alert the local community if they are in jeopardy.

15.2.0.2 As conditions dictate, the CENAB Site Operations Officer, USAESCH Safety Specialist, or the SSHO will be the on-site emergency coordinator in case of an accident or incident requiring emergency response. All personnel will be briefed at the morning tailgate safety meetings of the location of the cellular telephones and who has on-site radio communications. This information will also be included in all visitor briefings and in briefings to residents, if the work is occurring at a residential property.

15.2.0.3 A warning system using a series of three (3) long blasts on portable air horns and/or vehicle horns will notify site personnel that an accident or incident has occurred and evacuation is required. Another type of warning signal may be used for emergency notification if deemed appropriate. If another warning signal is to be used, it will be stated in the SSWP. Upon hearing the site evacuation warning, all personnel will immediately clear the site and respond to the rally point. A rally point will be identified for each site-specific investigation. The rally point will be revised based upon prevailing weather conditions and will be identified by the SSHO at the morning tailgate safety briefing. At the rally point, all personnel will be accounted for and interviewed to ensure no one has sustained injuries as a result of the accident or incident.

15.2.0.4 If an emergency response rescue operation is required, no personnel will re-enter the area until the situation has been assessed and it has been determined that resources are on hand to handle the rescue without jeopardizing additional personnel.

15.2.0.5 During investigations at higher probability sites, agencies that may provide emergency response, such as the D.C. Metropolitan Police Department, D.C. Metropolitan Fire Department, and ambulance services, will receive a daily operations schedule. Those agencies will also be involved in pre-emergency planning through their involvement in the tabletop training exercise (Section 4.10.3).

15.3 PERSONNEL ROLES, LINES OF AUTHORITY, AND TRAINING

15.3.0.1 This section describes the various roles, responsibilities, and communication procedures that will be followed by personnel working on this project in the event of an emergency.

15.3.0.2 In the event of an emergency on site, the primary on-site Emergency Coordinator will be the Parsons SSHO or his designee. The on-site Emergency Coordinator will determine the nature of the emergency and take appropriate action.

15.3.0.3 Prior to all field activities, the Parsons SSHO will plan emergency egress routes and discuss them with all personnel who will be conducting fieldwork. Initial planning includes activities such as establishing and testing emergency warning signals and evacuation routes to prevent delays in the event of an emergency.

15.3.0.4 Training requirements for site personnel, including site-specific training and tabletop exercises for higher probability sites, are discussed in Chapter 4 of this SSHP.

15.4 EMERGENCY CONTACT LIST

15.4.0.1 Emergency telephone numbers for the closest hospitals capable of providing emergency service, the Poison Control Center, local police and fire departments, and key safety and management personnel from CENAB, USAESCH, TE, the U.S. Army Edgewood Chemical Biological Center, and Parsons are listed in Appendix C of the SSWP for the site, and will also be posted in conspicuous locations on site. The SSHO will be responsible for contacting the listed emergency contacts.

15.5 SITE TOPOGRAPHY, LAYOUT AND PREVAILING WEATHER CONDITIONS

15.5.1 Topography

15.5.1.1 Elevations at the site vary from approximately 360 feet North American Vertical Datum (NAVD 88) to approximately 318 feet NAVD 88 (east to west).

15.5.2 Layout

15.5.2.1 A site-specific layout depicting locations of major equipment, work zones, and AEGL-2 distances are presented in the SSWP.

15.5.3 Weather Conditions

15.5.3.1 Temperature

15.5.3.1.1 The Washington, D.C. area has an average annual temperature of 54.5°F and the climate is classified as modified continental. The average length of the growing season is 200 days. Winters are cold and mild, and summers are warm and humid. The coldest average daily temperatures are in late January and early February (upper 20s °F), and the warmest average daily temperatures are in mid-July (upper 80s °F).

15.5.3.2 Precipitation

15.5.3.2.1 The average annual precipitation for the Washington, D.C. area is approximately 41 inches and is distributed evenly throughout the year. Thunderstorms may occur at any time, but are most frequent during late spring and summer, and downpours and gusty winds most often accompany these storms. Tropical storms can bring heavy rain. Hailstorms can occur in the spring and single-event rainfalls of over 7 inches have occurred during hurricanes. Average snowfall is approximately 20 inches per year. Although a snowfall of 10 inches or more in 24 hours is unusual, several notable snowfalls of more than 25 inches within 24 hours have occurred in the recent past.

15.5.3.3 Wind

15.5.3.3.1 Winds are generally light and variable, but thunderstorms can bring gusty winds. Usually the gusts from windstorms are not severe. The prevailing wind direction is from the northwest. The average wind speed is approximately 9 miles per hour (mph). Wind gusts generally peak at 40 mph but may occasionally reach 60 mph. Tornadoes and tropical storms occur infrequently, but these storms have caused damage in the Washington, D.C. area (NOAA, 1992).

15.6 EMERGENCY RESPONSE PREPAREDNESS

15.6.0.1 The following emergency response preparedness steps will be taken prior to any intrusive activities:

- Personnel will have the proper PPE and will be trained in its correct use.
- The “buddy system” will be enforced. No one will be permitted to enter the EZ alone. Personnel within the EZ will remain in contact with each other at all times.
- During operations at higher probability areas, an ambulance staffed with EMTs trained in treating chemical agent-related injuries will be on site in the SZ.
- During operations at higher probability areas, a three-person Emergency Response Team (Chapter 16 of this SSHP) will be suited up and on standby in the redress area of the PDS.

15.7 MEDICAL EMERGENCIES

15.7.1 Treatment of Minor Injuries

15.7.1.1 For minor injuries during lower probability operations, the on-site first aid/CPR trained personnel will provide the initial first aid response. If additional/advanced attention is required, an ambulance will be called using 911 or the injured person will be transported by any available site personnel to Nearest Workers Compensation (WC) clinic.

15.7.1.2 For minor injuries during higher probability operations, the on-site emergency medical technicians (EMTs) or on-site first aid/CPR-trained personnel will provide the initial first aid response. If additional/advanced attention is required, and if the ambulance is on site, the EMTs will attend to the injured party. If recommended by the on-site EMTs, the injured person will be transported by any available site personnel to WC clinic. If additional/advanced attention is required and the ambulance is not on site, an ambulance will be called using 911 or the injured person will be transported by any available site personnel to Sibley Memorial Hospital.

15.7.1.3 The nearest workers' compensation medical providers are Washington Occupational Health Associates and George Washington University Hospital. Other workers' compensation medical providers are included in the Workers' Compensation Medical Providers List (see Enclosure D-1.1 of the SSHP).

15.7.1.4 For work related injuries/illnesses that may require physician direction on appropriate treatment, Parsons employees should report immediately to their supervisors, and then promptly contact Workcare at 888-449-7787. The incident intervention process for Parsons employees is included in Enclosure D-1.2 of the SSHP.

15.7.2 Treatment of Serious Non-Chemical Agent Injuries

15.7.2.1 For serious injuries during lower probability operations, the first aid/CPR-trained personnel will initiate appropriate emergency first-aid and emergency medical assistance will be summoned using 911.

15.7.2.2 For serious non- chemical agent related injuries during higher probability operations, when on-site EMTs are not present, the first aid/CPR-trained personnel will initiate appropriate emergency first-aid and emergency medical assistance will be summoned using 911. For serious non-RCWM injuries when the EMTs are present, the EMTs will provide emergency treatment to stabilize the injured person, and will then transport the injured person to Sibley Memorial Hospital. Under these circumstances, the first aid/CPR personnel will provide support as requested by the EMTs.

15.7.3 On-Site Treatment of Chemical Agent-Related Injuries

15.7.3.1 As stated in Section 7.3, an ambulance staffed by two trained EMTs will be present on site during any intrusive activities for the higher probability operations. In the event of a chemical agent-related injury/exposure, CARA personnel will decontaminate the injured/exposed person through the EPDS, and the EMTs will provide emergency treatment and transport the injured/exposed person to George Washington University Hospital.

15.7.4 Off Site Accidents

15.7.4.1 Accidents or incidents occurring off site will be reported to the local authorities. In the event of a transportation accident or incident, personnel will take immediate action to secure the area. Immediate notification of the local authorities will be initiated.

15.7.5 Accident Reporting Requirements

15.7.5.1 Accident reporting requirements are described in Chapter 8 of the APP to which this SSHP is attached.

15.8 CHEMICAL AGENT ALARMS

15.8.1 Alarms and Subsequent Actions

15.8.1.1 The sequence of chemical agent alarms and resultant actions are presented in Section 8.3.4 and in Tables D1.8.2a and D1.8.2b.

15.8.2 Alarm/Ringoff Notification

15.8.2.1 If a ringoff occurs, the SSHO, USAESCH Safety Specialist, CENAB Site Operations Officer, and PSHM will be notified immediately. The Evacuation/Shelter-in-Place Plan (contained within the CENAB PPP) will be activated if appropriate.

15.9 CHEMICAL TREATMENT PROTOCOLS

15.9.0.1 EMT personnel on-site during higher probability operations will maintain chemical treatment protocols for mustard, lewisite, arsine, phosgene, chloropicrin, cyanogen chloride, and ricin in the on-site ambulance. These protocols will include procedures for first aid (initial response), basic treatment (EMT level), and advanced treatment (paramedic level).

15.10 EMERGENCY EVACUATION PLAN

15.10.1 General Evacuation Plan

15.10.1.1 In the case of an operational shutdown as a result of severe weather conditions, or if other hazards exist on-site, the Emergency Coordinator or Site Manager will sound the alarm (three blasts each of five second duration on an air horn or other signal as specified in the SSWP). All personnel in the work area will secure their equipment and proceed to the off-site assembly point, located a safe distance (designated at morning safety meeting) at an upwind location from the site. The Emergency Coordinator or designated alternate will obtain the site entry/exit logs to ensure that all personnel have been safely evacuated. The Site Manager will coordinate with the Emergency Coordinator to determine when it is safe to re-enter the site and resume work.

15.10.1.2 In the general case of a large fire, explosion, or toxic vapor release, a site evacuation will be ordered and the following steps implemented:

- The alarm will be sounded (three blasts each of a five-second duration on an air horn or other signal as specified in the SSWP), appropriate emergency response agencies will be notified, and USAESCH and Parsons project management personnel will be advised of the situation.
- Downwind impact will be evaluated in order to assist emergency response agencies. All personnel will evacuate in an upwind direction.
- All personnel will assemble in an upwind area when the situation permits, and a head count will be taken.
- The extent of the problem will be determined. If necessary and when conditions do not endanger safety of rescue personnel, the response team will be dispatched in the appropriate PPE to evacuate any missing personnel and to correct the problem.

15.10.2 Evacuation Signals and Routes

15.10.2.1 Two-way radio communication, direct voice communication, or an air-horn (three blasts - each of five seconds duration) will be used to notify employees of the necessity to evacuate an area involved in a release/spill of a hazardous material. Each work location will have a two-way radio. A two-way radio will be kept in the Emergency Coordinator’s work location to monitor for emergencies. Total site evacuation will be initiated only by the Emergency Coordinator. However, in their absence, the decision to preserve the health and safety of employees and the public will take precedence.

15.10.2.2 Evacuation routes will be discussed and described during the daily tailgate safety meeting. Periodic drills (before each new phase of work) will be conducted to familiarize each employee with the proper routes and procedures.

15.10.3 Evacuation Procedures

15.10.3.1 In the event that evacuation is necessary, the following actions will be taken:

- The alarm will be activated.
- No further entry of visitors, contractors, or trucks will be permitted to the site. Vehicle and equipment traffic within the site will cease in order to allow the safe exit of personnel and movement of emergency equipment.

- All machinery and equipment will be shut off as long as it is safe to do so.
- All on-site personnel, visitors, and contractors in the Support Zone will assemble at the office trailer, or other designated area, for a head count and wait for further instructions from the Emergency Coordinator.
- Upon completion of the head count, the senior person will provide the information to the Emergency Coordinator.
- Visitors will also be accounted for.
- A final tally of persons will be made by the Emergency Coordinator or his designee. No attempt will be made to find persons not accounted for if the rescue attempt involves endangering the lives of employees.
- Personnel will be assigned by the Emergency Coordinator to be available at the main entrance point to direct and brief emergency responders.
- Re-entry into the site will be made only after clearance has been given by the Emergency Coordinator. At his direction, a signal or other notification will be given for re-entry into the site.
- Drills will be held at the beginning of intrusive fieldwork and at intervals during the intrusive work. Drills will be treated with the same seriousness as an actual emergency.

15.10.3.2 The Evacuation/Shelter-in-Place Plan that describes public evacuation procedures is contained within the CENAB PPP.

15.11 FIREFIGHTING PLAN

15.11.1 Immediate Action

15.11.1.1 Upon detecting a fire/explosion, employees will determine whether the fire is small enough to readily extinguish with immediately available portable extinguishers or water, or if other fire-fighting methods are necessary. Non-essential personnel will be directed away from the area of the fire. If it is judged that a fire is small enough to fight with available extinguishing media, employees will attempt to extinguish the fire provided that:

- They are able to approach the fire from the upwind side, or opposite to the direction of the fire's progress.
- The correct extinguisher is readily available. (Type ABC fire extinguishers will be provided in work areas and on vehicles.)
- No known complicating factors are present, such as the likelihood of rapid spread, imminent risk of explosion, or gross contamination.

15.11.1.2 Personnel leaving a fire/explosion area will account for all employees in that work area as soon as possible. The SSHO or designee will perform a head count for that work area.

15.11.2 Notification

15.11.2.1 The SSHO will be notified as soon as possible of the location, size, and nature of the fire/explosion. As conditions dictate, the SSHO will declare an emergency, initiate the remedial procedures, request assistance from the Metropolitan D.C. Fire Department by dialing 911, and make the necessary telephone notifications to the CENAB Site Operations Officer, USAESCH Safety Specialist, and USAESCH PM. Outside personnel responding to the fire/explosion may seek assistance from the SSHO with regard to the routing of equipment within the incident site to the most favorable and safe position while minimizing and/or avoiding exposure to any site contaminants.

15.11.3 Rescue

15.11.3.1 If employee(s) are unable to evacuate themselves from a fire/explosion area for any reason, their rescue will be the first priority of responders. The SSHO will determine whether on-site resources are sufficient to proceed or if rescue must be delayed until the D.C. Metropolitan Fire Department responders arrive.

15.11.4 Decontamination

15.11.4.1 At the conclusion of fire fighting activities, the SSHO will:

- Determine, to the extent practical, the nature of the contaminants encountered during the incident.
- If necessary, arrange for the Metropolitan D.C. Fire Department fire response equipment and on-site equipment to be decontaminated, using methods appropriate for the contaminants involved.
- Equipment not easily decontaminated will be labeled and isolated for further action, such as identifying specific contaminants by wipe sampling or awaiting the delivery of specific decontamination media and supplies.

15.12 SPILL PLAN

15.12.1 Chemical Warfare Agents and Chemical Agent-Contaminated Material

15.12.1.1 All suspect or confirmed RCWM and chemical agent is the responsibility of the Product Manager for Non-Stockpile Chemical Materiel/TE. RCWM or chemical agent-contaminated material will be handled in accordance with TE and U.S. Army procedures. The procedures employed by TE will be documented in SOPs required by Army Materiel Command Regulation 700-107.

15.12.2 Chemical Agent Decontamination Solutions

15.12.2.1 CARA will provide chemical agent decontamination solutions and will handle spills of these solutions.

15.12.2.2 Chemical agent decontaminants are generally caustic. Personnel handling these solutions will wear safety glasses, a splash apron, and butyl or nitrile gloves. Any clothing that needs to be reused will be thoroughly rinsed with water after being cleaned with decontamination solutions. Any permeable clothing that becomes wet will be removed. Skin that comes in contact with decontamination solutions will be thoroughly washed with water.

15.12.3 Hazardous Soils/Debris

15.12.3.1 All soil and debris excavated from 4825 Glenbrook Road will be characterized as clean, RCWM, or hazardous waste, and will be handled as such. Any spills of these materials will be reported to the SSHO, CENAB Site Operations Officer, and USAESCH Safety Specialist. TE/site support and the disposal team/UXO contractor will remediate spills of this nature, as appropriate, under direction of the SSHO.

15.12.4 Spill Response at Low Probability Areas

15.12.4.1 The only hazardous materials present at low probability areas that might present a spill threat are fuels and, to a lesser extent, decontamination fluids. In the event of a spill of one of these materials, the following actions will be taken:

- The SSHO and Site Manager will be notified immediately.
- The leak/spill will be stopped using spill kit located at command post, if this can be accomplished without endangering personnel.
- The spill will be contained, if this can be accomplished without endangering personnel
- The SSHO will sound the alarm to the rally point.
- All nearby drains will be covered/protected.

15.12.5 Spill Response at Higher Probability Areas

15.12.5.1 The following procedures will be implemented in the event of a spill:

15.12.5.2 Isolation:

- Upon observing a spill (or leakage or discharge of the contents of a container) of any size, personnel will immediately don the proper PPE and mitigate the spill as necessary.

- Until determined otherwise, any unidentified spilled material will be assumed to be hazardous and will be contained – see Containment (Section 16.12.5.8) below.
- Sources of ignition within 500 feet of a spill will be extinguished immediately or de-energized (including vehicle engines).
- Employees who have had contact with the spilled materials will report immediately to the decontamination area and undergo decontamination consistent with the extent and nature of the contact.

15.12.5.3 Notification:

- The SSHO, CENAB Site Operations Officer, and USAESCH Safety Specialist will be notified as soon as possible of the location, size, and nature of a spill. Other appropriate notifications will be made in accordance with the emergency contact numbers provided in Appendix C of the WP.
- If conditions dictate, the SSHO may declare an emergency, initiate remediation procedures, request assistance from the D.C. Office of Emergency Management, make the necessary notifications, and initiate a response.
- If assistance from the D.C. Metropolitan Fire Department Hazardous Materials Unit, Spill Response Team is required, the SSHO or CENAB Site Operations Officer will advise them of any special precautions/procedures in effect, and direct them to the location of on-site response supplies and the spill area. A TE escort will direct responders' vehicles over clean fill roads to the extent possible to minimize contamination.

15.12.5.4 Rescue:

- If employees are unable to evacuate themselves from a spill area for any reason, their rescue will be responders' first priority. Responders will wear the appropriate PPE to conduct rescues, as directed by the SSHO or USAESCH Safety Specialist.

15.12.5.5 Assessment/Characterization/Remediation:

- Once employees have left a spill area, initial re-entry to the area will be conducted in the appropriate level of PPE, as directed by the SSHO.

15.12.5.6 Identification:

- An attempt will be made to identify spilled material to the extent possible through container markings, physical properties of the material, and other available evidence.

- When doubt exists as to the material's identity, it will be presumed to be hazardous until proven otherwise.
- Actions will be carried out as though all of the following hazard categories apply, until evidence indicates otherwise: flammable, water reactive, oxidizing, corrosive, and acutely toxic by skin contact or inhalation (material will be presumed to volatilize significantly unless proven otherwise).
- At the direction of the SSHO and if considered necessary, samples of the spilled material will be collected for field testing and subsequent laboratory analysis. Field tests may include tests of pH, response by various instruments in the headspace of the sample container (colorimetric tubes, ionization device, combustible indicator, meter, etc.), and tests for combustibility and reactivity. Note: Standard procedures for the safe collection and testing of field samples will be followed. If RCWM is suspected of being involved, proper sampling protocols will be followed by TE.
- Available references will be consulted for guidance and toxicity information as the spilled material is identified.

15.12.5.7 Demarcation of Hazardous Spill Areas:

- The area of the spill will be determined and documented, noting area of contamination.
- The quantity of the material spilled will be estimated, and the basis for the estimate will be noted (i.e., remainder in container, direct observation of the spill in progress, etc.).
- The area will be marked with stakes, barrier tape, or other means as appropriate.

15.12.5.8 Containment (these directions for containment also apply if it is suspected that the spill contains chemical warfare agents):

- Prevent Spread of Material
  - Orient containers in an upright position to stop the flow of liquids. Depending on the circumstances, this step may be accomplished as soon as the spill or leak is observed, providing it can be done without personal contact with the material.
  - Use surrounding soil, booms, loose sorbent, sorbent pads, or other materials as appropriate to build a dike or berm around the spilled materials. Choose response materials with minimum potential for incompatibility.
- Suppress Vapors

  - Vapor-suppressing foams may be applied if it has been verified that the spill material is not water-reactive.
  - Sorbent pads with impervious backing may be laid over the spills, provided the potential for incompatibility is taken into consideration.
- Solidify Liquids
  - Apply loose sorbents, pads, or pillows to solidify spilled liquids. Clay and inorganic sorbent should be used on materials not fully identified. Sorbents made from organic materials (such as grain husks) and neutralizers will NOT be applied to materials not fully identified.

15.12.5.9 Cleanup of Hazardous Materials:

- Damaged containers will be placed in drums of compatible construction that contain suitable loose sorbents. Empty drums for this purpose will be maintained on site. Saturated sorbents, soil, spill-control pads, and other spill control material will be collected in compatible drums using non-sparking equipment as appropriate. Contaminated tools and equipment will be collected for subsequent decontamination or disposal.

15.12.5.10 Disposal:

- The appropriate disposal method will depend on the identity of the spilled material. Unidentified material will be stored in a stable, inactive area with secondary containment, pending identification of the material.

15.12.5.11 Restoration:

- Final cleanup of the spill area, which may include post cleanup environmental sampling, will depend on the following:
  - The identity and quantity of the spilled material
  - The physical location of the spill
  - The requirements imposed by regulatory agencies.

15.12.5.12 Air Releases:

- Air monitoring will be conducted by the Air Monitoring Team. The SSHO, in coordination with the Air Monitoring Team, will determine the frequency, duration, and type of air monitoring.

15.12.5.13 Evacuation Routes and Resources (if evacuation is deemed necessary):

- Evacuation notification will be three long blasts on an air horn or vehicle horn or by verbal communication via radio.
- Personnel will keep upwind of smoke, vapors, or spill locations, if possible.
- In the event that emergency site evacuation is necessary, all personnel are to:
    - Escape the emergency situation
    - Decontaminate to the maximum extent practical (personnel will exit through the decontamination corridor, if possible)
    - Assemble at the rally point identified in the morning tailgate meeting.
- If evacuation is not possible via the decontamination corridor, site personnel should remove contaminated clothing once they are in a safe location and leave it near the EZ or in a secure place.
- The SSHO will conduct a head count to ensure all personnel have evacuated safely.

15.13 MEC/RCWM CONTINGENCY PLAN FOR LOW PROBABILITY OPEARATIONS

15.13.1 Introduction

15.13.1.1 The purpose of this contingency plan is to define the procedures that will be followed in the unlikely event that items potentially related to the American University Experiment Station (AUES) are encountered during intrusive activities at low probability areas. For purposes of differentiation between this plan and the contingency plan used for higher probability operations, this plan will be referred to as the Low Probability Contingency Plan.

15.13.2 Definitions

15.13.2.1 Items that are potentially related to AUES will be defined as “suspect AUES items” for the purposes of this Low Probability Contingency Plan. These items include but are not limited to:

- Any item identified as suspect MEC/RCWM or as being related to MEC/RCWM; or
- Any sealed container that cannot be positively identified to be unrelated to AUES (e.g., paint cans, etc. are known to be unrelated to AUES activities); or
- Any unsealed container or identifiable fragment thereof that cannot be positively identified to be unrelated to AUES (e.g., beer bottles, etc. are known to be unrelated to AUES activities); or

- Any other item that is suspected to be agent-related material or that is suspected to contain agent-related material; or
- Any other item that cannot be positively identified as an obvious cultural feature or a post-1918 feature (obvious cultural features or post 1918 features include such items as root ball baskets, poly vinyl chlorinated [PVC] piping, wiring, etc.).

15.13.3 Low Probability Contingency Plan Initiation

15.13.3.1 The Low Probability Contingency Plan will be initiated if any suspect AUES items (as defined above) are encountered during low probability operation activities, or if personnel at a low probability site exhibit symptoms that may be attributable to a chemical exposure (i.e., respiratory irritation and/or irritation of the eyes or skin).

15.13.3.2 In the event that the Low Probability Contingency Plan is initiated for any reason, intrusive activities will be halted immediately. EXCEPTION: see Paragraphs 15.13.8.2 through 15.13.8.4. The Low Probability Contingency Plan is included in Attachment D-4 of the APP.

15.13.4 Initiation Procedures for Suspect AUES Items

15.13.4.1 In the event that the Low Probability Contingency Plan is initiated because suspect AUES items are encountered during site activities, subsequent actions taken will be determined according to the nature of the suspect item. This procedure is summarized in Figure D1-15-1 and in Sections 15.13.5 through 15.13.8.

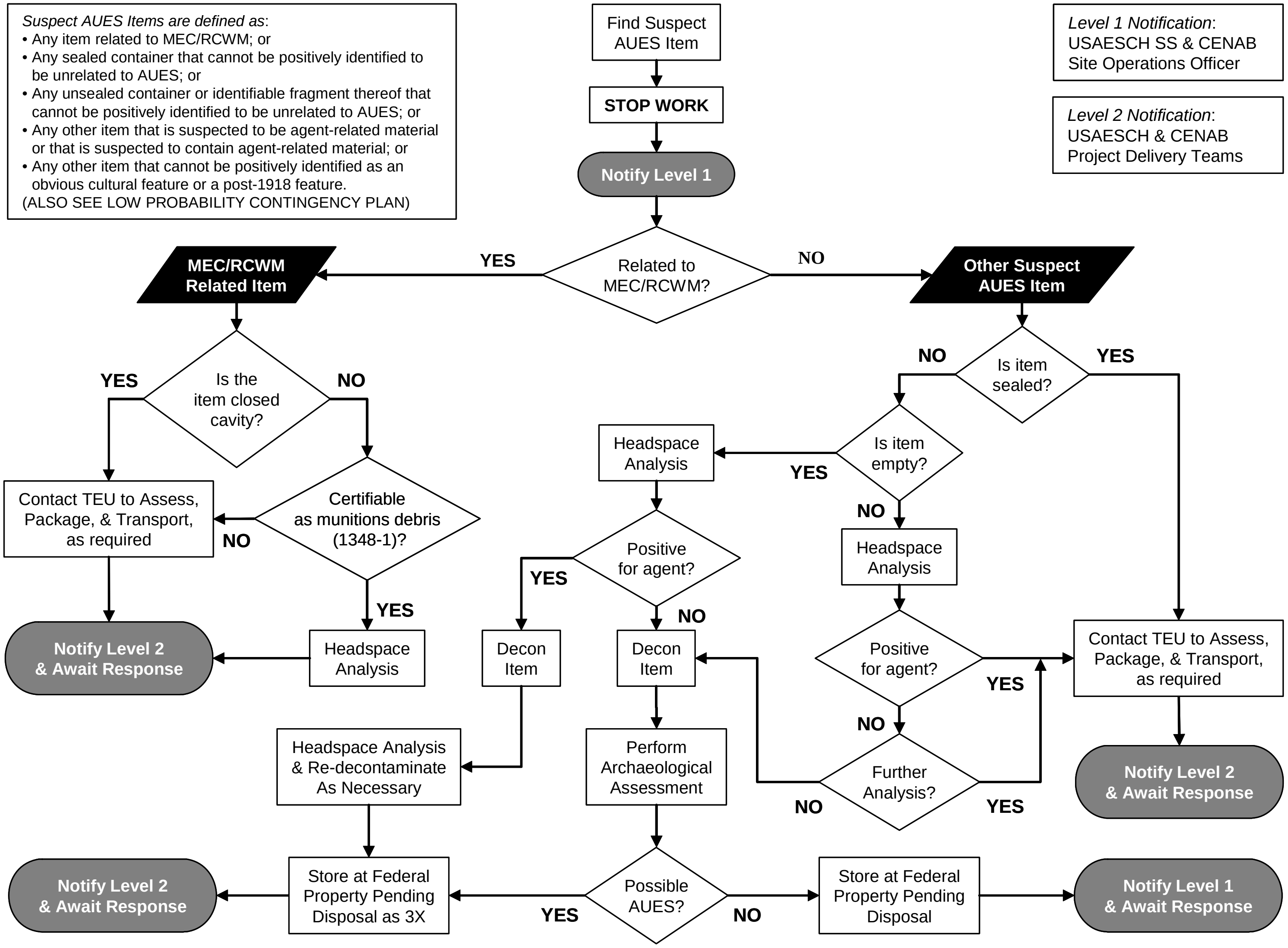
15.13.4.2 After initiation of the Low Probability Contingency Plan and the cessation of intrusive activities, the Site Manager or designate will contact the USAESCH Safety Specialist and CENAB Site Operations Officer and inform them that the Low Probability Contingency Plan has been initiated. The USAESCH Safety Specialist will coordinate further response with USAESCH, TE, and the Air Monitoring Team, as necessary. The CENAB Site Operations Officer will notify other outside agencies, as required. EXCEPTION: see Paragraphs 15.13.8.2 through 15.13.8.4.

15.13.5 Initiation Procedures for MEC/RCWM-Related Items

15.13.5.1 If the suspect item is potentially related to MEC/RCWM, the following step-by-step procedure will be followed:

- If the suspect item requires closed cavity assessment or is not certifiable as munitions debris in accordance with DoD Regulation 4160-21.M, the USAESCH Safety Specialist will contact TE so that the item can be assessed, photographed, packaged, and transported, as appropriate, in accordance with TE SOPs. After TE has been contacted, the USAESCH Safety Specialist and the CENAB Site Operations Officer will contact their respective PDTs to apprise them of the situation.

Figure D1-15-1
Low Probability Contingency Plan Decision Flowchart



Suspect AUES Items are defined as:
- Any item related to MEC/RCWM; or
- Any sealed container that cannot be positively identified to be unrelated to AUES; or
- Any unsealed container or identifiable fragment thereof that cannot be positively identified to be unrelated to AUES; or
- Any other item that is suspected to be agent-related material or that is suspected to contain agent-related material; or
- Any other item that cannot be positively identified as an obvious cultural feature or a post-1918 feature.

(ALSO SEE LOW PROBABILITY CONTINGENCY PLAN)

Level 1 Notification:
USAESCH SS & CENAB
Site Operations Officer

Level 2 Notification:
USAESCH & CENAB
Project Delivery Teams

- If the suspect item is certifiable as munitions debris in accordance with DoD Regulation 4160-21.M, then the item will be double-bagged in plastic lock bags by personnel wearing Nitrile gloves. The item will be given a tracking number in accordance with Section 16.13.10, and also be photographed unless it is considered unsafe to do so. The item will then be transferred to the Air Monitoring Team for headspace analysis for mustard and lewisite in accordance with their SOPs, and the excavation area will be covered with polyethylene sheeting and anchored at the edges with sandbags pending the analysis results. Once the item has been packaged for transfer, the USAESCH Safety Specialist and the CENAB Site Operations Officer will contact their respective PDTs to apprise them of the situation.
- Intrusive activities will not resume at the site until authorization to continue is received from the USAESCH and CENAB PDTs, via the USAESCH Safety Specialist.

15.13.6 Initiation Procedures for Suspect Sealed Items

15.13.6.1 If the suspect item is sealed, the USAESCH Safety Specialist will contact TE so that the item can be assessed, photographed, packaged, and transported, as appropriate, in accordance with TE SOPs. After TE has been contacted, the USAESCH Safety Specialist and the CENAB Site Operations Officer will contact their respective PDTs to apprise them of the situation.

15.13.6.2 Intrusive activities will not resume at the site until authorization to continue is received from the USAESCH and CENAB PDTs, via the USAESCH Safety Specialist.

15.13.7 Initiation Procedures for Suspect Unsealed Items Containing Liquids or Solids

15.13.7.1 If the suspect item is unsealed and contains a liquid or a solid substance, the following step-by-step procedure will be followed:

- The item will not be moved and the excavation area will be secured and covered with polyethylene sheeting, and anchored at the edges with sandbags.
- The USAESCH Safety Specialist will then contact the Air Monitoring Team to request that they come to the site to perform headspace analysis of the suspect item for mustard and lewisite in accordance with their SOPs.
- If the item is positive for agent, the USAESCH Safety Specialist will contact TE so that the item can be assessed, photographed, packaged and transported, as appropriate, in accordance with TE SOPs. After TE has been contacted, the USAESCH Safety Specialist and the CENAB Site Operations Officer will contact their respective PDTs to apprise them of the situation.
- If the item is not positive for agent, the SSHO will perform a visual assessment of the item to evaluate whether the contents should be recommended for further analysis. Agent-related material may be viscous (oil-like) liquid that is clear,

yellow, brown, black, or milky in appearance, or unidentifiable solid that is white, yellow, green, brown, or black in appearance.

- If the SSHO deems that there is any reason for the contents to undergo further analysis, the USAESCH Safety Specialist will contact TE so that the item can be assessed, photographed, packaged, and transported, as appropriate, in accordance with TE SOPs. After TE has been contacted, the USAESCH Safety Specialist and the CENAB Site Operations Officer will contact their respective PDTs to apprise them of the situation. Intrusive activities will not resume at the site until authorization to continue is received from the USAESCH and CENAB PDTs, via the USAESCH Safety Specialist.
- If the contents of the item clearly appear to be uncontaminated soil, mud, or groundwater, the SSHO will request the USAESCH Safety Specialist's concurrence with this assessment. If the USAESCH Safety Specialist does not concur with the SSHO's assessment, TE will be contacted as described in the previous step. However, if the USAESCH Safety Specialist does concur with the assessment, the item will be photographed, decontaminated in a container of 5% bleach solution, and then double-bagged, labeled (Section 15.13.10), and transferred to the Project Archaeologist for archaeological assessment. The item will be placed into the decontamination solution using tongs or other method to avoid physical contact with the item during decontamination, and the decontamination solution used will be kept segregated until after the results of the archaeological assessment, to allow analysis of the solution if necessary. Following this archaeological assessment, if the item is determined not to be AUES-related, the USAESCH Safety Specialist and the CENAB Site Operations Officer will be informed and may then give permission for intrusive activities to continue at the site. The decontaminated item will be held in a labeled drum at the Federal Property, pending appropriate disposal, and the segregated decontamination solution will be placed in the decontamination water drum.
- If the item is suspected to be AUES-related following this archaeological assessment, the USAESCH Safety Specialist and the CENAB Site Operations Officer will contact their respective PDTs to apprise them of the situation. Intrusive activities will not resume at the site until authorization to continue is received from the USAESCH and CENAB PDTs, via the USAESCH Safety Specialist. The decontaminated item will be held in a labeled drum at the Federal Property, pending disposal as agent contaminated scrap, and the segregated decontamination solution will be kept in a labeled container, pending the decision on whether or not it requires analysis.

15.13.8 Initiation Procedures for Other Suspect AUES Items

15.13.8.1 If the suspect item is neither MEC/RCWM-related nor a sealed item, and it does not contain any liquid or solid substances, the following step-by-step procedure will be followed:

- The item will be photographed and then double-bagged in plastic lock bags by personnel wearing Nitrile gloves. The item will then be transferred to the Air Monitoring Team for headspace analysis for mustard and lewisite in accordance with their SOPs, and the excavation area will be covered with polyethylene sheeting and anchored at the edges with sandbags pending the analysis results.
- If the item is positive for agent, the item will be decontaminated in a container of 5% bleach solution, and then tested again using headspace analysis to confirm decontamination. The item will be placed into the decontamination solution using tongs or other method to avoid physical contact with the item during decontamination. If the item is still positive for agent following this decontamination process, it will be decontaminated again and retested using headspace analysis. This two-step process will be repeated as necessary until decontamination is confirmed. Once the item is decontaminated, it will be double-bagged and labeled in accordance with Section 15.13.10. The USAESCH Safety Specialist and the CENAB Site Operations Officer will contact their respective PDTs to apprise them of the situation and the decontaminated item will be held in a labeled drum at the Federal Property, pending disposal as decontaminated scrap. Intrusive activities will not resume at the site until authorization to continue is received from the USAESCH and CENAB PDTs, via the USAESCH Safety Specialist.
- If the item is not positive for agent, the item will be decontaminated in a container of 5% bleach solution and then double-bagged, labeled (Section 15.13.10), and transferred to the Project Archaeologist for archaeological assessment. The item will be placed into the decontamination solution using tongs or other method to avoid physical contact with the item during decontamination, and the decontamination solution used will be kept segregated until the results of the archaeological assessment are known, to allow subsequent analysis of the solution if necessary. Following this archaeological assessment, if the item is determined not to be AUES-related, the USAESCH Safety Specialist and the CENAB Site Operations Officer will be informed and may then give permission for intrusive activities to continue at the site. The decontaminated item will be held in a labeled drum at the Federal Property, pending appropriate disposal, and the segregated decontamination solution will be placed in the decontamination water drum.
- If the decontaminated item is suspected to be AUES-related following this archaeological assessment, the USAESCH Safety Specialist and the CENAB Site Operations Officer will contact their respective PDTs to apprise them of the situation. The decontaminated item will be held in a labeled drum at the Federal

Property, pending disposal as decontaminated scrap, and the segregated decontamination solution will be kept in a labeled container, pending the decision on whether or not it requires analysis. Intrusive activities will not resume at the site until authorization to continue is received from the USAESCH and CENAB PDTs, via the USAESCH Safety Specialist.

15.13.8.2 The above procedure may be modified in the event that multiple suspect items are recovered that are neither MEC/RCWM-related, nor sealed items, and that do not contain any liquid or solid substances (e.g., the team are digging in an area of trash). Under these circumstances, the field team will not be required to stop work and may continue with excavation activities at the low probability site as long as the following conditions have been met:

- The initial suspect item find(s) have been sent for headspace analysis and no agent has been detected.
- The USAESCH and CENAB PDTs have been informed of these finds and have agreed to allow the modification of the procedure.

15.13.8.3 Under these conditions, any suspect items recovered that are neither MEC/RCWM-related, nor sealed items, and that do not contain any liquid or solid substances will be containerized (e.g., placed 55-gallon drum) and sent for headspace analysis at the end of each day. Results of these analyses will be reported to the USAESCH and CENAB PDTs the following morning, via the USAESCH Safety Specialist and the CENAB Site Operations Officer, respectively,. Excavation will halt if agent has been detected.

15.13.8.4 Subsequent to this procedure modification, in the event that any items are recovered that are addressed in Sections 15.13.5, 15.13.6, or 15.13.7 of this Low Probability Contingency Plan, or if the Parsons Site Manager, USAESCH Safety Specialist, or CENAB Site Operations Officer otherwise deem it necessary, further intrusive activities will be halted immediately and the appropriate Contingency Plan procedures will be followed.

15.13.9 Initiation Procedures for Possible Agent Exposure

15.13.9.1 In the event that the Low Probability Contingency Plan is initiated because site personnel exhibit symptoms that may be attributable to a chemical exposure, the following step-by-step procedure will be carried out:

- Personnel will move upwind of the excavation or other potential source of exposure.
- The USAESCH Safety Specialist and CENAB Site Operations Officer will be contacted and informed that the Low Probability Contingency Plan has been initiated. The USAESCH Safety Specialist will coordinate further response with USAESCH, TE, and the Air Monitoring Team, as necessary. The CENAB Site Operations Officer will notify and coordinate with other outside agencies, as required.

- Potentially exposed personnel may be processed through the EPDS, if signs of exposure are observed on their skin or clothing. Areas of the body suspected to be exposed will be flushed with copious quantities of water. Potentially exposed clothing or PPE will be removed and decontaminated in accordance with the procedures described in Chapter 12 of this SSHP.
- George Washington Hospital will be notified (telephone: 202-934-3211) and, if present, the onsite ambulance will be contacted and used to transport any personnel exhibiting chemical exposure symptoms, or other personnel potentially exposed, to that facility. If no ambulance is on-site, George Washington Hospital will be notified and 911 will be called. At this time, George Washington Hospital will be informed whether the potentially exposed personnel have been processed through the EPDS, though they will be advised that the potentially exposed personnel may require additional decontamination upon arrival at the hospital if decontamination has not been confirmed on site using agent monitoring.
- The excavation area will be covered with polyethylene sheeting and anchored at the edges with sandbags and the USAESCH Safety Specialist will contact the Air Monitoring Team to perform headspace analysis at the excavation. Also, the USAESCH Safety Specialist and the CENAB Site Operations Officer will contact their respective PDTs to apprise them of the situation.
- Intrusive activities will not resume until authorization to continue has been received from the USAESCH and CENAB PDTs, via the USAESCH Safety Specialist.

15.13.10 On-Site Tracking for Low Probability Contingency Plan

15.13.10.1 Every suspect item uncovered that causes the Low Probability Contingency Plan to be triggered will be tracked using unique alphanumeric tracking numbers. General details of the numbering systems to be used are described below, though specific details will be included in each SSWP.

15.13.10.2 The Site Manager will enter descriptions of all suspect items in the Field Log Book (e.g., dimensions, color, material of construction, other notable features). Photographs will be taken of suspect items, as specified in Section 15.13.6. All photographs of suspect items will include a visual scale in order that the dimensions of the item can be estimated using the photograph.

15.13.10.3 On any day that the Low Probability Contingency Plan is initiated, the Site Manager will complete a Contingency Plan Initiation Summary and include it in the Daily Report (Section 4.9 of the SSWP). Both the Site Manager and the USAESCH Safety Specialist will sign this Contingency Plan Initiation Summary.

15.13.10.4 Items Removed by TE

15.13.10.4.1 If the item has been removed by TE during a low probability intrusive operation, Parsons will assign a unique alphanumeric tracking number for internal reference and tracking purposes. The first two characters of this number will be "TE" (to denote an item removed by TE). The next set of characters will denote the overall site location (e.g., "4825GR" for 4825 Glenbrook Road). The next five characters will indicate the specific location (e.g., Area A or Area B) at which the item was recovered. The last number will be a unique number assigned to each item recovered at that location which is removed by TE.

15.13.10.5 The following is an example of designations for items removed by TE:

TE-4825GR-AreaA-010

15.13.10.6 Munitions Debris

15.13.10.6.1 Each item of munitions debris encountered during a low probability intrusive investigation will be given a unique alphanumeric tracking number. The first three characters of this number will be "SCR" (to denote munitions debris). The next set of characters will denote the overall site location (e.g., "4825GR" for 4825 Glenbrook Road). The next five characters will indicate the specific location (e.g., Area A or Area B) at which the item was recovered. The last number will be a unique number assigned to each munitions debris item recovered at that location.

15.13.10.6.2 The following is an example of munitions debris item designations:

SCR-4825GR-AreaA-010

15.13.10.7 Other Suspect Items

15.13.10.7.1 Other suspect items encountered during low probability intrusive operations will be given a unique alphanumeric tracking number, which will be marked on the bag in which the item is placed. Additionally, the date of generation will be marked on the bag. The first two characters of this number will be "SI" (suspect item). The next set of characters will denote the overall site location (e.g., "4825GR" for 4825 Glenbrook Road). The next four characters will indicate the specific location (e.g., Area A or Area B) at which the item was recovered. The last number will be a unique number assigned to each suspect item recovered at that location.

15.13.10.7.2 The following is an example of designations for other suspect items:

SI-4825GR-AreaA-010

15.13.10.7.3 In the event that the procedures detailed in Paragraphs 15.13.8.2 through 15.13.8.4 are followed, other suspect items will be containerized and tracked by batch using a unique alphanumeric tracking number, which will be marked on the container in which each batch of items is placed. Additionally, the date of generation will be marked on the container. The first two characters of this number will be “SI” (suspect item). The next set of characters will denote the overall site location (e.g., “4825GR” for 4825 Glenbrook Road). The next four characters will indicate the specific location (e.g., Area A or Area B) at which the item was recovered. The next part of the code will be “BATCH” to denote that this tracking number refers to multiple items. The last number will be a unique number assigned to each suspect item recovered at that location.

15.13.10.7.4 The following is an example of designations for other suspect items using the modified procedures:

SI-4825GR-AreaA-Batch-010

15.14 MEC/RCWM CONTINGENCY PLAN FOR HIGHER PROBABILITY OPERATIONS

15.14.1 Introduction

15.14.1.1 This contingency plan defines the procedures that will be followed in the event that suspect MEC/RCWM items are encountered during intrusive activities at higher probability sites in order to ensure the safety and the protection of the public and workers, and to ensure the proper disposal of discovered MEC/RCWM items. For purposes of differentiation between this plan and the contingency plan used for low probability sites, this plan will be referred to as the Higher Probability Contingency Plan.

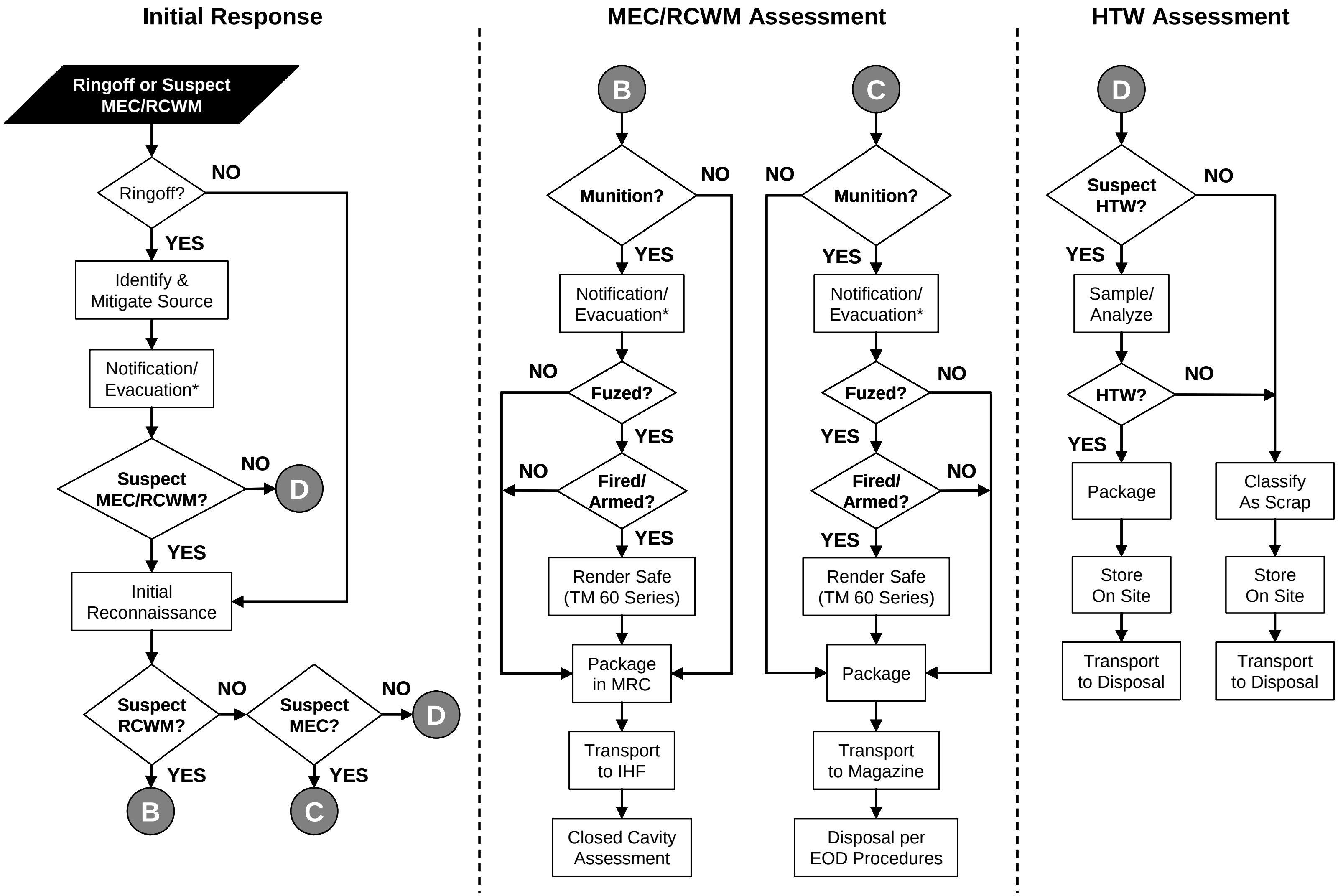
15.14.1.2 Responses to air monitoring alarms/ringoffs are described in Sections 8.3.4 and 8.3.5 of this SSHP.

15.14.2 Initial Response

15.14.2.1 If there is an alarm or a suspect RCWM item is encountered, the excavation team will respond according to the procedures described below and illustrated in Figure D1-15-2.

15.14.2.2 If an air monitoring alarm has occurred with no apparent suspect RCWM container present and the excavation team is in the proper level of PPE, they will take immediate action to investigate and mitigate the source, as necessary. If they are not in the appropriate level of PPE, the excavation team will exit the EZ, upgrade PPE depending upon the alarm level, and then reenter the EZ and work towards investigating and mitigating the source, as necessary. Mitigation procedures will include identifying the source of the alarm, and containerizing the surrounding soil until there are no additional alarms recorded. If, during source mitigation, a suspect RCWM container or MEC item is encountered, the excavation team will perform an initial reconnaissance.

Figure D1-15-2
Higher Probability Contingency Plan Decision Flowchart



* Notification/evacuation is only applicable if the public is not adequately protected by engineering controls or by prior withdrawal

15.14.2.3 Following investigation of possible source of an air monitoring alarm, if suspect chemical agent-related gross liquid contamination is observed, the excavation team will mitigate the source by covering the area with plastic and will then exit the EZ through the PDS. Personnel will then upgrade PPE to an adequate level for dealing with liquid contamination (Chapter 5 of this SSHP) and may then enter the EZ to further mitigate and/or containerize the suspect liquid source.

15.14.2.4 Excavation may continue once the alarm/ringoff has been cleared. However, PPE may be upgraded depending upon the alarm level.

15.14.3 Initial Reconnaissance

15.14.3.1 If a suspect RCWM container or MEC item is encountered, the excavation team and/or TE will perform an initial reconnaissance. For the purposes of this Higher Probability Contingency Plan, a suspect RCWM container is defined as either (a) a container with markings denoting chemical agent or RCWM, or (b) an unidentifiable intact container that contains liquid. Note that, during an investigation at a higher probability site, any discovered unidentifiable intact container that contains liquid will be assumed to be potential RCWM until determined otherwise.

15.14.3.2 If, during the initial reconnaissance, the item is determined to be potential RCWM, the assessment procedures described in Section 15.14.4 will be performed.

15.14.3.3 If an item is suspected to be MEC, the assessment team will assess the suspect MEC using their SOPs. Based upon their assessment, established procedures described in Section 15.14.5 will be implemented, if necessary.

15.14.3.4 Initial reconnaissance of unknown liquid fill or MEC may involve the use of on-site x-ray equipment. If assessment using on-site x-ray determines the item contains no energetics and/or solid/liquid fill, the item will no longer be considered to be of unknown liquid fill or MEC. In this case, the item will be classified as munitions debris (as defined in the ACSIM Memorandum, Munitions Response Terminology Dated April 21, 2005) and handled as Suspect HTW to be demilitarized later.

15.14.3.5 If it is determined that a suspect container is neither a RCWM container nor a MEC item, it will be categorized as Suspect HTW and assessed according to the procedures described in Section 15.14.6.

15.14.4 RCWM Assessment

15.14.4.1 If the item is categorized as potential RCWM, TE will perform an assessment in accordance with their assessment SOPs. This assessment will be performed at the Federal Property under the supervision of the USAESCH Safety Specialist and the SSHO.

NOTE: IN THE EVENT THAT A RCWM ITEM RECOVERED DURING THE REMEDIATION IS DETERMINED TO BE INCONSISTENT WITH THE MCE STATED IN THE SSWP, WORK WILL CEASE AND THE SITE-SPECIFIC MCE WILL BE REEVALUATED. IF THE MCE IS REVISED TO A GREATER HAZARD, THE AEGL-2 DISTANCE WILL BE RECALCULATED AND THE NEW AEGL-2 DISTANCE WILL BE IN EFFECT FOR THE REMAINDER OF THE INVESTIGATION. THE REVISED MCE AND AEGL-2 DISTANCE WILL BE APPROVED BY USAESCH PRIOR TO IMPLEMENTATION. AN AMENDMENT TO THE CSS OR ANNEX WILL BE PREPARED AND SUBMITTED FOR APPROVAL.

15.14.4.2 If an item is assessed to be a munition, the following steps will be taken.

- The CENAB Site Operations Officer, SSHO, USAESCH Safety Specialist, and Site Manager will be notified immediately. If not previously implemented, the CENAB Site Operations Officer may implement public evacuation or shelter-in-place in accordance with the CENAB PPP if the public is not adequately protected by engineering controls or a prior withdrawal.
- If the item is fuzed and fired/armed, it will be rendered acceptable to move by TE EOD personnel in accordance with TM 60 Series, packaged in a MRC, transported to the IHF containers, and subjected to closed cavity item assessment in accordance with TE assessment procedures (Section 3.8.13 of the SSWP). The transportation route to the IHF containers will be determined on a site-specific basis and will be included in the SSWP.
- If the item is not acceptable to move, work will stop and appropriate TM 60 series actions, in conjunction with engineering controls, will be selected. These measures will be applied only after review and approval by the on-site USAESCH Safety Specialist (reference TM 60A-1-1-22).
- If the item has not been fired/armed, it will be packaged in a MRC, transported to the IHF containers, and subjected to closed cavity item assessment in accordance with TE assessment procedures (Section 3.8.13 of the SSWP).

15.14.4.3 If the item is not a munition (i.e., it is an intact container), it will be packaged in a MRC, transported to the IHF containers, and subjected to closed cavity item assessment in accordance with TE assessment procedures (Section 3.8.13 of the SSWP).

15.14.5 MEC Assessment

15.14.5.1 If the item is not potential RCWM but is a potential MEC item, qualified UXO technicians will perform the assessment.

NOTE: IN THE EVENT THAT A MEC ITEM RECOVERED DURING THE REMEDIATION IS DETERMINED TO BE INCONSISTENT WITH THE MGFD STATED IN THE SSWP, WORK WILL CEASE AND THE SITE-SPECIFIC MGFD WILL BE REEVALUATED. IF THE MGFD IS REVISED TO A GREATER HAZARD, THE RELATED MSD WILL BE RECALCULATED AND THE NEW MSD WILL BE IN EFFECT FOR THE REMAINDER OF THE INVESTIGATION. THE REVISED MGFD AND MSD WILL BE APPROVED BY USAESCH PRIOR TO IMPLEMENTATION. AN AMENDMENT TO THE CSS OR ANNEX WILL BE PREPARED AND SUBMITTED FOR APPROVAL.

15.14.5.2 If the MEC item is assessed to be a munition, the following steps will be taken:

- The CENAB Site Operations Officer, SSHO, USAESCH Safety Specialist, and Site Manager will be notified immediately. If not previously implemented, the CENAB Site Operations Officer may implement public evacuation or shelter-in-place in accordance with the CENAB PPP if the public is not adequately protected by engineering controls or a prior withdrawal.
- If the item is fuzed and fired/armed, EOD support shall be requested for further action.
- If the item is not acceptable to move, work will stop and appropriate safety precautions, in conjunction with engineering controls, will be selected. These measures will be applied only after review and approval by the on-site USAESCH Safety Specialist (reference TM 60A-1-1-22).
- If the item has not been fired/armed, it will be packaged by UXO personnel, transported to the magazine at the Federal Property, and disposed of in accordance with applicable guidelines in coordination with USAESCH.

15.14.6 HTW Assessment

15.14.6.1 If the item is not MEC or RCWM but is a potential HTW item, it will undergo HTW assessment at the Federal Property assessment area. The potential HTW item will undergo headspace analysis and liquid or solid samples will be collected from the item by the Sample Team and submitted to the HTW laboratory. If the item itself cannot be sampled, soil samples will be collected from the vicinity in which the item was recovered and these will be analyzed and used to characterize the item.

15.14.6.2 If the item contains HTW components, it will be packaged in a polyethylene drum overpack and stored at the Federal Property with secondary containment until shipped for disposal.

15.14.6.3 All items that are obviously scrap or proven to be scrap will be staged at the Federal Property until shipped for disposal.

15.15 CHEMICAL AGENT OR RELEASE REPORTING

15.15.0.1 A Chemical Event Report, RCS: CSGPO-453 (an example will be kept on site), will be made within three hours of the occurrence of any one of the following (per USACE Interim Guidance – Notification Procedures for Discovery of RCWM During USACE Projects, 23 April 2004):

- Any detection of agent outside of a munition body, bulk storage container, or engineering control which is confirmed by other positive detections;
- Discovery of an actual or suspected chemical agent-filled munition or container that may require emergency transportation or disposal;

- Actual or suspected exposure of personnel to an agent above the allowable limits contained in DA Pam 385-61, DA Pam 40-8 or DA Pam 40-173; or
- Any of the above occurrences involving items configured as weapons containing chemical agents or industrial chemicals.

15.15.0.2 If it appears that chemical event reporting may be needed, the USAESCH Safety Specialist will be notified immediately.

15.15.0.3 The Site Manager or SSHO will be prepared to provide the information requested in the Chemical Event Report.

CHAPTER 16
EMERGENCY RESPONSE TEAM

16.1 SITE SAFETY AND HEALTH OFFICER

16.1.0.1 The SSHO has overall responsibility during emergencies. In case of emergency, the SSHO will implement the site emergency response procedures and is specifically responsible for the following:

- Designating the members of the Emergency Response Team.
- Implementing the site ERCP, including ordering site evacuations, coordinating fire fighting efforts, and directing spill control and cleanup.
- Supervising site evacuation and decontamination procedures.
- Contacting emergency services such as the fire department, ambulance and security services, as may be required as requested by the Emergency Response Team.
- Assisting in providing first aid services and medical support or evacuation for injured or exposed personnel.

16.2 EMERGENCY RESPONSE TEAM

16.2.0.1 During intrusive operations at higher probability areas, a three-person Emergency Response Team (Section 15.6) will be suited up and on standby in the redress area of the PDS.

16.2.0.2 Under the direction of the SSHO, the Emergency Response Team will respond in a defensive manner to hazardous substance releases that occur during project activities. In the event that an emergency response is required, the Emergency Response Team will:

- Locate all victims, assess their condition(s), and make an on-scene determination of the resources needed to stabilize and transport them.
- Request emergency response by outside agencies, if required.
- Assess the situation and identify the existing hazards, potential for additional hazards, and need for additional response. Supervisors will ensure that the hazardous condition is stabilized, eliminated, or permanently fixed. If personnel or property are jeopardized, a decision will be made about alerting the local community.

- Remove injured personnel from the EZ. Decontamination, if required, will be accomplished through the EPDS.

16.2.0.3 Response to chemical agent emergencies will be handled by TE (Section 16.3).

16.3 CHEMICAL AGENT EMERGENCY RESPONSE

16.3.0.1 CARA will respond to all chemical agent-related emergencies.

16.3.0.2 During intrusive activities at a higher probability site, TE will have a minimum of two medium and two large MRCs, decontamination solutions, and associated supplies and equipment available in preparation for response to potential chemical agent-related emergencies. These supplies will be stored in the TE van in the SZ. Additional MRCs and supplies will be stored in the TE MilVan at the Federal Property.

16.4 ON-SITE PERSONNEL

16.4.0.1 Other on-site personnel will be responsible for reporting emergency situations or conditions immediately to their supervisors, alerting other employees, helping injured personnel, and assisting as directed to mitigate an incident.

CHAPTER 17
CONFINED SPACE ENTRY

Confined space entry is not anticipated to be required for the activities conducted during the remedial action at 4825 Glenbrook Road except for if an excavation is more than 4 feet deep and requires personnel entry during low probability test pit operations. The confined space entry will be performed according to SOP 11 Confined Space.

CHAPTER 18
LOGS, REPORTS, AND RECORDKEEPING

18.1 LOGBOOK

18.1.0.1 The SSHO will keep a log recording all of the following aspects related to safety at the site. This information will be maintained in a logbook or personal digital assistant. The log will include at a minimum, but not be limited to:

- Date and recorder of log;
- Training (kickoff training, site-specific training, and other gatherings);
- Issues or problems encountered;
- Tailgate safety briefings (time conducted and by whom);
- Significant site events relating to safety;
- Accidents, incidents, and near misses;
- Stop work events resulting from reasons of safety; and
- Safety audits.

18.2 WEEKLY REPORTS

18.2.0.1 The SSHO will prepare a report each week that is forwarded to the PSHM and USAESCH. This report will describe and summarize the following for the completed week:

- Activities performed and personnel on-site.
- Level of PPE used for site activities.
- Air monitoring results for industrial chemicals (for low probability sites only).
- Air monitoring results for chemical agent and industrial chemicals (for higher probability sites only).
- Training provided (including topics and number of personnel attending).
- On-site visitors.
- Incidents involving safety or health concerns or questions.
- Problems needing resolution.

- Activities planned for the following week.

18.3 RECORDKEEPING

18.3.0.1 The SSHO will establish and maintain a filing system onsite for health and safety records, reports, and other related information such as individual training, medical surveillance, etc. Folders in the health and safety filing system will include:

- Personnel Records: certificates for training (or copies) required by 29 CFR 1910.120, medical examination summary letters or certifications, signed APP/SSHP acceptance forms, monitoring results, etc.
- Air Monitoring Records: calibration details, equipment maintenance, monitoring results, etc.
- Training Records: sign-in sheets for onsite training with topics and dates.
- Visitor Logs: sign-in sheets for site visitors.
- Inspection Reports: reports of daily inspections by the SSHO and others concerning health and safety issues. Copies of reports of periodic safety-related inspections and/or audits by the PSHM, Quality Control Officer, and others.
- WPL Monitoring Records: records documenting the amount of time individual workers are present within the ECS while wearing Level D PPE (for higher probability areas only).
- Accident Prevention: copies of all hazard analyses performed on new tasks or activities, copies of any accident/incident reports and follow-up reports, and any other pertinent correspondence.
- PPE Records: records of periodic inspection, testing, and maintenance performed on PPE.
- Weekly Reports: Copies of weekly safety reports (Section 18.2) forwarded to USAESCH.

ENCLOSURE D-1.1
WORKERS' COMPENSATION MEDICAL PROVIDER LIST

Workers' Compensation Medical Providers List

Prepared for:

Parsons
Washington, DC

EMPLOYEE NOTICE

ALL ACCIDENTS MUST BE REPORTED TO YOUR SUPERVISOR **IMMEDIATELY!** FOR **WORK RELATED INJURIES**, MEDICAL SERVICES MAY BE OBTAINED FROM ONE OF THE MEDICAL FACILITIES LISTED BELOW:

If you require emergency medical treatment, go to the nearest hospital emergency room or urgent care facility.

Medical Providers

Washington Occupational Health Associates
Occupational/Industrial Medicine
1140 19th St NW Ste 700
Washington, DC 20036
202-463-6440

Chartered Family Health Ctr
Urgent Care Center/Walk-in
3924 Minnesota Ave NE
Washington, DC 20019
202-398-8683

Hospitals

George Washington University Hospital
Hospital - General
900 23rd St NW
Washington, DC 20037
202-715-4000

Howard University Hospital
Hospital - General
2041 Georgia Ave NW
Washington, DC 20060
202-865-6100

Pharmacies

Chartis' preferred Pharmacy PPO is TMESYS (Tim-a-sis). Please ask your Pharmacist to submit your prescription online.

CVS Pharmacy
Giant Pharmacy
Safeway Pharmacy

CHARTIS

Email Document Print Document

Powered by MAPQUEST.

NAVTECH ON BOARD

Email Document Print Document

ENCLOSURE D-1.2
INCIDENT INTERVENTION FOR PARSONS EMPLOYEE

Incident Intervention for Parsons Employees

For Emergencies Call 911

If the incident that occurred is life threatening or requires emergency response, first summon medical attention before contacting your GBU Safety Director, filing the IndustrySafe online incident report, or involving WorkCare.

To coordinate the WorkCare triage process, it is imperative that Parsons employees report all work-related injuries immediately to their supervisors.

For work related injuries/illnesses that may require physician direction on appropriate treatment, Parsons employees should then promptly contact Workcare, ideally before seeking medical care, as this will provide the greatest opportunity for appropriate intervention.

WorkCare's Incident Intervention is available 24/7.

WorkCare 888-449-7787

Be prepared to provide:

Injured worker's name:

Injured worker's contact number:

Injured worker's location (at a minimum – city and state):

Employee id number:

Employee's GBU:

Employee's Project or Office Location:

Functional Manager's name:

ATTACHMENT D-2
ACTIVITY HAZARD ANALYSES

Activity Hazard Analysis (AHA)

Activity/Work Task: **DEMOLITION OPERATIONS**	Overall Risk Assessment Code (RAC) (Use highest code): **M**
Project Location:	
Contract Number:	
Date Prepared: 29 DECEMBER 2009	
Prepared by (Name/Title): Michael E. Short/Technical &Ops. Dir	
Reviewed by (Name/Title): Ed Grunwald, CIH	

Notes: (Field Notes, Review Comments, etc.)

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each "**Hazard**" with identified safety "**Controls**" and determine RAC (See above)

	RAC Chart
"**Probability**" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.	**E = Extremely High Risk**
"**Severity**" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible	**H = High Risk**
Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.	**M = Moderate Risk** **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. Establish location for desired work area to conduct operations, to include: a. Establish Work Area Control Zones in a Conventional MEC/UXO Environment b. Mechanical Excavation c. Disposal Operations d. Post Blast Check of Demolition Area	1a. Slip, trip and fall.	1a. Worker awareness of potential slippery/uneven surfaces and tripping hazards plus inspection and policing of debris.	L
	1b.Biological hazards.	1b. See Biological Hazards AHA, which must be used in conjunction with this AHA if applicable.	L
	1c. Endangered/threatened flora/fauna.	1c. Conduct reconnaissance IAW approved WP and avoid endangered and threatened species if at all possible.	L
	1d. Cold/Heat Stress	1d. All site activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions	L
	1e. Contact with chemical agent or other hazardous chemicals	1e. Personnel will don the proper PPE commensurate with the chemical hazard encountered and the work is being accomplished. Demolition Crew will use nitrile gloves when handling bulk explosives	L
	1f. MEC/UXO Hazards	1f. If an MEC item is encountered alert the rest of the team and conduct an inspection of the item IAW the approved WP, SOP and EM 385-1-97.	M

Job Steps	Hazards	Controls	RAC
	1g. Lifting hazards.	1g. Ensure that you, and if there is another individual assisting you, both have solid footing, leather work gloves and use the proper lifting technique, bend at the knees keeping your back as straight as possible and lift with your knees, not your back. Ensure you have good visibility in the direction you are carrying an item. Do not attempt to carry anything by yourself in excess of 50 lbs. or any item that blocks your visibility or is cumbersome to carry alone.	L
	1h. Hand and Power tool operation	1h. When operating power tools they will be handled, operated and maintained IAW the manufactures instructions, the approved WP and any applicable SOPs. The power tool will be inspected prior to use to ensure that all of the hand and safety guards are in place and that the chain, if present, is properly tightened and that the tool is otherwise in good working order. Depending on the power tool PPE will vary and it too must be serviceable, operable and free of any defect. PPE will be worn IAW the approved WP and inspected by the user prior to donning. Hand and power tool use will be IAW EM 385-1-1, Chapter 13	L
	1i. Vehicle and heavy equipment traffic in area.	1i. Be aware of any vehicles or heavy equipment in area and be certain to wear a hard hat, safety glasses, and a high visibility safety vest when working around heavy equipment. Establish arm and hand signals or radio communication with the equipment operator and be certain the equipment is grounded and shut off when within the arc of the boom, shovel, etc.	L
	1j. Pinch and cut hazard from handling sharp scrap material.	1j. Wear all required PPE, ensure that it is serviceable, and check hand placement to ensure there are no sharp surfaces or pinch areas.	L
	1k. Unintentional Detonation	1k. Establish clear and defined work zones, such as Minimum Safe Distance (MSD) between teams and non-essential personnel. All demolition operation will be conducted IAW TM60A1-1-31. All MEC/UXO work ceases when unauthorized personnel enter into the MSD.	M
	1l. Noise in excess of OSHA standards	1l. If the heavy equipment and/or power tools used are louder than 85dB (A) then the appropriate hearing attenuation PPE must be worn. This could be ear plugs, ear muffs or both depending on the noise level. The site safety officer will measure the noise level of the equipment and prescribe the applicable noise attenuation PPE to be worn.	L

Job Steps	Hazards	Controls	RAC
	1m. Underground Utilities	1m. The local utility locating hotline will be contacted to identify the locations of buried utilities before subsurface activities are allowed to commence.	L
	1n. Fire/Explosion	1n. Refueling of all vehicles, heavy equipment and other fueled equipment will be conducted in accordance with the SSHP, applicable SOPs and EM 385-1-1, Chapter 9. Proper fire extinguishers will be on site and serviceable. There will be no “Hot Fueling” authorized at any time.	L
	1o. Confined Space – Cave In/Entrapment	1o. Any excavation deeper than 4ft is classified as a confined space (non-permit required). Competent Soil Person (UXOSO) will inspect the excavation daily and periodically to ensure engineering controls are adequate and working. Engineering controls are Sloping, Benching and Shoring. No work will be allowed in an excavation that has standing water. The water will be pumped out and re-entry will only be allowed after the Competent Person inspects the excavation site. Egress points are placed no further than 25ft from any workers. If ladders are used, they must: a. Extend from the floor surface of the excavation and extend a minimum of 3ft beyond above ground level of the excavation b. Be clear of all equipment and engineering controls for workers to use c. Upon entry into the excavation, be OSHA rated and support the worker’s weight to include tools and equipment	L
	1p. Misfires	1p. Misfires will be handled, as prescribed in TM60A-1-1-31, Explosive Ordnance Disposal Procedures.	L
	1q. Severe Weather (Lightning, Winds, Snow)	1q. No demolitions operations will be conducted during the on-set of severe weather (strong winds above 25mph; lightning, d snow and other visibility reducing events).	L
	1r. Low flying aircraft	1r. UXOSO or Demolition Team Leader will prepare and telephonically submit a NOTAM (Notice to Airmen) through the servicing Federal Aviation Administration Office during the entire Demolition Operation. Above Ground Limit (AGL or Ceiling Limitations) requirements for the NOTAM will be based on calculations from 1q below.	L

	1s. Hazardous Fragmentation	1s. Demolition Crew will adhere to HNC-ED-CS-S-98-7, August 1998, and Amendment 1, February 2011, Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions to reduce the fragmentation hazards and establish the HFD as listed in DDESB TP16 or USACE Fragmentation Data Sheet for items being destroyed.	L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Hand and Power Tools 2. Appropriate PPE for selection operation, at minimum – a. Long Sleeve Shirt b. Long Legged Pants c. Sturdy Work Boots d. Leather Gloves e. Safety Glasses, when required f. Hard Hat, when required g. Safety Vest, when required h. Additional PPE to conduct other operations, as directed 3. Heavy Equipment, as needed or specified by WP or SSHP 4. Additional equipment to conduct other operations, that may include – a. Demolition Material sufficient to complete the operation b. Galvometer c. Firing Device d. Sandbags 5. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable A:BC rated 2.5lb or larger fire extinguisher 6. Other vehicles designated as personnel conveyance will be equipped with – a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing 7. Two forms of Communications a. Project issued Radio b. Project supplied or personal Cellular Phone	Qualified Personnel 1. First Aid/CPR – UXOSO or site safety officer and one other individual. 2. Site Manager or SUXOS 3. All personnel operating heavy equipment will provide proof of competency (documentation of training or experience) to the UXOSO prior to operating the equipment. 4. UXO Personnel must be certified as an EOD-trained and must have the necessary experience for the position filled. 5. Competent Person (UXOSO) for Soils. 6. UXO Tech III, serving as a Licensed Blaster, if required by state. Training 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Flora/Fauna endangered/threatened 7. Daily safety and operational briefing 8. Site visitor training	1. Initial (Site Selection) – General inspection of assembly area. Equipment will be inspected daily by operator prior to use in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. 2. Daily- Housekeeping of assembly and work areas for debris and hazards. UXOSO will perform audits and spot checks to verify compliance. UXOSO will update site's MSDS files on all items, supplies and material brought onto site. Periodic communication checks between Field Office or UXOSO and Field Crews, as deemed necessary, to ensure crew's status and relay emergency information. Field Office and UXOSO will maintain a telephonic roster of all site personnel's cellular phone numbers to ensure two forms of communications. In the event that a field crew fails to make a communications check, they will cease operations and relocate to re-establish communications link with the Field Office or UXOSO. Competent Soil Person (UXOSO) will inspect the excavation daily and periodically to ensure engineering controls are adequate and working. 3. Weekly – First Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment. 4. Final (Site Departure) – Inspection of the entire area to ensure the site is left in the same or better than when we arrived.

Training Requirements: Only qualified personnel will be allowed to operate hand and power tools.

Training Acknowledgement:

Printed Name	Signature	Date

Activity Hazard Analysis (AHA)

Activity/Work Task: **DRUM HANDLING**	Overall Risk Assessment Code (RAC) (Use highest code)	**L**

Project Location:

Contract Number:

Date Prepared: 29 December 2011

Prepared by (Name/Title): Michael E. Short/Technical &Ops. Dir

Reviewed by (Name/Title): Ed Grunwald, CIH

Notes: (Field Notes, Review Comments, etc.)

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Step 1: Review each “**Hazard**” with identified safety “**Controls**” and determine RAC (See above)

	RAC Chart
“**Probability**” is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.	**E = Extremely High Risk**
“**Severity**” is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible	**H = High Risk**
Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each “Hazard” on AHA. Annotate the overall highest RAC at the top of AHA.	**M = Moderate Risk** **L = Low Risk**

Job Steps	**Hazards**	**Controls**	**RAC**
1. Transfer drums to/from transport vehicle:	1a. Slip, trip and fall.	1a. Worker awareness of potential slippery surfaces and tripping hazards plus inspection and policing of debris.	**L**
	1b. Cold and heat stress injuries.	1b. UXOSO will implement heat stress/cold injury control program as prescribed in the SSHP.	**L**
	1c. Vehicle and heavy equipment traffic in work area	1c. Operation of heavy equipment in accordance with SSHP. Be alert when working around heavy equipment. Use ground guide when backing vehicles and heavy equipment. All personnel operating heavy equipment will provide proof of competency (documentation of training or experience) to the SSHO or UXOSO prior to operating the equipment.	**L**
	1d. Noise	1d. If the heavy equipment and/or power tools used are louder than 85dB (A) then the appropriate hearing attenuation PPE must be worn. This could be ear plugs, ear muffs or both depending on the noise level. The site safety officer will evaluate the work area noise levels and prescribe the applicable hearing protection to be worn	**L**

Job Steps	Hazards	Controls	RAC
	1e. Back Injury	1e. Utilize proper ergonomic techniques. Ensure that you, and if there is another individual assisting you, both have solid footing, leather work gloves and use the proper lifting technique, bend at the knees keeping your back as straight as possible and lift with your knees, not your back. Ensure you have good visibility in the direction you are carrying an item. Do not attempt to carry anything by yourself in excess of 50 lbs. or any item that blocks your visibility or is cumbersome to carry alone.	L
	1f. Biological Hazards	1f. See Biological Hazards AHA, which must be used in conjunction with this AHA if applicable.	L
	1g. Pressurized cylinders – sudden release of contents.	1g. Periodic inspection of all pressurized cylinders by air monitoring team. Proper storage of cylinders in accordance with SOP.	L
2. Drum Transport:	2a. Vehicle and heavy equipment traffic in work area.	2a. Operation of heavy equipment in accordance with the SSHP. Be alert when working around heavy equipment. Use ground guide when backing vehicles and heavy equipment. Heavy equipment must be inspected	L
	2b. Noise.	2b. . If the heavy equipment and/or power tools used are louder than 85dB (A) then the appropriate hearing attenuation PPE must be worn. This could be ear plugs, ear muffs or both depending on the noise level. The site safety officer will evaluate the work area noise levels and prescribe the applicable hearing protection to be worn	L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Drum dolly and skid/steer loader or forklift with drum grappler. 2. Appropriate PPE for selection operation, at minimum – a. Long Sleeve Shirt b. Long Legged Pants c. Steel toed safety Work Boots d. Leather Gloves e. Safety Glasses, when required f. Hard Hat, g. Safety Vest when required h. Additional PPE (example hearing protection), as directed	Qualified Personnel 1. First Aid/CPR – UXOSO or site safety officer and one other individual. 2. Site Manager or SUXOS 3. All personnel operating heavy equipment will provide proof of competency (documentation of training or experience) to the UXOSO prior to operating the equipment. 4. The forklift operator must be certified as having been trained and evaluated in accordance with 29 CFR 1910.178. Training 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Enrolled in a medical monitoring program 7. Current occupational physical and physician's certificate in accordance with 29 CFR 1910.120(f)	1. Initial (Site Selection) – All PPE will be inspected by workers prior to use. 2. Daily – All machinery and equipment shall be inspected daily to ensure safe operating conditions. Inspections shall be performed by a competent person.

Training Requirements: Only qualified personnel will be allowed to operate drum dolly and skid/steer loader or forklift with drum grappler.

Training Acknowledgement:

Printed Name	Signature	Date

Activity Hazard Analysis (AHA)

Activity/Work Task: **Excavation Backfill**	Overall Risk Assessment Code (RAC) (Use highest code)	**L**

Project Location:

Contract Number:

Date Prepared: 2 March 2012

Prepared by (Name/Title): Joseph Kaputa/Construction Manager

Reviewed by (Name/Title): Ed Grunwald, CIH

Notes: (Field Notes, Review Comments, etc.)

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Job Steps	**Hazards**	**Controls**	**RAC**
1. General Backfill Activities	1a. Biological hazards	1a. SSHO will walk site and identify potentially hazardous areas and these will be identified in the daily tailgate briefing. Site personnel will wear protective clothing to prevent exposure to biological hazards such as poison ivy. Personnel will exercise caution when moving obstacles, items, etc., that could be homes to snakes, spiders, or other animals or insects.	**L**
	1b. Cold and Heat Stress Injuries	1b. SSHO will implement heat stress/cold injury control program (when daily temperature is predicted to be greater than 80ºF or less than 40ºF. SSHO will monitor weather conditions and stress symptoms in workers.	**L**
	1c. Noise	1c. SSHO will ensure that hearing protection is worn in hazardous noise areas (where shouting is required for face-to-face communication within three feet).	**L**
	1d Slip trip, fall Hazards	1d. SSHO will ensure that workers are aware of potential slippery surfaces and tripping hazards. Personnel will inform site manager or SSHO of any observed potential slip, trip, or fall hazards.	**L**

Job Steps	Hazards	Controls	RAC
2. Delivery and stockpiling of backfill material	2a Injury from vehicle and heavy equipment traffic in work area	2a. Personnel will remain out of the bucket swing radius and make sure they have the attention of the equipment operator and that the excavator's bucket is lowered to the ground prior to approaching the equipment. A ground guide will be used when backing. All vehicles will have back up alarms. Equipment will be immediately grounded if unauthorized personnel enter the work zone. If there are overhead power lines in the vicinity of the work area, a ground guide will be used to ensure that equipment maintains proper safe distances.	L
	2b Tools	2b Hand tools shall be used, inspected, and maintained in accordance with the manufacturer's instructions and recommendations and shall be used only for the purpose for which designed.	L
	2c. Traffic control	2c Certified traffic controllers will be present to control traffic during delivery of mechanized equipment to and from the site.	L
3. Mechanical placement of backfill	3a. Excavation and trenching	3a. It is not expected that workers will enter excavations greater than 4 feet deep. If this does become necessary, shoring will be installed or benching/sloping implemented in accordance with approved designs (kept on site) when excavation depth exceeds 4 feet. All water will be pumped from the excavation prior to worker entrance. Excavation will be inspected by the SSHO prior to entrance by workers. Proper ingress and egress will be provided.	L
	3b. Injury from vehicle and heavy equipment traffic in work area	3b. Personnel will remain out of the bucket swing radius and make sure they have the attention of the equipment operator and that the excavator's bucket is lowered to the ground prior to approaching the equipment. A ground guide will be used when backing. All vehicles will have back up alarms. Equipment will be immediately grounded if unauthorized personnel enter the work zone. If there are overhead power lines in the vicinity of the work area, a ground guide will be used to ensure that equipment maintains proper safe distances. Mechanized equipment will be operated by a qualified personnel (personnel with experience in the operation and inspection of the equipment).	L

4. Mechanical compaction of backfill	4a Excavation and trenching (cave-in)	4a It is not expected that workers will enter excavation greater than 4 feet deep. If this does become necessary, shoring will be installed or benching/sloping implemented in accordance with approved designs (kept on site) when excavation depth exceeds 4 feet. All water will be pumped from the excavation prior to worker entrance. Excavation will be inspected by the SSHO prior to entrance by workers. Proper ingress and egress will be provided	**L**
	4b Injury from vehicle and heavy equipment traffic in work area	4bPersonnel will remain out of the bucket swing radius and make sure they have the attention of the equipment operator and that the excavator’s bucket is lowered to the ground prior to approaching the equipment. A ground guide will be used when backing. All vehicles will have back up alarms. Equipment will be immediately grounded if unauthorized personnel enter the work zone. If there are overhead power lines in the vicinity of the work area, a ground guide will be used to ensure that equipment maintains proper safe distances. Mechanized equipment will be operated by qualified personnel.	**L**
	4c Injury from hand tool/power tool usage	4c. SSHO and Site Manager will ensure that all tools used on site are in proper working order and are in good condition. Use of hand tools/power tools will be monitored periodically by SSHO. Workers will inform supervisors if tools require repair or replacement and no damaged equipment will be used until repaired or replaced. Workers will ensure other personnel are clear of the swing arc of hand tools. Face shield, leather gloves, and/or chaps will be used as prescribed by the SSHO.	**L**

5. Refueling equipment	5a.Handling flammable liquid during fueling	5a. Gasoline will be stored in approved flammable liquid containers. Fueling will be carried out in areas free of combustible debris/vegetation. Fueling will not be performed in back of a pick-up truck with a bed liner. All engines will be turned off prior to fueling. Containers will be bonded and grounded during transfer of flammable liquids.	**L**

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Vehicles: excavator, loader, compactor 2. Hand tools (i.e., shovels, rakes) 3. Level D PPE (see Chapter 5 of the SSHP. 4. Face shield, leather gloves, and/or chaps as prescribed by the SSHO during use of hand/power tools	Qualified Personnel 1. 1st Aid/CPR – SSHO and one other individual. 2. 30-hr OSHA construction outreach (SSHO) 3. Excavation Competent person (Heavy equipment operator) Training 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour HAZWOPER and applicable 8 Hour refresher 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Flora/Fauna endangered/threatened 7. Daily safety and operational briefing 8. Site visitor training	1. Pre mobilization-before any mechanized equipment is placed in use it shall be inspected and tested IAW manufactuer's recommendations and shall be certified in writing by a competent person. 2. Daily-Workers will inspect PPE hand tools daily prior to use in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/ replacement. All safety guards on equipment will remain in place. If any safety device on equipment is missing, that piece of equipment will be placed out of service until it can be repaired/replaced. When personnel are in the excavation or are anticipated to enter the excavation the competent person will as a minimum inspect or survey the excavation prior to the start of work and after any hazard increasing event (i.e., rainstorm). All mechanized equipment will be inspected daily to ensure safe operating condition. If equipment is found to be unsafe it will be taken out of service until repaired. 3. Weekly- first aid kits and fire extinguishers will be inspected weekly by the SSHO.

raining Acknowledgement:

Printed Name	Signature	Date

Activity Hazard Analysis (AHA)

Activity/Work Task: **EXPLOSIVE STORAGE AND TRANSPORTATION (ESAT) OPERATIONS**	Overall Risk Assessment Code (RAC) (Use highest code): **M**
Project Location:	
Contract Number:	
Date Prepared: 29 DECEMBER 2011	
Prepared by (Name/Title): Michael E. Short/Technical &Ops. Dir	
Reviewed by (Name/Title): Ed Grunwald, CIH	
Notes: (Field Notes, Review Comments, etc.)	

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

	RAC Chart
"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.	**E = Extremely High Risk**
"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible	**H = High Risk**
Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.	**M = Moderate Risk** **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. Establish location for desired work area to conduct operations, to include: a. Establish Explosive Storage Area (ESA) b. Receipt/Store/Issue/ Inventory/Restock Explosive material	1a. Slip, trip and fall.	1a. Worker awareness of potential slippery/uneven surfaces and tripping hazards plus inspection and policing of debris.	L
	1b. Biological hazards.	1b. See Biological Hazards AHA, which must be used in conjunction with this AHA if applicable.	L
	1c. Endangered/threatened flora/fauna.	1c. Conduct reconnaissance IAW approved WP and avoid endangered and threatened species if at all possible.	L
	1d. Cold/Heat Stress	1d. All site activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	L
	1e. Contact with chemical agent or other hazardous chemicals	1e. Personnel will don the proper PPE commensurate with the chemical hazard encountered and the work is being accomplished.	L

Job Steps	Hazards	Controls	RAC
	1f. Static Electricity (Grounding/Lightning Protection)	1f. The ESA bunker will be grounded IAW with the WP, SOP and DA Pam 385-64, Chapters 6 &12. Lightning protection for the ESA may be excluded as described in EM 1110-1-4009, Chapter 11. Electrical work and grounding to be performed by a certified electrician.	L
	1g. Fire/Explosion (Range Fires/ Unintentional Detonation/Compatibility of Explosives)	1g. Fire Protection Plan - The ESA area will require general and specific housekeeping on a routine basis to keep vegetation and flammable material maintained to a level that will not propagate the spread of a fire. All trash will be removed from the fencing around the ESA. The ESA will be protected by at least one 20A:BC fire extinguisher mounted on the outside of the ESA fence, near the entrance. All spark emitting devices, matches and flame producing items will not be carried into the ESA. These items will be left outside in a designated location. In the event of a fire at or near the ESA, all site personnel will be evacuated to a distance outside the approved Inhibited Building Distance (IBD), as stated in the approved Explosive Siting Plan (ESP). An honest attempt to fight the fire will be made with all available fire-fighting equipment on hand. A reasonable decision will be made by the UXOSO when these means have been exhausted and any further attempts will endanger site personnel. At no time will anyone attempt to evacuate the explosives from the ESA; should the bunker door be open at the time, it will be shut and secured if time permits. The UXOSO will notify meet the responding local fire department at the IBD boundary and brief them on the following: • Total Quantity of Explosives, by hazard classification, inside the ESA; • Time the fire started; and • The amount of time the bunkers have been engulfed by flames.	L
		1g. Unintentional Detonation - Establish clear and defined work areas/zones, such as Minimum Safe Distance (MSD) between teams and non-essential personnel. All MEC/UXO work ceases when unauthorized personnel enter into the work area.	L

Job Steps	Hazards	Controls	RAC
		1g. Explosive Compatibility - Explosive compatibility will be maintained in accordance with DA PAM 385-64; TM 9-1300-206; the ESP and SOP. In certain instances, it may be necessary to store incompatible items in the same magazine. If this should occur, a waiver will be requested IAW DOD 6055.09-M, and then a barricade, such as sandbags, within the magazine, will physically separate the incompatible items.	L
	1h. ESP Structure and Security	1h. Bunker Structure - Approved explosive storage facilities may be provided at the site, either by the U.S. Army Corps of Engineers (USACE) or by the installation. Parsons will use the existing magazines for explosive storage and comply with local storage criteria and procedures. If no explosives storage facilities are available, Parsons will:	L
		• Use approved BATF Type 2 structures; • Locate, install, and maintain the magazines to comply with the magazine criteria and quantity distance requirements established in DOD 6055.09-M, DOD Ammunition and Explosives Safety Standards; • Install sufficient magazines to comply with the explosive compatibility requirements, (i.e., bulk explosives, initiating explosives); • Establish security, such as fencing, to prevent unauthorized access and/or theft, as required.	RAC
		1h. Security - Appropriate fencing; hinges and hasps; keys and locks; key control; signage and placards and inspections (physical security) protection will be installed on all site(s), in accordance with AR 190-11, paragraph 5-3, the ESP and SOP. An emergency notification list containing the names, telephone numbers, and local addresses of the individuals to be notified in the event of an emergency, will be posted on the outside and inside of the magazine door. These individuals should be the same individuals authorized to sign for explosives, as well as the site manager and UXOSO.	

Job Steps	Hazards	Controls	
	1i. MEC/UXO Hazards	1i. If an MEC item is encountered alert the rest of the team and conduct an inspection of the item IAW the approved WP, SOP and EM 385-1-97.	M
	1j. Severe Weather (containing potential electrical charge)	1j. UXOSO will verify through local and national weather forecast agencies that an optimum time frame to complete all Explosive Storage and Transportation (ESAT) operations is in effect for the area. There will be no scheduled ESAT operations during weather conditions that pose static electrical charges, or minimize visibility.	L
	1k. Pinch and cut hazard from handling debris material.	1k. All UXO personnel will use good and serviceable leather gloves when handling potentially contaminated MPPEH/UXO and range-related debris.. Items have extremely sharp edges and surfaces that will cut and lacerate hands.	L
	1l. Vehicle and heavy equipment traffic in area.	1l. Be aware of any vehicles or heavy equipment in area and be certain to wear a hard hat, safety glasses and a high visibility safety vest when working around heavy equipment. Establish arm and hand signals or radio communication with the equipment operator and be certain the equipment is grounded and shut off when within the arc of the boom, shovel, etc. Use of "ground guides" will be used, when vehicle(s) are not equipped with an audible warning device and/or has an obstructed view. When transporting equipment by trailers, the trailer will be "chocked" with approved devices when unhooked from the transporting vehicle. When attempting to hook onto the trailer, "ground guides" will not place any part of their body between the trailer and vehicle.	L
	1m. Noise in excess of OSHA standards	1m. If the heavy equipment and/or power tools used are louder than 85dB (A) then the appropriate hearing attenuation PPE must be worn. This could be ear plugs, ear muffs or both depending on the noise level. The site safety officer will measure the noise level of the equipment and prescribe the applicable noise attenuation PPE to be worn.	L
	1n. Lifting hazards.	1n. Ensure that you, and if there is another individual assisting you, both have solid footing, leather work gloves and use the proper lifting technique, bend at the knees keeping your back as straight as possible and lift with your knees, not your back. Ensure you have good visibility in the direction you are carrying an item. Do not attempt to carry anything by yourself in excess of 50 lbs. or any item that blocks your visibility or is cumbersome to carry alone.	L

Job Steps	Hazards	Controls	RAC
2. Transport Explosive from Storage Area to Disposal Site and return of un-used Explosives to include:	2. The Hazards itemized in Hazard 1 are applicable to Hazard 2, with the exception of Hazard 2f; 2h; 2i and 2n. In addition hazard 2a and 2b are added.	2. The Controls itemized in Control 1 are also applicable to Control 2. 2a is changed as follows:	
a. Explosive Transportation Route	2a. Contact with chemical agent or other hazardous chemicals	2a. UXO Workers will don the nitrile gloves, as an inner and outer liner to the issued leather gloves, when handling raw and bulk explosives.	L
b. On Call Provider c. Project End Use Disposal	2b. Transportation of Explosives (Unintentional Detonation)	2b. On Site - UXOSO will develop an Explosive Transportation Route to ensure that non-essential personnel; buildings, roads and railways are not exposed to potential hazards, when transporting explosives from the ESA to the disposal site. Explosive Vehicle will be inspected and maintained IAW DA Pam 385-64, Chapter 7 and SOP. This will include – • One 20A:BC or two 10A:BC rated fire extinguishers (**do not** use the extinguisher located at the ESA); • Flame Retardant Tarpaulin to cover explosives; • Approved Electro-Magnetic Radiation (EMR) container for initiators; • Appropriate Signage/Placards; and, • Non-conductive bed liner (plywood sheet) for transport vehicle	L
		2b. Off Site - Certain or remote sites may have established the use of an "On-Call" explosives provider, as a sub-contractor, listed in the Explosive Management Plan (EMP). UXOSO will ensure that the provider transports, placards and conforms to the required Department of Transportation (DOT) regulations, prior to arrival on site. The "On Call" supplier will be briefed on the Explosive Transportation Route by the UXOSO. If the state requires a licensed Blaster, a site UXO Tech III will be licensed to serve in that capacity and sign receipt of all requested explosives from the "On Call" supplier. The "On Call" supplier will remain on site, but outside the Maximum Generated Fragmentation Distance (MGFD), until all disposal operations are completed.	L
	2c. Intentional Detonation	2c. The detonation team leader will maintain control of the initiating device i.e., blasting machine or blasting machine handle of NonEl initiator at all times. Non-essential personnel will be evacuated, access routes to the demolition site guarded, required entities notified. The demolition team will follow the Demolition SOP, and TM 60A-1-1-31.	M

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Hand and Power Tools 2. Appropriate PPE for selection operation, at minimum – a. Long Sleeve Shirt b. Long Legged Pants c. Sturdy Work Boots d. Leather Gloves e. Safety Glasses, when required f. Hard Hat, when required g. Safety Vest, when required h. Additional PPE to conduct other operations, as directed 3. Heavy Equipment, as needed or specified by WP or SSHP 4. Additional equipment to conduct other operations, that may include – a. One 20A:BC or two 10A:BC Fire Extinguishers for Explosives Transport Vehicle; b. Flame Retardant Tarpaulin to cover explosives; c. Non-conductive material (plywood lining) for transport vehicle; d. EMR-approved Container for initiators; 5. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable A:BC rated 2.5lb or larger fire extinguisher 6. Other vehicles designated as personnel conveyance will be equipped with – a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing 7. Two forms of Communications a. Project issued Radio b. Project or personal Cellular Phone	Qualified Personnel 1. First Aid/CPR – UXOSO or site safety officer and one other individual. 2. Site Manager or SUXOS 3. All personnel operating heavy equipment will provide proof of competency (documentation of training or experience) to the UXOSO prior to operating the equipment. 4. UXO Personnel must be certified as an EOD-trained and must have the necessary experience for the position filled. 5. UXO Tech III, serving as a Licensed Blaster, if required by state. 6. Electrical work to be performed by a Certified Electrician. Training 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Flora/Fauna endangered/threatened 7. Daily safety and operational briefing 8. Site visitor training	1. Initial (Site Selection) – General inspection of assembly area. Equipment will be inspected daily by operator prior to use in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. 2. Daily- Housekeeping of assembly and work areas for debris and hazards. UXOSO will perform audits and spot checks to verify compliance. UXOSO will update site's MSDS files on all items, supplies and material brought onto site. Periodic communication checks between Field Office or UXOSO and Field Crews, as deemed necessary, to ensure crew's status and relay emergency information. Field Office and UXOSO will maintain a telephonic roster of all site personnel's cellular phone numbers to ensure two forms of communications. In the event that a field crew fails to make a communications check, they will cease operations and relocate to re-establish communications link with the Field Office or UXOSO. 3. Weekly – First Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment. 4. Final (Site Departure) – Inspection of the entire area to ensure the site is left in the same or better than when we arrived.

Training Requirements: Only qualified personnel will be allowed to operate hand and power tools.

Training Acknowledgement:

Printed Name	Signature	Date

Activity Hazard Analysis (AHA)

Activity/Work Task: **FUELING OPERATIONS**	Overall Risk Assessment Code (RAC) (Use highest code)	**L**

Project Location:

Contract Number:

Date Prepared: 29 DECEMBER 2011

Prepared by (Name/Title): Michael E. Short/Technical &Ops. Dir

Reviewed by (Name/Title): Ed Grunwald, CIH

Notes: (Field Notes, Review Comments, etc.)

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

	RAC Chart
"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.	
"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible	**E = Extremely High Risk** **H = High Risk**
Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.	**M = Moderate Risk** **L = Low Risk**

Job Steps	**Hazards**	**Controls**	**RAC**
1. General Fueling Operations	1a. Slip, trip and fall.	1a. Worker awareness of potential slippery/uneven surfaces and tripping hazards plus inspection and policing of debris.	**L**
	1b.Biological hazards.	1b. See Biological Hazards AHA, which must be used in conjunction with this AHA if applicable.	**L**
	1c. Endangered/threatened flora/fauna.	1c. Conduct reconnaissance IAW approved WP and avoid endangered/threatened species if at all possible.	**L**
	1d. Fire/Explosion	1d. Smoking or open flames within 50 feet of where flammables are being used or transferred or where equipment is being fueled is prohibited. Each service or fueling area will have at least one 20-B:C rated fire extinguisher within 75 feet of each pump. Clearly identified and easily accessible Emergency Cut-Off switch(es) will be installed and clearly marked at a location remote from dispensing devices to shut off the power to all dispensing devices in an emergency. Equipment using flammable liquid fuel shall be shut down during refueling, servicing, or maintenance. Those vehicles or equipment without an internal grounding system will be bonded between the fueling system and themselves, prior to dispensing fuel.	**L**

Job Steps	Hazards	Controls	RAC
	1e. Contact with chemical agent or other hazardous chemicals	1e. Operators need to be aware of potential exposure to corrosive and/or flammable liquids when conducting vehicle fueling. Operators will not eat, drink or smoke when performing these tasks. Any visible leaking will be immediately reported to their supervisor. Select appropriate PPE, based on task.	L
	1f. Vehicle and heavy equipment traffic in area.	1f. Be aware of any vehicles or heavy equipment in area and be certain to wear a hard hat, safety glasses and a high visibility safety vest when working around heavy equipment.	L
	1g. Pinch hazard from assembly and placement of equipment	1g. Wear leather gloves and place hands on smooth surfaces checking the area on which you are going to place your hands for pinch areas as well.	L
	1h. Cold/Heat Stress	1h. All site activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. OSHA Approved Fuel Cans; Approved Fire Extinguishers; Bonding Strap; Funnels; Drip Pans, and Absorbent Material 2. Hand Tools 3. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable A:BC rated 2.5lb or larger fire extinguisher 4. Other vehicles designated as personnel conveyance will be equipped with – a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing 5. Two forms of Communications a. Project issued Radio b. Project supplied or personal Cellular Phone	Qualified Personnel 1. First Aid/CPR – UXOSO or site safety officer and one other individual. 2. Site Manager or SUXOS 3. UXO Personnel must be certified as an EOD-trained and must have the necessary experience for the position filled. Training 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Flora/Fauna endangered/threatened 7. Daily safety and operational briefing 8. Site visitor training	1. Initial (Site Selection) – General inspection of assembly area. Equipment will be inspected daily by operator prior to use in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. 2. Daily- Housekeeping of assembly and work areas for debris and hazards. UXOSO will perform audits and spot checks to verify compliance. UXOSO will update site's MSDS files on all items, supplies and material brought onto site. Periodic communication checks between Field Office or UXOSO and Field Crews, as deemed necessary, to ensure crew's status and relay emergency information. Field Office and UXOSO will maintain a telephonic roster of all site personnel's cellular phone numbers to ensure two form s of communications. In the event that a field crew fails to make a communications check, they will cease operations or relocate to re-establish communications link with the Field Office or UXOSO. 3. Weekly – First Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment. 4. Final (Site Departure) – Inspection of the entire area to ensure the site is left in the same or better than when we arrived.

Training Requirements: Only qualified personnel will be allowed to use OSHA approved fuel cans, Approved fire extinguishers, bonding straps, funnels, drip pans, and absorbent materials.

Training Acknowledgement:

Printed Name	Signature	Date

Activity Hazard Analysis (AHA)

Activity/Work Task: **GENERAL SITE CONSTRUCTION OPERATIONS**	Overall Risk Assessment Code (RAC) (Use highest code) **M**
Project Location:	
Contract Number:	
Date Prepared: 29 DECEMBER 2011	
Prepared by (Name/Title): Michael E. Short/Technical &Ops. Dir	
Reviewed by (Name/Title): Ed Grunwald, CIH	

Notes: (Field Notes, Review Comments, etc.)

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Marginal	**H**	**M**	**M**	**L**	**L**
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Job Steps	**Hazards**	**Controls**	**RAC**
1. General Operations, to include: a. Site Preparation b. Proper Tool Selection c. Equipment Load-Out	1a. Slip, trip and fall.	1a. Worker awareness of potential slippery/uneven surfaces and tripping hazards plus inspection and policing of debris.	**L**
	1b.Biological hazards.	1b. See Biological Hazards AHA, which must be used in conjunction with this AHA if applicable.	**L**
	1c. Endangered/threatened flora/fauna.	1c. Conduct reconnaissance IAW approved WP and avoid endangered and threatened species if at all possible.	**L**
	1d. Cold/Heat Stress	1d. All site activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	**L**
	1e.Inspect Tools for Proper Guards and Electrical Cords (Failure of Integral Safety Equipment)	1e. All portable power tools will be inspected, and maintained in accordance with manufacturer's instructions and recommendations, and will be only used for the purpose for which designed. Portable power tools will be inspected, tested, and determined to be in safe operating condition before use. Portable power tools will be in good repair and with all required safety devices installed and properly adjusted. Portable power tools having defects that will impair	**L**

Job Steps	Hazards	Controls	RAC
		their strength or render them unsafe will be removed from service. Portable power tools with guards will be equipped with such guards; ensure guards are in place and operational at pinch and nip points and control loose clothing, gloves, jewelry and hair.	
2. General Construction, to include: a. Normal Operations b. Portable Ladders and Lifts c. Hoisting & Rigging	2. The Hazards itemized in Hazard 1 are applicable to Hazard 2. In addition hazard 2a, 2b, 2c, 2d; 2e; 2f; 2g; 2h; 2i; 2j; 2k; 2l and 2m are added.	2. The Controls itemized in Control 1 are also applicable to Control 2.	
	2a. Electrical Shock.	2a. Most electrical hand tools are battery operated and require recharging at the end of each day's operation and some require a supplied electrical source, such as a generator or "hard wired" connections. Electrical hook-ups and installation, if required, will be conducted by a certified electrician, local electrical company or equipment company. In the event there is an electrical problem that cannot be corrected by merely un-plugging and re-plugging an item or replacing a blown fuse, then an electrician will be contacted to correct the problem. All electrical appliances, extension cords and equipment will have a third prong for proper grounding; all electrical outlets used on project sites will have three pronged receptacles and meet the requirements of EM 385-1-1, Chapter 11. GFCIs will be used for all outdoor connections.	L
	2b. Airborne Dust/Particulates	2b. Project CIH will establish Respiratory Protection Plan; ensure local ventilation/engineering controls are in place. UXOSO will monitor exposure and area, if additional respiratory guidance is needed.	L
	2c. Eye/Foot and Hand Hazards	2c. Eye/Face Protection – Safety glasses with side shields (ANZI Z87.1); Appropriate footwear as required, but safety toed footwear may be required depending on task; Sturdy leather work gloves as required	L
	2d. Ergonomic Hazards	2d. Reduce bending, twisting, and kneeling, by using alternating work, rotating workers and periodic stretching break to reduce static or awkward postures. Use team lifting, and lifting aids to minimize lifting weights over 25-lbs above the shoulders, below the knees, or at arm length	L

Job Steps	Hazards	Controls	RAC
	2e. Pinch and cut hazard from handling sharp scrap material.	2e. Operators will use good and serviceable leather gloves when performing service checks. Potential pinch and cut hazards when performing vehicle inspections inside the engine compartment; around doors; latches and lift gates.	L
	2f. Falls from height	2f. Visually inspect ladders and lifts before use; select proper type; protect against exposure to moving traffic, equipment and access doorways; conduct good housekeeping around the top and base of the ladder, and always ensure proper placement, lashing or holding when on slippery surfaces. Use hoists/ropes to bring tools and equipment up to elevated work surfaces. Have someone hold ladder if it will provide more support. Use barricades or signs to warn of presence of ladder. Do not position ladder in front of closed door that can open into the ladder.	L
	2g. Power and Pneumatic Tools (All types)	2g. When operating power tools they will be handled, operated and maintained IAW the manufactures instructions, the approved WP and any applicable SOPs. The power tool will be inspected prior to use to ensure that all of the hand and safety guards are in place and that the chain, if present, is properly tightened and that the tool is otherwise in good working order. Depending on the power tool PPE will vary and it too must be serviceable, operable and free of any defect. PPE will be worn IAW the approved WP and inspected by the user prior to donning. Hand and power tool use will be IAW EM 385-1-1, Chapter 13. Refer to Portable Hand Held Power Tools Activity Hazard Analysis (AHA).	L
	2h. Hoisting and Rigging of heavy equipment. (Incorrect rigging practice resulting in load falling)	2h. Only use equipment and lift loads that are approved by Site Lift Plan (SLP) (Refer to Corporate Health and Safety Manual, Chapter 26). Obtain CIH approval before starting the rigging job. Do not alter any engineered lift or SLP. Keep within load limit of equipment and know the weight of your load. Inspect equipment (including slings, shackles, etc.) before use.	L
	2i. MEC/UXO Hazards	2i. If an MEC item is encountered alert the rest of the team and conduct an inspection of the item IAW the approved WP, SOP and EM 385-1-97.	M

Job Steps	Hazards	Controls	RAC
	2j. Noise in excess of OSHA standards	2j. If the heavy equipment and/or power tools used are louder than 85dB (A) then the appropriate hearing attenuation PPE must be worn. This could be ear plugs, ear muffs or both depending on the noise level. The site safety officer will measure the noise level of the equipment and prescribe the applicable noise attenuation PPE to be worn.	L
	2k. Vehicle and heavy equipment traffic in area.	2k. Be aware of any vehicles or heavy equipment in area and be certain to wear a hard hat, safety glasses and a high visibility safety vest when working around heavy equipment. Establish arm and hand signals or radio communication with the equipment operator and be certain the equipment is grounded and shut off when within the arc of the boom, shovel, etc.	L
	2l. Towing Hazards	2l. When transporting tools and required equipment by trailers, the trailer will be “chocked” with approved devices when unhooked from the transporting vehicle. Use of “ground guides” will be used, when vehicle(s) are not equipped with an audible warning device and/or has an obstructed view. When attempting to hook onto the trailer, “ground guides” will not place any part of between the trailer and vehicle.	L
	2m. Pressurized cylinders – sudden release of contents; fire, explosion ; burns and asphyxiation	2m. Assign users/handlers who are trained in compressed gas safety; ensure pressure relief valves are in place; isolate from vehicular traffic; transport in a safe manner, and secure and store all gases, based on compatibility. Periodic inspection of all pressurized cylinders by operator. Proper storage of cylinders in accordance with SOPs.	L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Hand and Power Tools 2. Appropriate PPE for selection operation, at minimum – a. Long Sleeve Shirt b. Long Legged Pants c. Sturdy Work Boots d. Leather Gloves e. Safety Glasses, when required f. Hard Hat, when required g. Safety Vest, when required h. Steel-toed boots, as directed i. Additional PPE to conduct other operations, as directed 3. Heavy Equipment, as needed or specified by WP or SSHP 4. Additional equipment to conduct other operations, that may include – a. Compressed Gas Cylinders; b. Nail Guns; 5. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable A:BC rated 2.5lb or larger fire extinguisher 6. Other vehicles designated as personnel conveyance will be equipped with – a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing 7. Two forms of Communications a. Project issued Radio b. Project or personal Cellular Phone	Qualified Personnel 1. First Aid/CPR – UXOSO or site safety officer and one other individual. 2. Site Manager or SUXOS 3. Personnel operating any powered tool will provide proof of competency (documentation of training or experience) to the UXOSO prior to operating the equipment. 5. UXO Personnel must be certified as an EOD-trained and must have the necessary experience for the position filled. Training 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Flora/Fauna endangered/threatened 7. Daily safety and operational briefing 8. Site visitor training	1. Initial (Site Selection) – General inspection of assembly area. Equipment will be inspected daily by operator prior to use in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. 2. Daily- Housekeeping of assembly and work areas for debris and hazards. UXOSO will perform audits and spot checks to verify compliance. UXOSO will update site's MSDS files on all items, supplies and material brought onto site. Periodic communication checks between Field Office or UXOSO and Field Crews, as deemed necessary, to ensure crew's status and relay emergency information. Field Office and UXOSO will maintain a telephonic roster of all site personnel's cellular phone numbers to ensure two forms of communications. In the event that a field crew fails to make a communications check, they will cease operations and relocate to re-establish communications link with the Field Office or UXOSO. 3. Weekly – First Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment. 4. Final (Site Departure) – Inspection of the entire area to ensure the site is left in the same or better than when we arrived.

Training Requirements: Only qualified personnel will be allowed to operate hand and power tools.

Training Acknowledgement:

Printed Name	Signature	Date

Activity Hazard Analysis (AHA)

Activity/Work Task: **INTRUSIVE INVESTIGATIONS IN CONVENTIONAL/CWM/HTRW OPERATIONS, TO INCLUDE CONCRETE CORING**	Overall Risk Assessment Code (RAC) (Use highest code) **M**
Project Location:	
Contract Number:	
Date Prepared: 29 DECEMBER 2011	
Prepared by (Name/Title): Michael E. Short/Technical &Ops. Dir	
Reviewed by (Name/Title): Ed Grunwald, CIH	
Notes: (Field Notes, Review Comments, etc.)	

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

	RAC Chart
"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.	**E = Extremely High Risk**
"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible	**H = High Risk**
Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.	**M = Moderate Risk** **L = Low Risk**

Job Steps	**Hazards**	**Controls**	**RAC**
1. Establish location for desired work area to conduct operations, to include: a. Establish Work Area Control Zones in a Conventional MEC/UXO Environment b. Manual Excavation c. Mechanical Excavation d. Ordnance Identification e. Disposal f. Munitions Debris Segregation	1a. Slip, trip and fall.	1a. Worker awareness of potential slippery/uneven surfaces and tripping hazards plus inspection and policing of debris.	**L**
	1b.Biological hazards.	1b. See Biological Hazards AHA, which must be used in conjunction with this AHA if applicable.	**L**
	1c. Endangered/threatened flora/fauna.	1c. Conduct reconnaissance IAW approved WP and avoid endangered and threatened species if at all possible.	**L**
	1d. Cold/Heat Stress	1d. All site activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	**L**
	1e. Contact with chemical agent or other hazardous chemicals	1e. Personnel will don the proper PPE commensurate with the chemical hazard encountered and the work is being accomplished. The breathing zone will be continually monitored by the Photo Ionizing Detector (PID). During intrusive operations, excavations will be periodically monitored by passing the PID over the hole.	**L**

Job Steps	Hazards	Controls	RAC
	1f. MEC/UXO Hazards	1f. Inspect the area for the presence of UXO using a magnetometer to assist in finding items in brush and dense vegetation. If an MEC item is encountered alert the rest of the team and conduct an inspection of the item IAW the approved WP, SOP and EM 385-1-97.	M
	1g. Lifting hazards.	1g. Ensure that you, and if there is another individual assisting you, both have solid footing, leather work gloves and use the proper lifting technique, bend at the knees keeping your back as straight as possible and lift with your knees, not your back. Ensure you have good visibility in the direction you are carrying an item. Do not attempt to carry anything by yourself in excess of 50 lbs. or any item that blocks your visibility or is cumbersome to carry alone.	L
	1h. Hand and Power tool operation	1h. When operating power tools they will be handled, operated and maintained IAW the manufactures instructions, the approved WP and any applicable SOPs. The power tool will be inspected prior to use to ensure that all of the hand and safety guards are in place and that the chain, if present, is properly tightened and that the tool is otherwise in good working order. Depending on the power tool PPE will vary and it too must be serviceable, operable and free of any defect. PPE will be worn IAW the approved WP and inspected by the user prior to donning. Hand and power tool use will be IAW EM 385-1-1, Chapter 13.	L
	1i. Vehicle and heavy equipment traffic in area.	1i. Be aware of any vehicles or heavy equipment in area and be certain to wear a hard hat, safety glasses and a high visibility safety vest when working around heavy equipment. Establish arm and hand signals or radio communication with the equipment operator and be certain the equipment is grounded and shut off when within the arc of the boom, shovel, etc.	L
	1j. Pinch and cut hazard from handling sharp scrap material.	1j. Wear all required PPE, ensure that it is serviceable, and check hand placement to ensure there are no sharp surfaces or pinch points.	L
	1k. Unintentional Detonation	1k. Establish clear and defined work areas/zones, such as Minimum Safe Distance (MSD) between teams and non-essential personnel. All MEC/UXO work ceases when unauthorized personnel enter into the work area.	M

Job Steps	Hazards	Controls	RAC
	1l. Noise in excess of OSHA standards	1l. If the heavy equipment and/or power tools used are louder than 85dB (A) then the appropriate hearing attenuation PPE must be worn. This could be ear plugs, ear muffs or both depending on the noise level. The site safety officer will measure the noise level of the equipment and prescribe the applicable noise attenuation PPE to be worn.	L
	1m. Underground Utilities	1m. The local utility locating hotline will be contacted to identify the locations of buried utilities before subsurface activities are allowed to commence.	L
	1n. Fire/Explosion	1n. Refueling of all vehicles, heavy equipment and other fueled equipment will be conducted in accordance with the SSHP, applicable SOPs and EM 385-1-1, Chapter 18. Proper fire extinguishers will be on site and serviceable. There will be no “Hot Fueling” authorized at any time.	L
	1o. Confined Space – Cave In/Entrapment	1o. Any excavation deeper than 4ft are classified as confined spaces (non-permit required). Competent Soil Person (UXOSO) will inspect the excavation daily and periodically to ensure engineering controls are adequate and working. Engineering controls are Sloping, Benching and Shoring. No work will be allowed in an excavation that has standing water. The water will be removed and re-entry will only be allowed after the Competent Person inspects the excavation site. Egress points are placed no further than 25ft from any workers. If ladders are used, they must – a. Extend from the floor surface of the excavation and extend a minimum of 3ft beyond surface level of the excavation b. Be clear of all equipment and engineering controls for workers to use c. Upon entry into the excavation, be OSHA rated and support the worker’s weight to include tools and equipment	L

Job Steps	Hazards	Controls	RAC
2. Conduct Operations in a CWM Environment –	2. The Hazards itemized in Hazard 1 are applicable to Hazard 2. In addition hazard 2b is added.	2. The Controls itemized in Control 1 are also applicable to Control 2. 2a is changed as follows:	
a. Establish Work Area Control Zones b. Manual Excavation c. Mechanical Excavation d. Ordnance Identification	2a. Contact with chemical agent or other hazardous chemicals.	2a. Monitoring for CA and VOCs during this operation is required. The breathing zone will be continually monitored by the Photo Ionizing Detector (PID) and appropriate CA Air Monitoring devices (Refer to ECBC Plan contained in WP). Personnel will don the proper PPE commensurate with the chemical hazard encountered and the work is being accomplished.	L
e. Processing of RCW Material; Personnel and Equipment f. Packaging	2b. Pressurized cylinders – sudden release of contents	2b. Periodic inspection of all pressurized cylinders by field crew. Proper storage of cylinders in accordance with SOPs and EM 385-1-1, Chapter 20.	L
3. Conduct Operations in a HTRW Environment -	3. The Hazards itemized in Hazards 1 and 2 are applicable to Hazard 3.	3. The Controls itemized in Controls 1 and 2 are also applicable to Control 3. 3a is changed as follows:	
a. Establish Work Area Control Zones b. Manual Excavation c. Mechanical Excavation d. Ordnance Identification e. Processing of HTRW Material; Personnel and Equipment f. Packaging	3a. Contact with chemical agent or other hazardous chemicals.	3a. Monitoring for VOCs and identified hazardous emissions during this operation is required. The breathing zone will be continually monitored by the Photo Ionizing Detector (PID) and appropriate Air Monitoring devices, IAW WP and SSHP. Personnel will don the proper PPE commensurate with the chemical hazard encountered and the work is being accomplished.	L

Job Steps	Hazards	Controls	RAC
4. Concrete Coring in selected environment – a. Establish Work Area Control Zones b. Mechanical Excavation c. Ordnance Identification d. Processing of RCW Material; Personnel and Equipment e. Soil Sampling for Chemical Agent (CA) or Agent Breakdown Products (APB) f. Load soils and material into drums	4. The Hazards itemized in Hazards 1, 2, and 3 are applicable to Hazard 4. 4a. Contact with chemical agent or other hazardous chemicals. 4b. Hand and Power tool operation. 4c. Pinch and cut hazard from handling sharp scrap material.	4. The Controls itemized in Controls 1, 2, and 3 are also applicable to Control 4. 4a; 4b and 4c are changed as follows: 4a. To minimize inhalation of crystalline silica dust, engineering controls will be implemented (wetting the coring surface). Protective clothing such as gloves should be worn during operation of the machinery. In addition, eye protection should be worn to protect the operator from pieces of concrete, silica and rocks that may become airborne during coring. Additionally, during concrete coring activities, an N95 dust mask will be worn by the machine operator. 4b. Since a water-cooled concrete corer will be used; a potential electrical hazard could exist. Site personnel should ensure that power cords are connected to GFCI. 4c. Same as 1j above. The cutting blade of the concrete corer presents a cutting hazard. Site personnel should take care to keep loose clothing and fingers away from the blade when operational.	**L** **L** **L**

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Air Monitoring Equipment; Pumps; Stands 2. Hand and Power Tools 3. Appropriate PPE for selection operation, at minimum – a. Long Sleeve Shirt b. Long Legged Pants c. Sturdy Work Boots d. Leather Gloves e. Safety Glasses, when required f. Hard Hat, when required g. Safety Vest, when required h. Additional PPE to conduct other operations, as directed 4. Heavy Equipment, as needed or specified by WP or SSHP 5. Additional equipment to conduct other operations, that may include – a. Packaging Supplies for RCWM/HTW items b. 55-gal Drums for Munitions Debris collection c. 6-mil plastic bags and sheeting 6. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable A:BC rated 2.5lb or larger fire extinguisher 7. Other vehicles designated as personnel conveyance will be equipped with – a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing 8. Two forms of Communications a. Project issued Radio b. Project supplied or personal Cellular Phone	<u>Qualified Personnel</u> 1. 1st Aid/CPR – UXOSO or site safety officer and one other individual. 2. Site Manager or SUXOS 3. All personnel operating heavy equipment will provide proof of competency (documentation of training or experience) to the UXOSO prior to operating the equipment. 4. All personnel involved in this operation that are required to wear Self-Contained Breathing Apparatus (SCBA) or a full-face Air Purifying Respirator (APR) will be certified under 29 CFR1910.134 5. UXO Personnel must be certified as an EOD-trained and must have the necessary experience for the position filled. 6. Competent Person (UXOSO) for Soils. <u>Training</u> 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Flora/Fauna endangered/threatened 7. Daily safety and operational briefing 8. Site visitor training	<u>1. Initial (Site Selection)</u> – General inspection of assembly area. Equipment will be inspected daily by operator prior to use in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. <u>2. Daily</u>- Housekeeping of assembly and work areas for debris and hazards. UXOSO will perform audits and spot checks to verify compliance. UXOSO will update site's MSDS files on all items, supplies and material brought onto site. Periodic communication checks between Field Office or UXOSO and Field Crews, as deemed necessary, to ensure crew's status and relay emergency information. Field Office and UXOSO will maintain a telephonic roster of all site personnel's cellular phone numbers to ensure two forms of communications. In the event that a field crew fails to make a communications check, they will cease operations and relocate to re-establish communications link with the Field Office or UXOSO. Competent Soil Person (UXOSO) will inspect the excavation daily and periodically to ensure engineering controls are adequate and working. <u>3. Weekly</u> – 1st Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment. <u>4. Final (Site Departure)</u> – Inspection of the entire area to ensure the site is left in the same or better than when we arrived.

Training Requirements: Only qualified personnel will be allowed to operate air monitoring equipment, pumps, stands, and hand and power tools.

Training Acknowledgement:

Printed Name	**Signature**	**Date**

Activity Hazard Analysis (AHA)

Activity/Work Task: **LAND SURVEYING**	Overall Risk Assessment Code (RAC) (Use highest code) **M**
Project Location:	
Contract Number:	
Date Prepared: 29 DECEMBER 2011	
Prepared by (Name/Title): Michael E. Short/Technical &Ops. Dir	
Reviewed by (Name/Title): Ed Grunwald, CIH	
Notes: (Field Notes, Review Comments, etc.)	

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

	RAC Chart
"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.	
"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible	**E = Extremely High Risk** **H = High Risk**
Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.	**M = Moderate Risk** **L = Low Risk**

Job Steps	**Hazards**	**Controls**	**RAC**
1. Set Up and Calibrate equipment prior to use	1a. Slip, trip and fall.	1a. Worker awareness of potential slippery/uneven surfaces and tripping hazards plus inspection and policing of debris.	**L**
	1b.Biological hazards.	1b. See Biological Hazards AHA, which must be used in conjunction with this AHA if applicable.	**L**
	1c. Endangered/threatened flora/fauna.	1c. Conduct reconnaissance IAW approved WP and avoid endangered/threatened species if at all possible.	**L**
	1d. MEC/UXO Hazards.	1d. Observe the route of advance, foot placement and heed the magnetometer alarm. UXO personnel will precede the survey team where necessary to ensure UXO avoidance. If an MEC item is encountered alert the rest of the team and conduct an inspection of the item IAW the approved WP, SOP and EM 385-1-97.	**M**
	1e. Vehicle and heavy equipment traffic in area.	1e. Be aware of any vehicles or heavy equipment in area and be certain to wear a hard hat, safety glasses and a high visibility safety vest when working around heavy equipment.	**L**

Job Steps	Hazards	Controls	RAC
	1f. Pinch hazard from assembly and assembly/placement of equipment and vegetation	1f. Wear leather gloves and place hands on smooth surfaces checking the area on which you are going to place your hands. Be careful when removing cut brush and watch for sharp tree stumps.	L
	1g. Lifting hazards	1g. Ensure that you, and if there is another individual assisting you, both have solid footing, leather work gloves and use the proper lifting technique, bend at the knees keeping your back as straight as possible and lift with your knees, not your back. Ensure you have good visibility in the direction you are carrying an item. Do not attempt to carry anything by yourself in excess of 50 lbs. or any item that blocks your visibility or is cumbersome to carry alone.	L
	1h. Cold/Heat Stress	1h. All site activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	L
	1i. Use of hand and power tools .	1i. Use the proper tools for the specific job being performed. Be certain that the tools to be used are serviceable and free of slippery surfaces. Hand and power tool use will be IAW EM385-1-1, Chapter 13.	L
	1j. Fire/Explosion	1j. Battery Charging operations will be conducted IAW EM 385-1-1, Chapter 11. Appropriate PPE will be worn. Site vehicle battery will not be used as a back-up for this operation, because it may damage the system and strand field crew.	L
2. Locate grid corners and layout of surveyed area(s)	2. The Hazards itemized in Hazard 1 are applicable to Hazard 2, with the exception of 1j.	2. The Controls itemized in Control 1 are also applicable to Control 2.	L
3. Completion of Task and Tear Down or Relocate to another area	3. The Hazards itemized in Hazards 1 and 2 are applicable to Hazard 3, to include 1j.	3. The Controls itemized in Controls 1 and 2 are also applicable to Control 3.	L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. GPS Total Station and GPS 2. Wooden Stakes/Plastic Pin Flags 3. Hand Tools 4. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable A:BC rated 2.5lb or larger fire extinguisher 5. Other vehicles designated as personnel conveyance will be equipped with – a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing 6. Two forms of Communications a. Project issued Radio b. Project supplied or personal Cellular Phone 7. Battery and Battery Charger	Qualified Personnel 1. First Aid/CPR – UXOSO or site safety officer and one other individual. 2. Site Manager or SUXOS 3. Licensed Surveyor or trained GPS Total Station Operator 4. UXO Personnel must be certified as an EOD-trained and must have the necessary experience for the position filled. Training 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Flora/Fauna endangered/threatened 7. Daily safety and operational briefing 8. Site visitor training	1. Initial (Site Selection) – General inspection of assembly area. Equipment will be inspected daily by operator prior to use in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. 2. Daily- Housekeeping of assembly and work areas for debris and hazards. UXOSO will perform audits and spot checks to verify compliance. UXOSO will update site's MSDS files on all items, supplies and material brought onto site. Periodic communication checks between Field Office or UXOSO and Field Crews, as deemed necessary, to ensure crew's status and relay emergency information. Field Office and UXOSO will maintain a telephonic roster of all site personnel's cellular phone numbers to ensure two form s of communications. In the event that a field crew fails to make a communications check, they will cease operations or relocate to re-establish communications link with the Field Office or UXOSO. 3. Weekly – First Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment. 4. Final (Site Departure) – Inspection of the entire area to ensure the site is left in the same or better than when we arrived.

Training Requirements: Only qualified personnel will be allowed to operate GPS Total Station and GPS, wooden stakes/plastic pin flags, and hand tools.

Training Acknowledgement:

Printed Name **Signature** **Date**

Activity Hazard Analysis (AHA)

Activity/Work Task: **MOBILIZATION/DEMOBILIZATION**	Overall Risk Assessment Code (RAC) (Use highest code) **M**
Project Location:	
Contract Number:	
Date Prepared: 29 DECEMBER 2011	
Prepared by (Name/Title): Michael E. Short/Technical &Ops. Dir	
Reviewed by (Name/Title): Ed Grunwald, CIH	
Notes: (Field Notes, Review Comments, etc.)	

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

	RAC Chart
"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.	**E = Extremely High Risk**
"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible	**H = High Risk**
Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.	**M = Moderate Risk** **L = Low Risk**

Job Steps	**Hazards**	**Controls**	**RAC**
1. Site Set Up or Tear Down, to include install or dismantle – a. Trailers; Tents; CONEX containers, and storage sheds (Refer to ESAT AHA for Explosive Storage Magazines)	1a. Slip, trip and fall.	1a. Worker awareness of potential slippery surfaces and tripping hazards plus inspection and policing of debris.	**L**
	1b.Biological hazards.	1b. See Biological Hazards AHA, which must be used in conjunction with this AHA if applicable.	**L**
	1c. Endangered/threatened flora/fauna.	1c. Conduct reconnaissance IAW approved WP and avoid endangered/threatened species if at all possible.	**L**
	1d. Pinch hazard from assembly and placement of equipment.	1d. Wear leather gloves and place hands on smooth surfaces checking the area on which you are going to place your hands to avoid sharp areas and pinch points.	**L**
	1e. Lifting hazards.	1e. Ensure that you, and if there is another individual assisting you, both have solid footing, leather work gloves and use the proper lifting technique, bend at the knees keeping your back as straight as possible and lift with your knees, not your back. Ensure you have good visibility in the direction you are carrying an item. Do not attempt to carry anything by yourself in excess of 50 lbs. or any item that blocks your visibility or is cumbersome to carry alone.	**L**

Job Steps	Hazards	Controls	RAC
	1f. Cold/Heat Stress	1f. All site activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	L
	1g. Vehicle and heavy equipment traffic in area.	1g. Be aware of any vehicles or heavy equipment in area and be certain to wear a hard hat, safety glasses, and a high visibility safety vest when working around heavy equipment.	L
	1h. Use of hand and power tools	1h. Use the proper tools for the specific job being performed. Be certain that the tools to be used are serviceable and free of slippery surfaces. Hand and power tool use will be IAW EM 385-1-1, Chapter 13.	L
	1i. Fire/Explosion	1i. Refueling of all vehicles, heavy equipment and other fueled equipment will be conducted in accordance with the SSHP, applicable SOPs and EM 385-1-1, Chapter 18. Proper fire extinguishers will be on site and serviceable. There will be no “Hot Fueling” authorized at any time.	L
	1j. Noise in excess of OSHA standards	1j. If the heavy equipment and/or power tools used are louder than 85dB (A) then the appropriate hearing attenuation PPE must be worn. This could be ear plugs, ear muffs or both depending on the noise level. The site safety officer will measure the noise level of the equipment and prescribe the applicable noise attenuation PPE to be worn.	L
	1k. MEC/UXO Hazards	1k. Inspect the area for the presence of UXO using a magnetometer to assist in finding items in brush and dense vegetation. If an MEC item is encountered alert the rest of the team and conduct an inspection of the item IAW the approved WP, SOP and EM 385-1-97.	M
	1l. Collapse Hazards	1l. Secure all locking pins and bracing supports for portable shelters and tents IAW manufacturer’s manual. **Do not** use “make shift” replacement parts to secure braces or supports. Shelters and tents with missing parts will not be erected until authorized parts are on hand.	L
	1m. Inclement Weather (Winds; Snow; Ice and Dust)	1m. Personnel need to be aware of special precautions to safely erect or tear down portable shelters and tents in adverse weather conditions. Tents and collapsible shelters will be anchored to the ground to prevent being blown over in strong winds. Tents and collapsible shelters will be lowered and secured when wind speeds exceed 25mph.	L

Job Steps	Hazards	Controls	RAC
2. Establishment/Termination of services, to include - a. Electrical connections b. Water/Sewer/Portable Toilets	2. The Hazards listed in Hazard 1 are applicable to Hazard 2. Hazards 2a and 2b are added. 2a. Underground Utilities 2b. Electrical Shock.	2. The Controls that are listed in Controls 1 are applicable to Controls 2. Controls 2a and 2b are added. 2a. The local utility locating hotline will be contacted to identify the locations of buried utilities before subsurface activities are allowed to commence. 2b. Ensure that the electrical company or equipment company installs and connects any electrical lines. In the event there is an electrical problem that cannot be corrected by merely un-plugging and re-plugging an item or replacing a blown fuse then an electrician will be contacted to correct the problem. All electrical appliances, equipment will have a third prong for proper grounding and all electrical outlets will have three pronged receptacles and meet the requirements of EM 385-1-1, Chapter 11. GFCIs will be used for all outdoor connections.	L L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Hand and Power Tools 2. Appropriate PPE for selection operation, at minimum – a. Long Sleeve Shirt b. Long Legged Pants c. Sturdy Work Boots d. Leather Gloves e. Safety Glasses, when required f. Hard Hat, when required g. Safety Vest, when required h. Additional PPE to conduct other operations, as directed 3. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable A:BC rated 2.5lb or larger fire extinguisher 4. Other vehicles designated as personnel conveyance will be equipped with – a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing 5. Two forms of Communications a. Project issued Radio b. Project supplied or personal Cellular Phone	<u>Qualified Personnel</u> 1. First Aid/CPR – UXOSO or site safety officer and one other individual. 2. Site Manager or SUXOS 3. Certified Electrician 4. UXO Personnel must be certified as an EOD-trained and must have the necessary experience for the position filled. 5. All personnel operating any motorized equipment, to include ATVs or Segways will provide proof of competency (documentation of training or experience) to the UXOSO prior to operating the equipment. <u>Training</u> 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Flora/Fauna endangered/threatened 7. Daily safety and operational briefing 8. Site visitor training	<u>1. Initial (Site Selection)</u> – General inspection of assembly area. Equipment will be inspected daily by operator prior to use in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. <u>2. Daily</u>- Housekeeping of assembly and work areas for debris and hazards. UXOSO will perform audits and spot checks to verify compliance. UXOSO will update site's MSDS files on all items, supplies and material brought onto site. Periodic communication checks between Field Office or UXOSO and Field Crews, as deemed necessary, to ensure crew's status and relay emergency information. Field Office and UXOSO will maintain a telephonic roster of all site personnel's cellular phone numbers to ensure two form s of communications. In the event that a field crew fails to make a communications check, they will cease operations or relocate to re-establish communications link with the Field Office or UXOSO. <u>3. Weekly</u> – First Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment. <u>4. Final (Site Departure)</u> – Inspection of the entire area to ensure the site is left in the same or better than when we arrived.

Training Requirements: Only qualified personnel will be allowed to operate hand and power tools.

Training Acknowledgement:

Printed Name	**Signature**	**Date**

Activity Hazard Analysis (AHA)

Activity/Work Task: **MATERIAL POTENTIALLY PRESENTING AN EXPLOSIVE HAZARD (MPPEH) INSPECTION AND MUNITION DEBRIS (MD) TURN-IN**	Overall Risk Assessment Code (RAC) (Use highest code)	**H**

Project Location:

Contract Number:

Date Prepared: 29 DECEMBER 2011

Prepared by (Name/Title): Michael E. Short/Technical &Ops. Dir

Reviewed by (Name/Title): Ed Grunwald; CIH

Notes: (Field Notes, Review Comments, etc.)

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

	RAC Chart
"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.	**E = Extremely High Risk** **H = High Risk**
"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible	
Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.	**M = Moderate Risk** **L = Low Risk**

Job Steps	**Hazards**	**Controls**	**RAC**
1. Establish location for desired work area to conduct operations, to include: a. Establish Work Area Control Zones in a Conventional MEC/UXO Environment b. Debris Identification c. Munitions Debris Segregation	1a. Slip, trip and fall.	1a. Worker awareness of potential slippery surfaces and tripping hazards plus inspection and policing of debris.	**L**
	1b.Biological hazards.	1b. See Biological Hazards AHA, which must be used in conjunction with this AHA if applicable.	**L**
	1c. Endangered/threatened flora/fauna.	1c. Conduct reconnaissance IAW approved WP and avoid endangered and threatened species if at all possible.	**L**
	1d. Cold/Heat Stress	1d. All site activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	**L**
	1e. Contact with chemical agent or other hazardous chemicals	1e. Personnel will don the proper PPE commensurate with the chemical hazard encountered and the work that is being accomplished.	**L**

Job Steps	Hazards	Controls	RAC
	1f. MEC/UXO Hazards	1f. If an MEC item is encountered alert the rest of the team and conduct an inspection of the item IAW the approved WP, SOP and EM 385-1-97.	M
	1g. Unintentional Detonation	1g. Establish clear and defined work area zones, such as Minimum Safe Distance (MSD) between teams and non-essential personnel. All MEC/UXO work ceased when unauthorized personnel enter into the work area.	M
	1h. Severe Weather (containing potential electrical charge)	1h. UXOSO will verify through local and national weather forecast agencies that an optimum time frame to complete all MPPEH/MD operations is in effect for the area. There will be no scheduled MPPEH/MD operations during weather conditions that pose static electrical charges.	L
	1i. Pinch and cut hazard from handling sharp scrap material.	1i. All UXO personnel will use good and serviceable leather gloves when handling potentially contaminated MPPEH/UXO scrap. Items have extremely sharp edges and surfaces that will cut and lacerate hands.	L
	1j. Vehicle and heavy equipment traffic in area.	1j. Be aware of any vehicles or heavy equipment in area and be certain to wear a hard hat, safety glasses and a high visibility safety vest when working around heavy equipment. Establish arm and hand signals or radio communication with the equipment operator and be certain the equipment is grounded and shut off when within the arc of the boom, shovel, etc.	L
	1k. Noise in excess of OSHA standards	1k. If the heavy equipment and/or power tools used are louder than 85dB (A) then the appropriate hearing attenuation PPE must be worn. This could be ear plugs, ear muffs or both depending on the noise level. The site safety officer will measure the noise level of the equipment and prescribe the applicable noise attenuation PPE to be worn.	L
	1l. Lifting hazards.	1l. Ensure that you, and if there is another individual assisting you, both have solid footing, leather work gloves and use the proper lifting technique, bend at the knees keeping your back as straight as possible and lift with your knees, not your back. Ensure you have good visibility in the direction you are carrying an item. Do not attempt to carry anything by yourself in excess of 50 lbs. or any item that blocks your visibility or is cumbersome to carry alone.	L

Job Steps	Hazards	Controls	RAC
2. Segregate items for MPPEH assessment, to include: a. Ordnance Identification b. Disposal c. Munitions Debris Segregation	2. The Hazards itemized in Hazard 1 are applicable to Hazard 2.	2. The Controls itemized in Control 1 are also applicable to Control 2.	
	2a. Contact with chemical agent or other hazardous chemicals	2a. UXO Workers will don the proper PPE when handling potentially contaminated scrap metal. There is a potential of lead exposure from small arms constituents (.50cal and smaller),or possibly explosives remnants. Lead in this form, poses only a dermal contact threat to workers. UXOSO will provide proper decontamination for workers, when dealing with small arms constituents.	L
	2b. MEC/UXO Hazards	2b. MEC/UXO inspection involves a five step process once the item is identified as MEC/UXO, the item is destroyed, through explosive means. The MEC/UXO process is repeated and if confirmed as MPPEH, the item is staged for additional disposal. Only UXO technicians will handle MPPEH/UXO material.	H
3. Segregate metal scrap and items for MD assessment, to include: a. Ordnance Identification b. Disposal, if needed c. Munitions Debris Segregation	3. The Hazards itemized in Hazards 1 and 2 are applicable to Hazard 3. In addition hazard 3a; 3b; and 3c are added.	3. The Controls itemized in Controls 1 and 2 are also applicable to Control 3 with 3a; 3b; and 3c added.	
	3a. Contact with chemical agent or other hazardous chemicals	3a. MPPEH/MD workers need to be aware of potential exposure to corrosive and/or flammable liquids when conducting inspections of hard targets. Any visible leaking will be immediately reported and any spills (anti-freeze, oil, hydraulic fluids, etc.) will be cleaned up immediately. UXOSO will provide proper decontamination for workers. During cutting/brazing operations, certain debris may require an established Respiratory Protection Plan; ensure local ventilation/engineering controls are in place. UXOSO will monitor exposure and area, if additional respiratory guidance is needed. See Brazing, Cutting AHA.	L
	3b. Hand and Power tool operation	3b. When operating power tools they will be handled, operated and maintained IAW the manufactures instructions, the approved WP and any applicable SOPs. The power tool will be inspected prior to use to ensure that all of the hand and safety guards are in place and that the chain, if present, is properly tightened and that the tool is otherwise in good working order. Depending on the power tool PPE will vary and it too must be serviceable, operable and free of any defect. PPE will be worn IAW the approved WP and inspected by the user prior to donning. Hand and power tool use will be IAW EM 385-1-1, Chapter 13.	L

Job Steps	Hazards	Controls	RAC
	3c. Fire/Explosion	3c. Proper fire extinguishers will be on site and serviceable.	**L**
4. Segregate non UXO metal scrap and non metal scrap items assessment, to include: a. Munitions Debris Segregation b. Packaging	4. The Hazards itemized in Hazards 1, 2, and 3 are applicable to Hazard 4. 4a. Pinch and cut hazard from handling sharp scrap material.	4. The Controls itemized in Controls 1, 2, and 3 are also applicable to Control 4. 4a. All UXO personnel will use good and serviceable leather gloves when handling all types of range residue scrap. Items include barbed wire; damaged and cut tires and creosote treated timbers that have extremely sharp edges and surfaces which will cut and lacerate hands.	**L**

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Hand and Power Tools 2. Appropriate PPE for selection operation, at minimum – a. Long Sleeve Shirt b. Long Legged Pants c. Sturdy Work Boots d. Leather Gloves e. Safety Glasses, when required f. Hard Hat, when required g. Safety Vest, when required h. Additional PPE to conduct other operations, as directed 3. Heavy Equipment, as needed or specified by WP or SSHP 4. Additional equipment to conduct other operations, that may include – a. Cutting and Brazing material and equipment, to include PPE b. Hand Metal Saw/Wet Saw c. Wrenches and Vises d. MPPEH/MD Storage Bins/Drums 5. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable A:BC rated 2.5lb or larger fire extinguisher 6. Other vehicles designated as personnel conveyance will be equipped with – a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing 7. Two forms of Communications a. Project issued Radio b. Project supplied or personal Cellular Phone	<u>Qualified Personnel</u> 1. First Aid/CPR – UXOSO or site safety officer and one other individual. 2. Site Manager or SUXOS 3. All personnel operating heavy equipment will provide proof of competency (documentation of training or experience) to the UXOSO prior to operating the equipment. 4. UXO Personnel must be certified as an EOD-trained and must have the necessary experience for the position filled. 5. Certified Cutting/Brazing Operator <u>Training</u> 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Flora/Fauna endangered/threatened 7. Daily safety and operational briefing 8. Site visitor training	<u>1. Initial (Site Selection)</u> – General inspection of assembly area. Equipment will be inspected daily by operator prior to use in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. <u>2. Daily</u>- Housekeeping of assembly and work areas for debris and hazards. UXOSO will perform audits and spot checks to verify compliance. UXOSO will update site's MSDS files on all items, supplies and material brought onto site. Periodic communication checks between Field Office or UXOSO and Field Crews, as deemed necessary, to ensure crew's status and relay emergency information. Field Office and UXOSO will maintain a telephonic roster of all site personnel's cellular phone numbers to ensure two forms of communications. In the event that a field crew fails to make a communications check, they will cease operations and relocate to re-establish communications link with the Field Office or UXOSO. <u>3. Weekly</u> – First Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment. <u>4. Final (Site Departure)</u> – Inspection of the entire area to ensure the site is left in the same or better than when we arrived.

Training Requirements: Only qualified personnel will be allowed to operate hand and power tools.

Training Acknowledgement:

Printed Name	Signature	Date

Activity Hazard Analysis (AHA)

Activity/Work Task: **PORTABLE HAND HELD POWER TOOLS, SAWS, GRINDERS, AND PNEUMATIC TOOL OPERATIONS**	Overall Risk Assessment Code (RAC) (Use highest code)	**M**

Project Location:

Contract Number:

Date Prepared: 29 DECEMBER 2011

Prepared by (Name/Title): Michael E. Short/Technical &Ops. Dir

Reviewed by (Name/Title): Ed Grunwald, CIH

Notes: (Field Notes, Review Comments, etc.)

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart
E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Job Steps	Hazards	Controls	RAC
1. General Operations, to include: a. Site Preparation b. Proper Tool Selection c. Equipment Load-Out	1a. Slip, trip and fall.	1a. Worker awareness of potential slippery surfaces and tripping hazards plus inspection and policing of debris.	**L**
	1b.Biological hazards.	1b. See Biological Hazards AHA, which must be used in conjunction with this AHA if applicable.	**L**
	1c. Endangered/threatened flora/fauna.	1c. Conduct reconnaissance IAW approved WP and avoid endangered and threatened species if at all possible.	**L**
	1d. Cold/Heat Stress	1d. All site activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	**L**

Job Steps	Hazards	Controls	RAC
	1e.Inspect Tools for Proper Guards and Electrical Cords (Failure of Integral Safety Equipment)	1e. All portable power tools will be inspected, and maintained in accordance with manufacturer's instructions and recommendations, and will only be used for the purpose for which designed. Portable power tools will be inspected, tested, and determined to be in safe operating condition before use. They will be in good repair and with all required safety devices installed and properly adjusted. Portable power tools having defects that will impair their strength or render them unsafe will be removed from service. Power tools equipped with guards will be inspected to ensure guards are in place and operational. Operators will not wear control loose clothing or long hair that may get caught in the tool anc cause injury.	L
2. General Operations of Tools, to include: a. Normal Operations b. Perform Operator Level Maintenance	2. The Hazards itemized in Hazard 1 are applicable to Hazard 2. In addition hazard 2a, 2b, 2c, 2d; 2e; 2f; 2g; 2h; 2i; 2j; 2k; 2l and 2m are added.	2. The Controls itemized in Control 1 are also applicable to Control 2.	
	2a. Electrical Shock.	2a. Most hand tools are battery operated and requires to be re-charged at the end of each day's operation and some require a supplied electrical source, such as a generator or "hard wired" connections. Electrical hook-ups and installation, if required, will be conducted by a certified electrician, local electrical company or equipment company. In the event there is an electrical problem that cannot be corrected by merely un-plugging and re-plugging an item or replacing a blown fuse, then an electrician will be contacted to correct the problem. All electrical appliances, extension cords and equipment will have a third prong for proper grounding; all electrical outlets used on project sites will have three pronged receptacles and meet the requirements of EM 385-1-1, Chapter 11. GFCIs will be used for all outdoor connections.	L
	2b. Airborne Dust/Particulates	2b. Project CIH will establish Respiratory Protection Plan; ensure local ventilation/engineering controls are in place. UXOSO will monitor exposure and area, if additional respiratory guidance is needed.	L
	2c. Eye/Foot and Hand Hazards	2c. Eye/Face Protection – Safety glasses with side shields (ANZI Z87.1) or face shield as applicable; Appropriate footwear as required, but safety toed footwear may be required depending on task; Sturdy leather work gloves as required	L

Job Steps	Hazards	Controls	RAC
	2d. Ergonomic Hazards	2d. Reduce bending, twisting, and kneeling, by using alternating work, rotating workers and periodic stretching break to reduce static or awkward postures. Use team lifting, and lifting aids to minimize lifting weights over 25-lbs above the shoulders, below the knees, or at arm length	L
	2e. Pinch and cut hazard	2e. Operators will use good and serviceable leather gloves when using power tools.	L
	2f. Towing Hazards	2f. When transporting generator or large motor power source for tools by trailers, the trailer will be "chocked" with approved devices when unhooked from the transporting vehicle. Use of "ground guides" will be used, when vehicle(s) are not equipped with an audible warning device and/or has an obstructed view. When attempting to hook onto the trailer, "ground guides" will not place any part of between the trailer and vehicle.	L
	2g. MEC/UXO Hazards	2g. If an MEC item is encountered alert the rest of the team and conduct an inspection of the item IAW the approved WP, SOP and EM 385-1-97.	M
	2h. Noise in excess of OSHA standards	2h. If the heavy equipment and/or power tools used are louder than 85dB (A) then the appropriate hearing attenuation PPE must be worn. This could be ear plugs, ear muffs or both depending on the noise level. The site safety officer will measure the noise level of the equipment and prescribe the applicable noise attenuation PPE to be worn.	L
	2i. Vehicle and heavy equipment traffic in area.	2i. Be aware of any vehicles or heavy equipment in area and be certain to wear a hard hat, safety glasses, and a high visibility safety vest when working around heavy equipment. Establish arm and hand signals or radio communication with the equipment operator and be certain the equipment is grounded and shut off when within the arc of the boom, shovel, etc.	L

Job Steps	Hazards	Controls	RAC
	2j. Power Saws (Table, Circular, Miter and Band)	2j. Table Saw – Always use blade guard, splitter and anti-kickback fingers on all “through-sawing” operations. Never perform any operation “free hand”, stand or have any part of the body in line with the path of the saw blade. Never reach behind or over the blade with either hand while the saw is operating. Never attempt to free a stalled saw blade without first “turning off” the power. Always lower or remove saw blade when equipment is not in use. Never use a damaged saw blade or one that has been dropped. Circular Saw - Will be equipped with guards that automatically and completely enclose the cutting edge, splitters, and anti-kickback devices. All portable power-driven circular saws will be equipped with guards above and below the base plate. The upper and lower guards will cover the saw to the depth of the teeth, except for the minimum arc required to permit the base to be tilted for bevel cuts and for minimum arc required to allow retraction and contact the work. When the tool is withdrawn from the work, the lower guard will automatically and instantly return to the covering position. Miter Saw – Guard miter saws with an upper hood that completely encloses the upper half of the blade. Guard the lower blade by making sure the teeth are guarded at least ¾ of an inch beyond the root of the teeth, towards the center of the blade with a retractable guard that **cannot be locked in any position**. Band Saw – Enclose or guard all portions of the blade except for the working portion of the blade between the guide rolls and the table. Ensure the guard for the portion of the blade between the sliding guide and the wheel guard – protects the front and outer side of the blade and is self-adjusting to move with the guide. Ensure the gap between the guide rolls and the work is as small as is practical. Ensure band saws have a tension control device to indicate the proper tension for standard saws used on the machine. Protect employees passing near-by providing a 4-foot clearance when the saws are in use.	**L**

Job Steps	Hazards	Controls	RAC
	2k. Pneumatic Tools (Wrenches, Fasteners and Driving Tools)	2k. Follow the manufacturer's instructions and prevent air tools from ejecting attachments. Protect employees from contact with compressed air. Ensure tool nozzles or an air hose opening is not pointed at anyone or allowed to contact a person's body. Air nozzle pressure is not to exceed 30psi, when cleaning with compressed air. Place barriers, baffles or screens to protect other workers. Appropriate PPE needs to be worn when cleaning with compressed air. Air Hose and Plastic Pipe – Ensure air hose and hose connections are suitable for the air pressure that is supplied. Ensure any plastic pipe used to supply compressed air to portable air tools has been specifically identified by the manufacturer as being suitable for compressed air use. Tool Design and Construction – Ensure air tools are adequately designed and constructed for the task. Tool Use – Use air tool safely. (1) relieve pressure in the air line before disconnecting a compressed air tool from the line or disconnecting a hose joint, unless there is an automatic valve closing protection at the joint being separated, (2) disconnect the tool from the compressed air supply before repairs are done, and (3) ensure that adequate eye protection is worn at all times by the personnel using the tool and other workers in the area. Fastener/Driving Tools – Ensure fastener/driving tools (nailers and staplers) are safe. (1) ensure any fastener/driving tool discharges all air in the tool when disconnected from the compressed air supply, (2) ensure that pneumatically driven nailers, staplers and similar equipment provide with automatic fastener feed have a safety device on the muzzle to prevent the tool from ejecting fasteners unless the muzzle is in contact with the work surface and (3) all portable, hand held air tools meet the requirements of ANSI B186.1-1984, Safety Code for Portable Air Tools or ANSI/SANTA SNT-101-1993, Portable, Compressed-Air-Actuated, Fastener Driving Tools-Safety Requirement.	L
	2l. Pressurized cylinders – sudden release of contents.	2l. Periodic inspection of all pressurized cylinders by operator. Proper storage of cylinders in accordance with SOPs and EM 385-1-1, chapter 20.	L

Job Steps	Hazards	Controls	RAC
3. General Tool Repair and Service	3. The Hazards itemized in Hazards 1 and 2 are applicable to Hazard 3. In addition hazard 3a; 3b and 3c are added.	3. The Controls itemized in Controls 1 and 2 are applicable to Control 3.	
	3a. Hand Portable Electric Tools	3a. All repairs to hand portable electric tools will be done by a qualified electrician or service technician. Hand portable electric tools will serviced, IAW manufacturer's specifications	**L**
	3b. Permanently installed Tools	3b. Repairs and servicing of permanently installed tools (band saws, table saws, etc) will be done by a qualified electrician. "Lock Out/Tag Out" procedures on the electrical circuit or the equipment being repaired or serviced will be adhered to during these operations.	**L**
	3c. Pneumatic Tools	3c. All repairs to pneumatic (air compressed) power tools will be done by a qualified service technician. Servicing of these tools will be done, IAW manufacturer's specifications.	**L**
4. General Tool Storage	4. The Hazards itemized in Hazards 1, 2, and 3 are applicable to Hazard 4. In addition hazard 4a and 4b are added.	4. The Controls itemized in Controls 1, 2, and 3 are applicable to Control 4.	
	4a. Hand Portable Electric Tools	4a. When not in use, all hand portable electric tools will be stored in their manufacturer's supplied carrying/storage case, in a storage bin or trailer, in such a manner as not to do damage to the tool or its electrical cord, switch or plug.	**L**
	4b. Pneumatic Tools	4b. When not in use, all portable pneumatic tools will be stored in their manufacturer's supplied carrying/storage case, storage bin or trailer, in such a manner as not to do damage to the tool or its compressed air nozzle. Air hoses will be coiled without kinks or sharp bends and either hung up or placed flat in a storage bin.	**L**

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Hand and Power Tools 2. Appropriate PPE for selection operation, at minimum – a. Long Sleeve Shirt b. Long Legged Pants c. Sturdy Work Boots d. Leather Gloves e. Safety Glasses, when required f. Hard Hat, when required g. Safety Vest, when required h. Steel-toed boots, as directed i. Additional PPE to conduct other operations, as directed 3. Heavy Equipment, as needed or specified by WP or SSHP 4. Additional equipment to conduct other operations, that may include – a. Compressed Gas Cylinders; b. Nail Guns; 5. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable A:BC rated 2.5lb or larger fire extinguisher 6. Other vehicles designated as personnel conveyance will be equipped with – a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing 7. Two forms of Communications a. Project issued Radio b. Project or personal Cellular Phone	<u>Qualified Personnel</u> 1. First Aid/CPR – UXOSO or site safety officer and one other individual. 2. Site Manager or SUXOS 3. Personnel operating any powered tool will provide proof of competency (documentation of training or experience) to the UXOSO prior to operating the equipment. 5. UXO Personnel must be certified as an EOD-trained and must have the necessary experience for the position filled. <u>Training</u> 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Flora/Fauna endangered/threatened 7. Daily safety and operational briefing 8. Site visitor training	<u>1. Initial (Site Selection)</u> – General inspection of assembly area. Equipment will be inspected daily by operator prior to use in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. <u>2. Daily</u>- Housekeeping of assembly and work areas for debris and hazards. UXOSO will perform audits and spot checks to verify compliance. UXOSO will update site's MSDS files on all items, supplies and material brought onto site. Periodic communication checks between Field Office or UXOSO and Field Crews, as deemed necessary, to ensure crew's status and relay emergency information. Field Office and UXOSO will maintain a telephonic roster of all site personnel's cellular phone numbers to ensure two forms of communications. In the event that a field crew fails to make a communications check, they will cease operations and relocate to re-establish communications link with the Field Office or UXOSO. <u>3. Weekly</u> – First Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment. <u>4. Final (Site Departure)</u> – Inspection of the entire area to ensure the site is left in the same or better than when we arrived.

Training Requirements: Only qualified personnel will be allowed to operate portable hand held power tools, saws, grinders, and pneumatic tools.

Training Acknowledgement:

Printed Name	**Signature**	**Date**

Activity Hazard Analysis (AHA)

Activity/Work Task: **SECURITY OPERATIONS**	Overall Risk Assessment Code (RAC) (Use highest code) **L**
Project Location:	
Contract Number:	
Date Prepared: 29 DECEMBER 2011	
Prepared by (Name/Title): Michael E. Short/Technical &Ops. Dir	
Reviewed by (Name/Title): Ed Grunwald, CIH	
Notes: (Field Notes, Review Comments, etc.)	

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

	RAC Chart
"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.	
"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible	**E = Extremely High Risk** **H = High Risk**
Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.	**M = Moderate Risk** **L = Low Risk**

Job Steps	**Hazards**	**Controls**	**RAC**
1. Pre-Patrol operations, to include: a. Receive daily Site Safety Brief from UXOSO b. Vehicle and Equipment Inspection c. Establish Work Area Control Zones	1a. Slip, trip and fall.	1a. Worker awareness of potential slippery/uneven surfaces and tripping hazards plus inspection and policing of debris.	L
	1b.Biological hazards.	1b. See Biological Hazards AHA, which must be used in conjunction with this AHA if applicable.	L
	1c. Endangered/threatened flora/fauna.	1c. Conduct reconnaissance IAW approved WP and avoid endangered/threatened species if at all possible.	L
	1d. Vehicle and Equipment Inspection (Pinch and Cut Hazard/Accidental Discharge of Firearm).	1d. Each day, prior to initiating patrol operations, the vehicle operator shall as a minimum check: brakes, fuel level, steering mechanism, seat belts and restraints, lights, signals, wipers, horn, back-up alarm (if applicable), mirrors, glass, and fluids (Vehicle Inspection checklist will be provided by UXOSO). Vehicles with mechanical problems shall be removed from service until repaired. Any security guard equipped with a side arm must attend training in the proper storage, use, handling, and maintenance of the sidearm (Training must comply with State requirements). The "safety" must be engaged when the pistol is loaded.	L

Job Steps	Hazards	Controls	RAC
	1e. Site and MEC/UXO Hazards	1e. SUXOS will meet with each day's on-coming Security Guards, prior to "End of Day" Activities at the site. The guards will receive a detailed briefing pertinent to that day's operation, to include – • Recovered MEC/UXO; • Any "On Going" operation of a hazardous or potential exposure situation and safeguards in place to prevent exposure; • Any personnel remaining at the site after hours; and, • Any other information deemed necessary to assist guards in performing their duties	L
	1f. Contact with chemical agent or other hazardous chemicals.	1f. Security Guards will not be exposed to or put in a manner that a chance of exposure may exist at all sites. UXOSO will brief all Security Guard personnel on site's Work Areas; Control Zones and barricades. Security Guards will not enter any enclosed building, tent or other structure, even if to prevent unauthorized access by intruder(s).	L
2. Site Patrol operations, to include: a. Motorized and/or Foot b. Vehicle Operations c. Confrontation with Unauthorized Personnel	2. The Hazards itemized in Hazard 1 are applicable to Hazard 2. In addition hazard 2a; 2b and 2c and 2d are added.	2. The Controls itemized in Control 1 are also applicable to Control 2. In addition Controls 2a, 2b, 2c, and 2d are added.	
	2a. Slip, trip and fall.	2a. During evening hours the security guard must use a high lumen flashlight/ lantern when performing rounds. The outsides of buildings, tents and structure will be lighted during evening hours.	L
	2b. Vehicle and heavy equipment traffic in area.	2b. The security guard operating the vehicle must possess a valid license. Vehicles may not be driven at speeds greater than the posted speed limit (25 MPH), with regard for weather, traffic, intersections, width and character of the roadway, and any other existing conditions. . The principles of defensive driving shall be practiced and all vehicle occupants shall wear a seat belt and shoulder harness when vehicle is in motion. The use of cellular phones while operating or refueling a vehicle is strictly prohibited. If any safety equipment fails, the operator will notify their supervisor; give their location and remain at that location, until the vehicle is repaired or replaced. Be aware of any vehicles or heavy equipment in area and be certain to wear a hard hat, safety glasses, and a high visibility safety vest when working around heavy equipment.	L

Job Steps	Hazards	Controls	RAC
	2c. Cold/Heat Stress	2c. Security Guards must dress appropriate for weather conditions. During winter months a heated shelter shall be available for use. Heat and Cold stress control measures will be discusses as a component of the Guard's site specific orientation training.	L
	2d. Unauthorized Personnel on Site	2d. Most security guards are not trained in apprehension techniques, thus if a crime is observed (i.e. break-in to one of the site trailers) the security guard must call the local police to make the arrest. The security guard should observe and document the incident (record description of events, license plate number, description of intruder, etc) but should not confront the intruder. The guard may only draw his or her sidearm when their life is threatened.	L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Appropriate Security Company provided uniform for selection operation, at minimum – a. Long or short Sleeve Shirt b. Long Legged Pants c. Sturdy Work Boots d. Leather Gloves, when required e. Serviceable halogen flashlight, with spare batteries f. Safety Glasses, when required g. Hard Hat, when required h. Safety Vest, when required i. Additional security company issued clothing to conduct operations in hot; cold and foul weather, as directed 2. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable A:BC rated 2.5lb or larger fire extinguisher 3. Two forms of Communications a. Project issued Radio b. Project supplied or personal Cellular Phone	Qualified Personnel 1. All Security Guards will receive training in accordance with State law before performing duties as a security guard. Security Guards assigned to carry a side arm are required to attend and complete the State firearm training. Certificates of all training will be presented to the UXOSO for site files. Training 1. Site-specific WP, SOP and AHA 2. Equipment operation 3. Heat/Cold Stress 4. Biological hazards 5. Flora/Fauna endangered/threatened 6. Daily safety and operational briefing 7. Firearms training, if required by Parsons	1. Daily- Housekeeping of assembly and work areas for debris and hazards. UXOSO will perform audits and spot checks to verify compliance. Periodic communication checks between Field Office or UXOSO and Field Crews, as deemed necessary, to ensure crew's status and relay emergency information. Field Office and UXOSO will maintain a telephonic roster of all site personnel's cellular phone numbers to ensure two forms of communications. In the event that a field crew fails to make a communications check, they will cease operations and relocate to re-establish communications link with the Field Office or UXOSO.

Training Requirements: Only qualified personnel will wear appropriate company uniform and perform security operations.

Training Acknowledgement:

Printed Name	Signature	Date

Activity Hazard Analysis (AHA)

Activity/Work Task: **SOIL HANDLING IN A CHEMICAL OR OTHER HAZARDOUS ENVIRONMENTS**	Overall Risk Assessment Code (RAC) (Use highest code)	**M**

Project Location:

Contract Number:

Date Prepared: 29 DECEMBER 2011

Prepared by (Name/Title): Michael E. Short/Technical &Ops. Dir

Reviewed by (Name/Title): Tim Mustard, CIH

Notes: (Field Notes, Review Comments, etc.)

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

	RAC Chart
"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.	
"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible	**E = Extremely High Risk** **H = High Risk**
Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.	**M = Moderate Risk** **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. Establish location for desired work area to conduct Soil Handling in a Chemical Environment, to include: a. Establish Work Area Control Zones b. Manual Excavation c. Mechanical Excavation d. Ordnance Identification e. Soil Sampling	1a. Slip, trip and fall.	1a. Worker awareness of potential slippery surfaces and tripping hazards plus inspection and policing of debris.	**L**
	1b.Biological hazards.	1b. See Biological Hazards AHA, which must be used in conjunction with this AHA if applicable.	**L**
	1c. Endangered/threatened flora/fauna.	1c. Conduct reconnaissance IAW approved WP and avoid endangered and threatened species if at all possible.	**L**
	1d. Cold/Heat Stress	1d. All site activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	**L**
	1e. Contact with chemical agent or other hazardous chemicals	1e. Monitoring for CA and VOCs during this operation is required. The breathing zone will be continually monitored by the Photo Ionizing Detector (PID) and appropriate CA Air Monitoring devices (Refer to ECBC Plan contained in WP). Personnel will don the proper PPE commensurate with the chemical hazard encountered and the work is being accomplished.	**L**

Job Steps	Hazards	Controls	RAC
	1f. MEC/UXO Hazards	1f. Inspect the area for the presence of UXO using a magnetometer to assist in finding items in brush and dense vegetation. If an MEC item is encountered alert the rest of the team and conduct an inspection of the item IAW the approved WP, SOP and EM 385-1-97.	M
	1g. Lifting hazards.	1g. Ensure that you, and if there is another individual assisting you, both have solid footing, leather work gloves and use the proper lifting technique, bend at the knees keeping your back as straight as possible and lift with your knees, not your back. Ensure you have good visibility in the direction you are carrying an item. Do not attempt to carry anything by yourself in excess of 50 lbs. or any item that blocks your visibility or is cumbersome to carry alone.	L
	1h. Hand and Power tool operation	1h. When operating power tools they will be handled, operated and maintained IAW the manufactures instructions, the approved WP and any applicable SOPs. The power tool will be inspected prior to use to ensure that all of the hand and safety guards are in place and that the chain, if present, is properly tightened and that the tool is otherwise in good working order. Depending on the power tool PPE will vary and it too must be serviceable, operable and free of any defect. PPE will be worn IAW the approved WP and inspected by the user prior to donning. Hand and power tool use will be IAW EM 385-1-1, Chapter 13.	L
	1i. Vehicle and heavy equipment traffic in area.	1i. Be aware of any vehicles or heavy equipment in area and be certain to wear hard hat and high visibility safety vest when working around heavy equipment. Establish arm and hand signals or radio communication with the equipment operator and be certain the equipment is grounded and shut off when within the arc of the boom, shovel, etc.	L
	1j. Pinch and cut hazard from handling scrap metal.	1j. Wear all required PPE, ensure that it is serviceable, and check hand placement to ensure there are no sharp surfaces.	M
	1k. Unintentional Detonation	1k. Establish clear and defined work area zones, such as Minimum Safe Distance (MSD) between teams and non-essential personnel. All MEC/UXO work ceased when unauthorized personnel enter into the work area.	L

Job Steps	Hazards	Controls	RAC
	1l. Noise in excess of OSHA standards	1l. If the heavy equipment and/or power tools used are louder than 85dB (A) then the appropriate hearing attenuation PPE must be worn. This could be ear plugs, ear muffs or both depending on the noise level. The site safety officer will measure the noise level of the equipment and prescribe the applicable noise attenuation PPE to be worn.	L
	1m. Underground Utilities	1m. The local utility locating hotline will be contacted to identify the locations of buried utilities before subsurface activities are allowed to commence.	L
	1n. Fire/Explosion	1n. Refueling of all vehicles, heavy equipment and other fueled equipment will be conducted in accordance with the SSHP, applicable SOPs and EM 385-1-1, Chapter 18. Proper fire extinguishers will be on site and serviceable. There will be no “Hot Fueling” authorized at any time.	L
	1o. Confined Space – Cave In/Entrapment	1o. Any excavation deeper than 4ft are classified as confined spaces (non-permit required). Component Soil Person (UXOSO) will inspect the excavation daily and periodically to ensure engineering controls are adequate and working. Engineering controls are Sloping, Benching and Shoring. No work will be allowed in an excavation that has standing water. The water will be removed and re-entry will only be allowed after the Component Person inspects the excavation site. Egress points must be placed no further than 25ft from any worker. If ladders are used, they must – a. Extend from the floor surface of the excavation and extend a minimum of 3ft beyond surface level of the excavation b. Be clear of all equipment and engineering controls for workers to use c. Upon entry into the excavation, be OSHA rated and support the worker’s weight to include tools and equipment	L

Job Steps	Hazards	Controls	RAC
2. Conduct Operations in a HTRW Environment - a. Establish Work Area Control Zones b. Manual Excavation c. Mechanical Excavation d. Ordnance Identification e. Soil Sampling	2. The Hazards itemized in Hazard 1 are applicable to Hazard 2. In addition hazard 2b is added.	2. The Controls itemized in Control 1 are applicable to Control 2.	
	2a. Contact with chemical agent or other hazardous chemicals.	2a. Monitoring for VOCs and identified hazardous emissions during this operation is required. The breathing zone will be continually monitored by the Photo Ionizing Detector (PID) and appropriate Air Monitoring devices, IAW WP and SSHP. Personnel will don the proper PPE commensurate with the chemical hazard encountered and the work is being accomplished.	L
	2p. Pressurized cylinders – sudden release of contents	2b. Periodic inspection of all pressurized cylinders by field crew. Proper storage of cylinders in accordance with SOPs	L
3. Conduct Operations in Other Hazardous Environment - a. Establish Work Area Control Zones b. Manual Excavation c. Mechanical Excavation d. Ordnance Identification e. Soil Sampling	3. The Hazards itemized in Hazard 2 are applicable to Hazard 3.	3. The Controls itemized in Control 2 are applicable to Control 3.	L
4. Backfill Operations – a. Excavation Backfill b. Soil Compaction c. Re-Seeding	4. The Hazards itemized in Hazard 3 are applicable to Hazard 4. In addition hazard 4b is added.	4. The Controls itemized in Control 3 are applicable to Control 4.	
	4a. Contact with chemical agent or other hazardous chemicals.	4a. Hydro-seeding material can cause skin reactions. Crews will used appropriate PPE during operations	L
	4b. High Pressure	4b. Hydro-seeding equipment produces extreme pressure that can cause injuries. Protective safeguards will not be removed or altered	L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Hand and Power Tools 2. Appropriate PPE for selection operation, at minimum – a. Long Sleeve Shirt b. Long Legged Pants c. Sturdy Work Boots d. Leather Gloves e. Safety Glasses, when required f. Hard Hat, when required g. Safety Vest, when required h. Additional PPE to conduct other operations, as directed 3. Heavy Equipment, as needed or specified by WP or SSHP 4. Air Monitoring Equipment; Pumps; Stands 5. Sampling Equipment, at a minimum - a. Sampling Bowls and Spoons b. 6-mil plastic sheeting and bags c. Cleaning Solution, Water and Soap d. 5-gal Buckets e. Nitrile Gloves f. Supplied jars and shipping containers g. Miscellaneous sampling supplies 6. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable A:BC rated 2.5lb or larger fire extinguisher 7. Other vehicles designated as personnel conveyance will be equipped with – a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing 8. Two forms of Communications a. Project issued Radio b. Project supplied or personal Cellular Phone	Qualified Personnel 1. First Aid/CPR – UXOSO or site safety officer and one other individual. 2. Site Manager or SUXOS 3. All personnel operating heavy equipment will provide proof of competency (documentation of training or experience) to the UXOSO prior to operating the equipment. 4. All personnel involved in this operation that are required to wear Self-Contained Breathing Apparatus (SCBA) or a full-face Air Purifying Respirator (APR) will be certified under 29 CFR1910.134 5. UXO Personnel must be certified as an EOD-trained and must have the necessary experience for the position filled. 6. Component Person (UXOSO) for Soils. Training 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Flora/Fauna endangered/threatened 7. Daily safety and operational briefing 8. Site visitor training	1. Initial (Site Selection) – General inspection of assembly area. Equipment will be inspected daily by operator prior to use in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. 2. Daily- Housekeeping of assembly and work areas for debris and hazards. UXOSO will perform audits and spot checks to verify compliance. UXOSO will update site's MSDS files on all items, supplies and material brought onto site. Periodic communication checks between Field Office or UXOSO and Field Crews, as deemed necessary, to ensure crew's status and relay emergency information. Field Office and UXOSO will maintain a telephonic roster of all site personnel's cellular phone numbers to ensure two forms of communications. In the event that a field crew fails to make a communications check, they will cease operations and relocate to re-establish communications link with the Field Office or UXOSO. Component Soil Person (UXOSO) will inspect the excavation daily and periodically to ensure engineering controls are adequate and working. 3. Weekly – First Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment. 4. Final (Site Departure) – Inspection of the entire area to ensure the site is left in the same or better than when we arrived.

Training Requirements: Only qualified personnel will be allowed to operate hand and power tools, heavy equipment, air monitoring equipment, pumps, stand, sampling equipment, and site vehicles.

Training Acknowledgement:

Printed Name	**Signature**	**Date**

Activity Hazard Analysis (AHA)

Activity/Work Task: **VEGETATION REMOVAL**	Overall Risk Assessment Code (RAC) (Use highest code)	**M**

Project Location:

Contract Number:

Date Prepared: 29 December 2011

Prepared by (Name/Title): Michael E. Short/Technical &Ops. Dir

Reviewed by (Name/Title): Ed Grunwald, CIH

Notes: (Field Notes, Review Comments, etc.)

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

	RAC Chart
"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.	
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Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.	**M = Moderate Risk** **L = Low Risk**

Job Steps	**Hazards**	**Controls**	**RAC**
1. Pre-Vegetation Removal UXO Survey	1a. Slips, trips and falls	1a. Ensure that you are thoroughly inspecting the ground in front of you for possible wet or muddy spots, holes, vines rocks etc. that could cause you to slip, trip or fall.	**L**
	1b. Presence of UXO	1b. Inspect the area to be cleared of vegetation for the presence of UXO using a magnetometer to assist in finding items in brush and dense vegetation. If UXO is encountered and it is not acceptable to move, it will be marked with crossed pin flags and dealt with IAW the approved WP. If the item is acceptable to move, it will be relocated to an area outside of the area to be cleared and reported IAW the approved WP.	**M**
	1c. Biological hazards	1c. See Biological Hazards AHA, which must be used in conjunction with this AHA if applicable.	**L**
	1d. Heat and Cold Stress	1d. All site preparation activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	**L**

Job Steps	Hazards	Controls	RAC
2. Manual Vegetation Removal	2a. Slip, trip and falls	2a. Ensure that you are thoroughly inspecting the ground in front of you for possible wet or muddy spots, holes, vines rocks etc. that could cause you to slip, trip or fall. Ensure that you have solid footing and are not in an awkward position when operating/using hand and power tools.	L
	2b. Power tool operation	2b. When operating power tools such as weed eaters, chainsaws etc. they will be handled, operated and maintained IAW the manufactures instructions, the approved WP and any applicable SOPs. The power tool will be inspected prior to use to ensure that all of the hand and safety guards are in place and that the chain, if present, is properly tightened and that the tool is otherwise in good working order. Depending on the power tool PPE will vary and it too must be serviceable, operable and free of any defect. PPE will be worn IAW the approved WP and inspected by the user prior to donning.	L
	2c. Noise in excess of OSHA standards	2c. If the power tools used are louder than 85dB (A) then the appropriate hearing attenuation PPE must be worn. This could be ear plugs, ear muffs or both depending on the noise level. The site safety officer will measure the noise level of the equipment and prescribe the applicable noise attenuation PPE to be worn.	L
	2d. Biological hazards	2d. The same as 1c. above.	L
	2e. The presence of UXO	2e. The same as 1b above.	L
	2f. Heat and Cold Stress	2f. The same as 1d.	L

Job Steps	Hazards	Controls	RAC
3. Mechanical Vegetation Removal	3a. Heavy equipment in the area	3a. Be aware of any heavy equipment in area and be certain to wear hard hat, safety glasses and orange safety vest when working around heavy equipment. Heavy equipment operator must be currently certified for the piece of equipment he is operating. Establish arm and hand signals or radio communication with the equipment operator and be certain the equipment is grounded and shut off when within the arc of the shredder, if applicable. When the heavy equipment is in use a safety UXO technician observer must be present to ensure that the operation is run IAW the approved WP, SOP and AHA. Any heavy equipment used must have a back-up alarm, be in good working order and free of oil or hydraulic fluid leaks. Depending on the type of vegetation removal equipment being used it may be necessary to establish a safety area to ensure no one is hit with flying debris from the blades.	**L**
	3b. Noise in excess of OSHA standards	3b. More than likely the vegetation equipment used will be louder than 85dB (A) then the appropriate hearing attenuation PPE must be worn. This could be ear plugs, ear muffs or both depending on the noise level. The site safety officer will measure the noise level of the equipment and prescribe the applicable noise attenuation PPE to be worn by the operator and the personnel within close proximity to the equipment.	**L**
	3c. Presence of UXO	3c. The operator must be observant to the possible presence of UXO and if encountered stop the equipment and proceed IAW the approved WP.	**L**
	3d. Heat and Cold Stress	3d. The same as 1d.	**L**

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Hand and power vegetation removal equipment. 2. Mechanical vegetation removal equipment 3. Site vehicles 4. Magnetometers 5. Radios	Qualified Personnel 1. 1st Aid/CPR – UXOSO or site safety officer and one other individual. 2. Site Manager or SUXOS 3. Heavy equipment operator, if Applicable Training 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Flora/Fauna endangered/threatened 7. Daily safety and operational briefing 8. Site visitor training	1. Daily- Housekeeping of assembly and work areas for debris and hazards. 2. Daily - Pre-operation checks of equipment. 3. Weekly – 1st Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment.

Training Requirements: Only qualified personnel will be allowed to operate hand and power vegetation removal equipment.

Training Acknowledgement:

Printed Name	Signature	Date

Activity Hazard Analysis (AHA)

Activity/Work Task: **VEHICLE, HEAVY EQUIPMENT, UTILITY VEHICLE (UTV) AND BATTERY OPERATED VEHICLES OPERATIONS**	Overall Risk Assessment Code (RAC) (Use highest code) **M**
Project Location:	
Contract Number:	
Date Prepared: 29 DECEMBER 2011	
Prepared by (Name/Title): Michael E. Short/Technical &Ops. Dir	
Reviewed by (Name/Title): Ed Grunwald, CIH	
Notes: **(**Field Notes, Review Comments, etc.)	

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

	RAC Chart
"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.	
"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible	**E = Extremely High Risk** **H = High Risk**
Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.	**M = Moderate Risk** **L = Low Risk**

Job Steps	**Hazards**	**Controls**	**RAC**
1. General Operations of Motorized Vehicles, to include: a. Pre-operational; During and After Checks b. Safe Normal Vehicle Operations c. Perform Operator Level Maintenance	1a. Slip, trip and fall. 1b.Biological hazards. 1c. Endangered/threatened flora/fauna. 1d. Cold/Heat Stress	1a. Worker awareness of potential slippery surfaces and tripping hazards plus inspection and policing of debris. 1b. See Biological Hazards AHA, which must be used in conjunction with this AHA if applicable. 1c. Conduct reconnaissance IAW approved WP and avoid endangered and threatened species if at all possible. 1d. All site activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	**L** **L** **L** **L**

Job Steps	Hazards	Controls	RAC
	1e. Contact with chemical agent or other hazardous chemicals	1e. Vehicle operators need to be aware of potential exposure to corrosive and/or flammable liquids when conducting vehicle inspections. Operators will not eat, drink or smoke when performing these tasks. Any visible leaking will be immediately reported to their supervisor. Any spills of vehicle additives (anti-freeze, oil, hydraulic fluids, etc.) will be cleaned up immediately. Personnel will don the proper PPE commensurate with the chemical hazard encountered and the work is being accomplished.	L
	1f. Pinch and cut hazard from operating near sharp edges .	1f. Operators will use good and serviceable leather gloves when performing service checks. Potential pinch and cut hazards when performing vehicle inspections inside the engine compartment; around doors; latches and lift gates.	L
	1g. Failure of Integral Safety Equipment	1g. During the inspection of the vehicle, if the operator notices that any of the vehicle's integral safety equipment (lights, brakes and turn-signals) is inoperable; that vehicle is no longer operational and cannot be used until repaired. Any issued safety equipment (first aid kit, fire extinguisher, etc) will be present and operational before the vehicle is operated. All vehicles, regardless of type, that are removed from the site for repairs will be re-inspected and accepted by a Competent person or assigned operator, IAW EM385-1-1.	L
	1h. Inclement Weather (Winds; Snow; Ice and Dust)	1h. Vehicle operators need to be aware of special controls to safely operate vehicles in adverse weather conditions. This may include reducing speed to maintain control; braking distances and improve visibility.	L
	1i. Fire/Explosion	1i. Refueling of all vehicles, heavy equipment and other fueled equipment will be conducted in accordance with the SSHP, applicable SOPs and EM 385-1-1. Proper fire extinguishers will be on site and serviceable. There will be no "Hot Fueling" authorized at any time.	L

Job Steps	Hazards	Controls	RAC
	1j. Operator Distractions (Cell Phones; Eating; Smoking; Road Rage; Traffic Flow and Exhaustion)	1j. Vehicle Operators will follow and adhered to all local, state or foreign rules of Safe Vehicle Operations. Obeying posted speed limits; traffic signals and signs; weight and height restrictions for any over-weight or over-height vehicles, and common courtesy on the road. Defensive Driving habits are needed to be adhered to avoid the perils of Road Rage. Trip planning will assist the operator in avoiding construction and traffic hazards. Eating, smoking and use of cellular phones by the vehicle operator, while driving or during refueling operations is prohibited. Vehicle operators' conducting long distance hauls of over 8 hours in length; will take a mandatory Rest Halt at least once every four hours for 25 minutes. A Rest Halt can be taken by any vehicle operator should the need arise. During a Rest Halt, the vehicle operator will re-inspect the vehicle to ensure that all integral safety equipment is still operational. If any safety equipment fails, the operator will notify their supervisor; give their location and remain at that location, until repairs can be completed.	L
	1k. Towing Hazards	1k. Use of "ground guides" will be used, when vehicle(s) are not equipped with an audible warning device and/or there is an obstructed view, or the vehicle is in a congested area. When transporting Heavy Equipment by trailers, the trailer will be "chocked" with approved devices when unhooked from the transporting vehicle. When attempting to hook onto the trailer, "ground guides" will not place any part of their body between the trailer and vehicle.	L
	1l. MEC/UXO Hazards	1l. If an MEC item is encountered alert the rest of the team and conduct an inspection of the item IAW the approved WP, SOP and EM 385-1-97.	M
	1m. Noise in excess of OSHA standards	1m. If the heavy equipment and/or power tools used are louder than 85dB (A) then the appropriate hearing attenuation PPE must be worn. This could be ear plugs, ear muffs or both depending on the noise level. The site safety officer will measure the noise level of the equipment and prescribe the applicable noise attenuation PPE to be worn.	L

Job Steps	Hazards	Controls	RAC
2. General Operations of Heavy Equipment Vehicles, to include: a. Pre-operational, During and After Checks b. Normal Vehicle Operations c. Perform Operator Level Maintenance	2. The Hazards itemized in Hazard 1 are applicable to Hazard 2. In addition hazard 2c; 2d and 2e are added.	2. The Controls itemized in Control 1 are also applicable to Control 2.	
	2a. Contact with chemical agent or other hazardous chemicals	2a. Equipment Operators will need to place a supplemental drip pan or catch basin underneath the engine and transfer cases at the end of the day.	L
	2b. Failure of Integral Safety Equipment	2b. Heavy Equipment will be inspected and tested, in accordance with manufacturer's recommendations and certified in writing by a Competent person prior to being placed in use. If at any time, the equipment is removed and subsequently returned to the site, it will be re-inspected and recertified, IAW EM 385-1-1. Heavy Equipment will be equipped with Roll Over Protection System (ROPS).	L
	2c. Vehicle and heavy equipment traffic in area.	2c. Be aware of any vehicles or heavy equipment in area and be certain to wear a hard hat, safety glasses and a high visibility safety vest when working around heavy equipment. Establish arm and hand signals or radio communication with the equipment operator and be certain the equipment is grounded and shut off when within the arc of the boom, shovel, etc.	L
	2d. Underground Utilities	2d. The local utility locating hotline will be contacted to identify the locations of buried utilities before subsurface activities are allowed to commence.	L

Job Steps	Hazards	Controls	RAC
	2e. Confined Space – Cave In/Entrapment	2e. Any excavation deeper than 4ft into which a piece of heavy equipment is to operate in is classified as a confined space (non-permit required). Competent Soil Person (UXOSO) will inspect the excavation daily and periodically to ensure engineering controls are adequate and working. Engineering controls for excavation vehicles are Sloping and, Benching. No work will be allowed in an excavation that has standing water. The water will be removed and re-entry will only be allowed after the Competent Person inspects the excavation site. Egress points are placed no further than 25ft from any workers. If ladders are used, they must – a. Extend from the floor surface of the excavation and extend a minimum of 3ft beyond surface level of the excavation b. Be clear of all equipment and engineering controls for workers to use c. Upon entry into the excavation, be OSHA rated and support the worker's weight to include tools and equipment	L
3. General Operations of Utility Vehicles (UTV) Vehicles, to include:	3. The Hazards itemized in Hazards 1 and 2 are applicable to Hazard 3 exception of 2e. In addition hazard 3b is added.	3. The Controls itemized in Controls 1 and 2 are also applicable to Control 3.	
a. Pre-operational, During and After Checks b. Normal Vehicle Operations c. Perform Operator Level Maintenance	3a. Failure of Integral Safety Equipment	3a. All UTV Equipment will be inspected and tested, in accordance with manufacturer's recommendations and certified in writing by a Competent person prior to being placed in use, IAW EM 385-1-1, Chapter 18, Section J. UTVs will be used only off road, unless equipped for paved road use by manufacturer. UTVs will only be operated during daylight hours, unless equipped for use in low light or darkness by manufacturer. All UTVs will be equipped with mufflers, spark arrester, tail lights, stop lights and an audible signal device (horn). Only UTVs with four or more wheels may be used. .	L

Job Steps	Hazards	Controls	RAC
	3b. UTV Hazards	3b. Passengers are only allowed to occupy a seat, they may not sit in the bed of the UTV, in the trailer if so equipped or on any other part of the UTV. Maintain safe and appropriate separation distances between UTV, when traveling as a group. The manufacturer's recommended payload will not be exceeded at any time. If the UTV is not equipped with a roll-over protection system (ROPS) then operators and passengers will wear approved head protection that at a minimum conforms to DOT 218 standards or equivalent and protective goggles or face shield. If the UTV is not equipped with a windshield operators and passengers will wear goggles when the UTV is in motion.	L
4. General Operations of Battery Operated Equipment (Segway), to include:	4. The Hazards itemized in Hazards 1, 2, and 3 are applicable to Hazard 4. In addition hazard 4b is added.	4. The Controls itemized in Controls 1, 2, and 3 are applicable to Control 4.	
a. Pre-operational, During and After Checks b. Normal Vehicle Operations	4a. Segway Hazards	4a. This type of vehicle is not addressed in EM 385-1-1 and will have to be evaluated as an ATV for operations, inspection, hazards and PPE. This equipment will only be operated during daylight hours.	L
c. Perform Operator Level Maintenance	4b. Electrical Shock.	4b. All Segway equipment is battery operated and requires to be re-charged at the end of each day's operation. Electrical hook-ups and installation, if required, will be conducted by a certified electrician, local electrical company or equipment company. In the event there is an electrical problem that cannot be corrected by merely un-plugging and re-plugging an item or replacing a blown fuse, then an electrician will be contacted to correct the problem. All electrical appliances, extension cords and equipment will have a third prong for proper grounding; all electrical outlets used on project sites will have three pronged receptacles and meet the requirements of EM 385-1-1, Chapter 11. GFCIs will be used for all outdoor connections.	L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Hand and Power Tools 2. Appropriate PPE for selection operation, at minimum – a. Long Sleeve Shirt b. Long Legged Pants c. Sturdy Work Boots d. Leather Gloves e. Safety Glasses, when required f. Hard Hat, when required g. Safety Vest, when required h. Steel-toed boots, as directed i. Additional PPE to conduct other operations, as directed 3. Heavy Equipment, as needed or specified by WP or SSHP 4. Additional equipment to conduct other operations, that may include – a. Motorcycle Helmet, w/full face or goggles and gloves (ATV/Segway); 5. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable A:BC rated 2.5lb or larger fire extinguisher 6. Other vehicles designated as personnel conveyance will be equipped with – a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing 7. Two forms of Communications a. Project issued Radio b. Project or personal Cellular Phone	Qualified Personnel 1. First Aid/CPR – UXOSO or site safety officer and one other individual. 2. Site Manager or SUXOS 3. All ATV operators will be licensed and trained by a recognized accredited ATV Training Course or in-house resource that is certified as a Trainer by an accredited organization. 4. All personnel operating any motorized equipment, to include ATVs or Segways will provide proof of competency (documentation of training or experience) to the UXOSO prior to operating the equipment. 5. UXO Personnel must be certified as an EOD-trained and must have the necessary experience for the position filled. 6. Competent Person (UXOSO) for Soils. Training 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Flora/Fauna endangered/threatened 7. Daily safety and operational briefing 8. Site visitor training	1. Initial (Site Selection) – General inspection of assembly area. Equipment will be inspected daily by operator prior to use in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. 2. Daily- Housekeeping of assembly and work areas for debris and hazards. UXOSO will perform audits and spot checks to verify compliance. UXOSO will update site's MSDS files on all items, supplies and material brought onto site. Periodic communication checks between Field Office or UXOSO and Field Crews, as deemed necessary, to ensure crew's status and relay emergency information. Field Office and UXOSO will maintain a telephonic roster of all site personnel's cellular phone numbers to ensure two forms of communications. In the event that a field crew fails to make a communications check, they will cease operations and relocate to re-establish communications link with the Field Office or UXOSO. Competent Soil Person (UXOSO) will inspect the excavation daily and periodically to ensure engineering controls are adequate and working. 3. Weekly – First Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment. 4. Final (Site Departure) – Inspection of the entire area to ensure the site is left in the same or better than when we arrived.

Training Requirements: Only qualified personnel will be allowed to operate vehicle, heavy equipment, all terrain vehicle (ATV), battery operated vehicles, and hand and power tools.

Training Acknowledgement:

Printed Name	**Signature**	**Date**

Activity Hazard Analysis (AHA)

Activity/Work Task: **AIR MONITORING**	Overall Risk Assessment Code (RAC) (Use highest code)	L
Project Location:		
Contract Number:		
Date Prepared: 29 DECEMBER 2011		
Prepared by (Name/Title): Michael E. Short/Ops & Technology Dir.		
Reviewed by (Name/Title): Ed Grunwald, CIH		

Notes: (Field Notes, Review Comments, etc.)

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

	RAC Chart
"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.	**E = Extremely High Risk** **H = High Risk**
"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible	**M = Moderate Risk** **L = Low Risk**
Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.	

Job Steps	Hazards	Controls	RAC
1. Set up and calibrate air monitoring equipment.	1a. Slip, trip and fall.	1a. Select a level area for the placement of the item and be aware of the condition of the ground on which you are working. Be certain to place your feet on as firm and solid a surface as possible.	L
	1b. Pinch hazard from assembly and placement of equipment.	1b. Wear leather gloves and place hands on smooth surfaces checking the area on which you are going to place your hands in order to avoid any sharp edges or pinch areas.	L
	1c. Vehicle and heavy equipment traffic in area.	1c. Be aware of any vehicles or heavy equipment in area and be certain to wear hard hat, safety glasses and high visibility safety vest when working around heavy equipment. Establish arm and hand signals or radio communication with the equipment operator and be certain the equipment is grounded and shut off when within the arc of the boom, shovel, etc.	L
	1d. Noise in excess of OSHA standards	1d. If the heavy equipment used is louder than 85dB (A) then the appropriate hearing attenuation PPE must be worn. This could be ear plugs, ear muffs or both depending on the noise level. The site safety officer will measure the noise level of the equipment and prescribe the applicable noise attenuation PPE to be worn.	L

Job Steps	Hazards	Controls	RAC
	1e. Lifting hazards.	1e. Ensure that you, and if there are other individuals assisting you, each have solid footing, leather work gloves and use the proper lifting technique; bend at the knees keeping your back as straight as possible and lift with your knees, not your back. Ensure you have good visibility in the direction you are moving an item. Do not attempt to carry anything by yourself in excess of 50 lbs. or any item that blocks your visibility or is cumbersome to carry alone.	**L**
	1f. Biological hazards.	1f. See Biological Hazards AHA, which must be used in conjunction with this AHA if applicable.	**L**
	1g. Endangered/threatened flora/fauna.	1g. Conduct reconnaissance IAW approved WP and avoid endangered/threatened species if at all possible.	**L**
	1h. Contact with chemical agent or other hazardous chemicals	1h. Personnel will don the proper PPE commensurate with the chemical hazard. CWM, HTW, and UXO training and safety awareness during site-specific training and refreshed during morning tailgate briefing. Use face shield as appropriate.	**L**
	1i. Pressurized cylinders – sudden release of contents	1i. Periodic inspection of all pressurized cylinders by air monitoring team. Proper storage of cylinders in accordance with SOPs.	**L**
	1j. Use of hand and power tools.	1j. When operating power tools they will be handled, operated and maintained IAW the manufactures instructions, the approved WP and any applicable SOPs. The power tool will be inspected prior to use to ensure that all of the hand and safety guards are in place and that the chain, if present, is properly tightened and that the tool is otherwise in good working order. Depending on the power tool PPE will vary and it too must be serviceable, operable and free of any defect. PPE will be worn IAW the approved WP and inspected by the user prior to donning. Hand and power tool use will be IAW EM 385-1-1, Chapter 13.	**L**

Job Steps	Hazards	Controls	RAC
	1k. Electrical Shock.	1k. Sites are remote and require portable, on board or trailer mounted generators to provide electrical power. All generators will be grounded, as stated in EM 385-1-1, Chapter 11. In the event there is an electrical problem that cannot be corrected by merely un-plugging and re-plugging an item or replacing a blown fuse then an electrician will be contacted to correct the problem. All electrical appliances and equipment will have a third prong for proper grounding and all electrical outlets will have three pronged receptacles and meet the requirements of EM 385-1-1, Chapter 11. GFCI circuitry will be used for all outdoor connections.	L
	1l. Cold/Heat Stress	1l. All site activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	L
	1m. Fire/Explosion	1m. Refueling of all vehicles, heavy equipment and other fueled equipment will be conducted in accordance with the SSHP, applicable SOPs and EM 385-1-1, Chapter 18. Proper fire extinguishers will be on site and serviceable. There will be no “Hot Fueling” authorized at any time.	L
2. Retrieval/Site Relocation Service/Recalibrate Air Monitoring Pumps/Systems/ Hoses	2. The Hazards itemized in Hazard 1 are also applicable to Hazard 2.	2. The Controls itemized in Control 1 are also applicable to Control 2.	L
3. Air Monitoring Pump/System Retrieval/Site Relocation	3. The Hazards itemized in Hazard 1 are applicable to Hazard 3.	3. The Controls itemized in Control 1 are also applicable to Control 3.	L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Air Monitoring Equipment; Pumps; Stands 2. Hand and Power Tools 3. Appropriate PPE for selection operation, at minimum – a. Long Sleeve Shirt b. Long Legged Pants c. Sturdy Work Boots d. Leather Gloves e. Safety Glasses, when required f. Hard Hat, when required g. Safety Vest, when required h. Additional PPE to conduct other operations, as directed 4. Heavy equipment, if applicable 5. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable ABC rated 2.5lb or larger fire extinguisher 6. Other vehicles designated as personnel conveyance will be equipped with – a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing 7. Two forms of Communications a. Project issued Radio b. Project supplied or personal Cellular Phone	Qualified Personnel 1. First Aid/CPR – UXOSO or site safety officer and one other individual. 2. Site Manager or SUXOS 3. Heavy equipment operator, if applicable 4. Trained Air Monitoring Operator Training 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Flora/Fauna endangered/threatened 7. Daily safety and operational briefing 8. Site visitor training	1. Initial (Site Selection) – General inspection of assembly area. Equipment will be inspected daily by operator prior to use in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. 2. Daily- Housekeeping of assembly and work areas for debris and hazards. UXOSO will perform audits and spot checks to verify compliance. UXOSO will update site's MSDS files on all items, supplies and material brought onto site. Periodic communication checks between Field Office or UXOSO and Field Crews, as deemed necessary, to ensure crew's status and relay emergency information. Field Office and UXOSO will maintain a telephonic roster of all site personnel's cellular phone numbers to ensure two form s of communications. In the event that a field crew fails to make a communications check, they will cease operations or relocate to re-establish communications link with the Field Office or UXOSO. 3. Weekly – First Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment. 4. Final (Site Departure) – Inspection of the entire area to ensure the site is left in the same or better than when we arrived.

Training Requirements: Only qualified personnel will be allowed to operate air monitoring equipment, pumps, stands, and hand and power tools.

Training Acknowledgement:

Printed Name	Signature	Date

Activity Hazard Analysis (AHA)

Activity/Work Task **Construction and Dismantling of MACS and ECS.**	Overall Risk Assessment Code (RAC) (Use highest code)	L
Project Location:	**Risk Assessment Code (RAC) Matrix**	
Contract Number:		
Date Prepared: 29 December 2011		
Prepared by (Name/Title):		
Reviewed by (Name/Title): Ed Grunwald, CIH		
Notes: (Field Notes, Review Comments, etc.)		

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

	RAC Chart
"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.	
"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible	**E = Extremely High Risk** **H = High Risk**
Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.	**M = Moderate Risk** **L = Low Risk**

Job Steps	**Hazards**	**Controls**	**RAC**
1. Site Preparation :	1a. Slip, trip and fall.	1a. Workers should be aware of any potential slippery/uneven surfaces in the area where the MACS/ECS is to be assembled.	L
	1b. Biological hazards.	1b. See Biological Hazards AHA, which must be used in conjunction with this AHA if applicable.	L
	1c. Back injury	1c. Personnel will be trained on and utilize proper lifting techniques. To move objects or equipment 50lbs or more hand carts or other lift assist devices shall be used when practical. If use of lift assist device is impractical two or more workers may be used to lift the item.	L
	1d. Cold/Heat Stress	1d. SSHO will implement heat stress/cold injury control program (when daily temperature is predicted to be greater than 80ºF or less than 35ºF) IAW the work plan. The SSHO will monitor weather conditions and stress symptoms in workers.	L

Job Steps	Hazards	Controls	RAC
	1e. Injured by power tools	1e. All portable power tools will be inspected, and maintained in accordance with manufacturer's instructions and recommendations, and will be only used for the purpose for which designed. Portable power tools will be inspected, by the operator prior to use to ensure that the equipment is in safe operating condition. Tools having defects that will impair their strength or render them unsafe will be removed from service. When power operated tools are designed to accommodate guards, they shall be equipped with such guards when in use. Personnel will be instructed in the proper use of equipment and proper PPE to utilize when operating the equipment. Instruction will be provided by the SSHO or his designee prior to the worker operating equipment.	L
2. Construction of MACS/ECS:	2a Slip, trip and fall	2a. Personnel will be trained on and utilize proper lifting techniques. To move objects or equipment 50lbs or more hand carts or other lift assist devices shall be used when practical. If use of lift assist device is impractical two or more workers may be used to lift the item.	L
	2b Back injury	2b. Personnel will be trained on and utilize proper lifting techniques. When moving equipment or panels weighing 50 or more pounds a lift assist device should be used. If use of lift assist device is impractical, two or more workers may be used to lift panel sections. When carrying sections personnel should plan their route carefully to avoid area where there are holes, or uneven surfaces.	L
	2c. Biological hazards	2c. Field Team Members are to be vigilant of potential biological hazards (bees, snakes, etc). If any biological hazard is encountered it will be communicated to the entire construction Field Team along with actions to be taken to mitigate the hazard.	L
	2d. Heat/ cold stress	2d. SSHO will implement heat stress/cold injury control program (when daily temperature is predicted to be greater than 80ºF or less than 35ºF) IAW the workplan. The SSHO and the Field Team Leaders will monitor weather conditions and stress symptoms in workers.	L
	2e. Electric Shock	2e. Electrical hook-ups and installation, if required, will be conducted by a certified electrician, local electrical company or equipment company. In the event there is an electrical problem that cannot be corrected by merely un-plugging and re-plugging an item or replacing a blown fuse, then an electrician will be contacted to correct the problem. All electrical appliances, extension cords and equipment will have a third prong for proper grounding; all electrical outlets used on project sites will have three pronged	L

Job Steps	Hazards	Controls	RAC
		receptacles and meet the requirements of EM 385-1-1, Chapter 11. GFCIs will be used for all outdoor connections.	
	2f. Eye, Foot and Hand Hazards	2f. Level D or Modified Level D protective ensemble will be worn during ECS/MACs construction (Work clothes[long pants and shirt, Leather work boots with safety toe, safety glasses with side shields[when using power tools], hard hat when working around heavy equipment or when overhead hazard exists, hearing protection when elevated noise levels[>85dbA] are present, leather or canvas work gloves when handling panels, and high visibility vest when working around heavy equipment or adjacent to roadways.	L
	2g. Fall hazard	2g. Ladders, aerial lifts, and scaffolds maybe be used during the installation (or dismantling) of the ECS or MACs. Ladders shall be inspected for visible defects on a daily basis by SSHO or designee and after any occurrence that could affect their safe use. Broken or damaged ladders shall be immediately tagged "**DO NOT USE**," or with similar wording, and withdrawn from service until repaired. Ladders shall not be moved, shifted, or extended while occupied and shall not be climbed by more than one person at a time. All portable ladders shall be of sufficient length and shall be placed so that workers will not stretch or assume a hazardous position. Ladder rungs shall have a non-slip surface to assure safe footing. Ladders shall not be placed in passageways, or any locations where they may be displaced by any other work unless protected by barricades or guards. Both hands must be “free” when climbing or descending a ladder. Tools may be hoisted or handed to the worker.	L

Job Steps	Hazards	Controls	RAC
		Personnel operating an aerial lift must be trained in the use of the equipment in accordance with EM 385-1-1 paragraph 22.M.02. Lifts shall be operated, inspected, tested, and maintained as specified in the operating manual. Records of inspections shall be maintained at the site. As a minimum, The lift operator shall test the lift controls each day prior to use to ensure safe working condition. When setting up a lift the brakes shall be set and outriggers, when used, shall be positioned on pads or a solid surface. If the lift is to be setup on an inclined wheel chokes shall be used. The rated load capacity of the lift shall not be exceeded and workers operating from a lift must use personal fall arrest system. Scaffolding must be constructed (or dismantled) in accordance with manufacturer's requirements. Personnel constructing/dismantling scaffolding must be trained in accordance with 29 CFR 1926.454. Scaffolds shall be plumb and level and on base plates setup on mudsills or other adequate foundation. The scaffold must meet the requirements contained in ANSI A10.8 and be capable of supporting without failure at least 4 times the maximum anticipated load. An access ladder or equivalent safe access to the scaffold platform shall be provided. The climbing of cross braces is prohibited. The work platform must contain a guardrail system. If the guardrail system is removed workers must tied-off (using personal fall arrest system).	
	2h. Injury from Power and pneumatic tools	2h. All portable power tools will be inspected, and maintained in accordance with manufacturer's instructions and recommendations, and will be only used for the purpose for which designed. Portable power tools will be inspected by the operator prior to use to ensure that the equipment is in safe operating condition. Tools having defects that will impair their strength or render them unsafe will be removed from service. When power operated tools are designed to accommodate guards, they shall be equipped with such guards when in use. For pneumatic tools Safety clips or retainers shall be installed to prevent dies and tools from being accidentally expelled from the barrel. Safety lashing shall be provided at connections between tool and hose and at all quick makeup type connections. Never use hoses to hoist or lower tools. Personnel will be instructed in the proper use of equipment and proper PPE to utilize when operating the equipment. Instruction will be provided by the SSHO or his designee prior to the worker operating equipment.	L

Job Steps	Hazards	Controls	RAC
	2i. Falling object hazard	2i. Areas below where people are working shall be barricaded (or taped off). Personnel conducting installation/dismantling activities must wear hard hat. When hoist are used. Personnel operating the hoist must know the maximum load rating of the hoist and keep within the load limit. Hoisting equipment must be inspected before daily (including slings, shackles, etc.)	**M**
	2j.Vehicle and heavy equipment traffic in area.	2j Be aware of any vehicles or heavy equipment in area and be certain to wear a hard hat, safety glasses and a high visibility vest when working around heavy equipment. Establish arm and hand signals or radio communication with the equipment operator and be certain the equipment is grounded and shut off when within the arc of the boom, shovel, etc.	**L**
	2k. Noise in excess of OSHA standards	2k. If the heavy equipment and/or power tools used are louder than 85dB (A) then the appropriate hearing attenuation PPE must be worn. This could be ear plugs, ear muffs or both depending on the noise level. The SSHO will measure the noise level of the equipment and prescribe the applicable noise attenuation PPE to be worn.	**M**

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Hand and Power Tools 2. Appropriate PPE for selection operation, at minimum – a. Short Sleeve Shirt b. Long Legged Pants c. Leather Gloves d. Safety Glasses e. Hard Hat f. Safety Vest, when required g. Steel-toed boots h. Personal fall arrest system (when working at heights 6' or more above ground and guardrail system not available) i. Additional PPE to conduct other operations, as directed 3. Heavy Equipment, as needed or specified by WP or SSHP a. Aerial lift b. Scaffolding b. Ladders 4. Additional equipment to conduct other operations, that may include – a. Nail gun; b. Power drill; c. Compressed gas cylinder 5. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable ABC rated 2.5lb or larger fire extinguisher 6. Other vehicles designated as personnel conveyance will be equipped with – a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing 7. Two forms of Communications a. Project issued Radio b. Project or personal Cellular Phone	Qualified Personnel 1. First Aid/CPR – 2 members of installation/dismantling team must be current in their CPR/first aid certification. 2. Personnel operating aerial lift must be train in use of equipment 3. Erection, moving, dismantling, or altering of scaffold work platforms shall be under the supervision of a Competent Person 4. Inspections of scaffolds shall be performed by Competent person. 3. UXO Personnel must be certified as an EOD-trained and must have the necessary experience for the position filled Training 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour HAZWOPER 3.30-hr OSHA construction outreach training for SSHO 4. Heat/Cold Stress 5. Biological hazards 6. Proper lifting ergonomics 7. Ladder use and inspection 8. Site visitor training 9. Fall protection training for people working 6' above the ground. Training must meet 1926.503 Requirements 10.Scaffold erection/dismantling	1. Initial (Site Selection) – General inspection of assembly area. Equipment will be inspected daily by operator prior to use in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. 2. Daily- Housekeeping of assembly and work areas for debris and hazards. SSHO will perform audits and spot checks to verify compliance. SSHO will update site's MSDS files on all items, supplies and material brought onto site. Periodic communication checks between Field Office or SSHO and Field Crews, as deemed necessary, to ensure crew's status and relay emergency information. Field Office and SSHO will maintain a telephonic roster of all site personnel's cellular phone numbers to ensure two forms of communications. In the event that a field crew fails to make a communications check, they will cease operations and relocate to re-establish communications link with the Field Office or SSHO. Equipment requiring daily inspection 1. Ladders 2. Tools 3. Aerial lift (lift controls) 4. Scaffold 5. Hoist 6. PPE (including fall arrest system) Defective equipment shall be removed from service until repaired or replaced 3. Weekly – First Aid/CPR kit(s), fire extinguisher(s), and vehicles. 4. Final (Site Departure) – Inspection of the entire area to ensure the site is left in the same or better than when we arrived.

Training Requirements: Only qualified personnel will be allowed to operate hand and power tools.

Training Acknowledgement:

Printed Name	**Signature**	**Date**

Rubb Building System
SITE SPECIFIC STEEL ERECTION PLAN

Job Name:	4825 Glenbrook Road RA	**Project Engineer:**	
Job Number:		**Fabricator:**	Rubb, Inc.
Erector Name:	Rubb, Inc.	**Qualified Person:**	David Sobus
PVC Cladding	Rubb, Inc.	**Qualified Rigger /Signal Person**	Thomas Caddigan
Anchor Bolt Contractor:	none	**Crane Operator:**	TBD

A. SCOPE OF WORK

General Description of Work: To erect one 60’ X 84’ Rubb BVE Building engineered and fabricated by Rubb Building Systems. The crew for the installation will be factory trained Rubb site technicians.

B. FOOTINGS, PIERS, WALLS AND ANCHOR BOLTS

Has concrete reached 75% of sufficient strength? Yes __ No __

Proof of Strength: ASTM test method results yes __ or Attach __

Engineer Verification Yes __

Were anchor bolts repaired, replaced or modified? Yes __ No __

Was erector notified in writing? Yes __ Attach

C. NOTIFICATION OF COMMENCEMENT OF STEEL ERECTION: **Was written notification given to erector? Yes __ Attach**

D. SITE LAYOUT

Has controlling contractor provided adequate access to the site? Yes __ No __

Is laydown area firm, properly graded, well drained and accessible? Yes __ No __

E. PRE-CONSTRUCTION SITE CONFERENCE

Has a Pre-Construction Site Conference been held? Yes __ No __

Please list those attending:

F. SEQUENCE OF ERECTION ACTIVITY

Leg trusses lifted into place and axial steel and cables installed between leg trusses. Roof trusses for each span joined together on the ground then hoisted between standing legs. Axial steel and cables installed connecting roofs together. The PVC cladding will be hoisted to top of structure unrolled and stretched over the the structure. PVC sections will be connected and sealed.

Give material delivery date:

How will activities be coordinated with other trades?
Rubb Technicians will be only personnel allowed in the erection area until all over head work has been completed.

G. CRANES

Crane Type: 22 ton hydraulic truck crane
Crane Brand: Manitowoc
Crane Capacity: 22 ton

How is site prepared for crane?

How many different locations will crane have and where are they? The crane will set up multiple times In and around the footprint of the structure as needed to stay under 75% of rated capacity.

What is the path for overhead loads? Building Parts that need to be hoisted will be located close as possible to the final lift location to limit overhead travel of building parts

How will employees be notified of overhead loads? All employees will be involved with the lift.

Are there any critical lifts? (75% of capacity or dual crane) Yes __ No **X**_ How many? ___________
Describe critical lifts:

Are lift tickets attached for all critical lifts? Yes __

H. STEEL ERECTION ACTIVITIES / PROCEDURES

Give a description of the following items and how they will be performed.

Temporary Bracing / Guying: Temporary bracing cables will be used to stabilize the first roof truss until the adjoining roof truss is installed and installation of axial steel and structural cables are completed.

Repair, Replacement or Modification of Anchor Bolts: Not applicable, temporary I beam foundation

Columns / Beams (Joists or Purlins)
Any modification of components will need to be signed off by the design engineer.

Connections:
Any modification of connections will need to be signed off by the design engineer.

Decking: N/A

PVC: Repairs made by qualified personnel.

Siding: N/A

Steel Grating: N/A

Ornamental or Misc. Iron: N/A

I. FALL PROTECTION

Please identify the Fall Protection procedures for the following tasks:

Erection of vertical structural members
_X_ JLG Lift / Tie-Off
_X_ Scissor Lift / Guardrails
__Vertical Lifeline / Harness and Lanyard
__Retractable Lanyard / Harness
__ Other – Explain ____

Erection Horizontal Structural Members
_X_JLG Lift / Tie-Off
_X_ Scissor Lift / Guardrails
__ Horizontal Lifeline / Harness and Lanyard
__ Retractable Lanyard / Harness
__ Beam Clamps / Harness and Lanyards
__ Other – Explain ____

Installation of PVC Cladding
_X_JLG Lift / Tie-Off
_X_ Scissor Lift / Guardrails
_X_ Horizontal Lifeline / Harness and Lanyard
__Rolling Scaffolding / Guardrails
_X_ Other – Explain See site specific non – conventional fall protection plan.

Has Fall Protection Training been documented? Yes _X_ No __ Attach
Is a Competent Person on-site at all times? Yes _X_ No __
Were Fall Protection Systems designed by a Qualified Person? Yes _X_ No __

J. FALLING OBJECT PROTECTION

Method for securing loose items aloft: No loose items will be left aloft.

Are all personnel wearing hardhats? Yes _X_ No __

Are erection areas properly barricaded? Yes __ No __

K. HAZARDOUS NON-ROUTINE TASKS

Are Job Safety Analyses performed on all non-routine hazardous tasks? Yes _X_ No __

List tasks below and attach JSA's

None

L. TRAINING CERTIFICATION

Are all personnel properly trained for performing steel erection activities? Yes _X_ No __

Are all personnel properly trained for the use of fall protection systems? Yes _X_ No __

Attach documentation of training

M. LIST OF QUALIFIED AND COMPETENT PERSONS

Qualified Person for site specific erection plan _David Sobus___ ______________________

Qualified Person for fall protection system design __Marc Boutet______________________

Qualified Rigger/ Signal Person___Thomas Caddigan________________________________

Crane Operator _TBD ______________________________

Crane Inspector ___TBD____

Fall Protection Competent Person ___David Sobus___________________________________

N. EMERGENCY RESCUE PROCEDURES

_X_ Self-Rescue
__ Stair Tower
_X_ Aerial Lifts
__Manbasket
_X_ 1st Aid Trained Personnel
_X_ Local fire and Rescue
__ Emergency Response Team
__ Hoists

Activity Hazard Analysis (AHA)

Activity/Work Task: **INVESTIGATION-DERIVED WASTE SAMPLING**	Overall Risk Assessment Code (RAC) (Use highest code): **L**
Project Location:	
Contract Number:	
Date Prepared: 29 December 2011	
Prepared by (Name/Title): Michael E. Short, Dir. Ops & Technology	
Reviewed by (Name/Title): Edward Grunwald, CIH	
Notes: (Field Notes, Review Comments, etc.)	

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Job Steps	Hazards	Controls	RAC
Setup / Preparation for sampling	1a. Injury incurred while using tools	1a.Hand and power tools shall be used, inspected, and maintained in accordance with the manufacturer's instructions and recommendations. Inspections shall be performed prior to use by the tool operator to determine that the tool operating safely. Tools with defect shall be taken out of service until repaired	**L**
	1b.Slip, trip, fall hazard	1b.Worker shall be aware of potential slippery surfaces and tripping hazards. Good housekeeping will be enforced by SSHO	**L**
	1c. Vehicle and heavy equipment traffic in work area	1c. Personnel shall be aware of any vehicles or heavy equipment in area and shall to wear a hard hat, safety glasses, and a high visibility safety vest when working around heavy equipment	**L**

Job Steps	Hazards	Controls	RAC
	1d.High noise levels	1d.Appropriate hearing protection will be used when the noise level exceeds 85dBA. Noise levels will be either monitored using a sound level meter or if a team member cannot be heard by another team member, at normal voice level, within a distance of three feet then hearing protection must be worn.	L
	1e.Biological hazards	1e. See Biological Hazards AHA, which must be used in conjunction with this AHA if applicable.	L
	1f.Contact with chemical agent or other hazardous chemicals	1f.CA and HTW safety awareness will be conducted during site-specific orientation training and reviewed during morning tailgate briefings. Personnel will utilize a mod D or level D protective ensemble during set-up operations	L
	1g Pressurized Drums	1g.Before opening drums assess the appearance of the drum for bulging or other signs of internal pressurization. Workers can test pressures within a drum without opening by attempting to flex down on the lid of the drum or by listening for differences in tone produced by tapping on the drum. Pressurized drums will not be opened without the proper equipment.	L
	1h. Heat/cold stress	1h. All site activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	L
	1i. Struck by Mechanized equipment	1i. If a forklift is used to move drums the operator must have received training in accordance with OSHA Standard 29 CFR 1910.178. Each day the forklift shall be checked by the operator to ensure equipment is in safe operating condition.	L

Job Steps	Hazards	Controls	RAC
Sample Collection	2a. Contact with chemical agent or other hazardous chemicals	2a.CA and HTW safety awareness will be conducted during site specific orientation training and reviewed during morning tailgate briefings. PPE and protective clothing selection will comply with SSHP requirements.(PPE and protective clothing requirements utilized during sampling is dependent upon waste characterization. If water being sampled was used to decon workers after ring-off than level C PPE may be warranted)	L
	2b. Slips, trips, and falls	2b. Worker shall be aware of potential slippery surfaces and tripping hazards. Good housekeeping will be enforced by SSHO	L
	2c. Injury incurred while handling tools	2c. Hand and power tools shall be used, inspected, and maintained in accordance with the manufacturer's instructions and recommendations. Inspections shall be performed prior to use by the tool operator to determine that the tool operating safely. Tools with defect shall be taken out of service until repaired	L
	2d Heat/Cold stress	2d. All site activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Appropriate PPE for selection operation, at minimum – a. Long Sleeve Shirt b. Long Legged Pants c. Sturdy Work Boots d. Leather Gloves (set up) e. Butyl gloves (sampling) f. Safety Glasses, when required g. Hard Hat, when required h. Safety Vest, when required i. Steel-toed boots, as directed j. Additional PPE, as directed (CBRN APR, hearing protection , tychem F, butyl boots) 2. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable A:BC rated 2.5lb or larger fire extinguisher 3. .Form of Communication a. Project or personal Cellular Phone 3.Hand tools (drum bung, wrench, drum dolly) 4. Possible use of forklift	Qualified Personnel 1. First Aid/CPR – SSHO and one other individual. 2. Training a. Site-specific WP, SOP and AHA b. OSHA 40 hour and applicable 8 hour c. Equipment operation (as applicable) d. Heat/Cold Stress e. Biological hazards f. Flora/Fauna endangered/threatened g. Daily safety and operational briefing h. Site visitor training (as applicable) I. HAZCOM J. supervisor training – SSHO k. 30-hr construction outreach (SSHO) l. Forklift operators must receive training as specified by 29 CFR1910.178	1. Initial (Site Selection) –Tools will be inspected prior to use by the operator in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly it will be disposed or turned in for repair/replacement. 2. Daily- Housekeeping of assembly and work areas for debris and hazards. SSHO will perform audits and spot checks to verify compliance. SSHO Escort will update site's MSDS files on all items, supplies and material brought onto site. If forklift used operator must inspect equipment daily to ensure operating safely. 3. Weekly – First Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment. 4. Final (Site Departure) – Inspection of the entire area to ensure the site is left in the same or better than when we arrived.

Training Requirements: Only qualified personnel will be allowed to operate hand and power tools.

Training Acknowledgement:

Printed Name	**Signature**	**Date**

Activity Hazard Analysis (AHA)

Activity/Work Task: **EMERGENCY RESCUE OPERATIONS**	Overall Risk Assessment Code (RAC) (Use highest code)	**L**
Project Location:		
Contract Number:		
Date Prepared: 29 DECEMBER 2011		
Prepared by (Name/Title): Michael E. Short/Technical &Ops. Dir		
Reviewed by (Name/Title): Ed Grunwald, CIH		
Notes: (Field Notes, Review Comments, etc.)		

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

	RAC Chart
"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.	
"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible	**E = Extremely High Risk** **H = High Risk**
Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.	**M = Moderate Risk** **L = Low Risk**

Job Steps	**Hazards**	**Controls**	**RAC**
1. Establish location for desired work area to conduct operations, to include: a. Establish Work Area Control Zones b. Assist with Personnel Decontamination c. Perform Rescue of Injured Down Range Member d. Perform Medical Monitoring of Injured Identification	1a. Slip, trip and fall.	1a. Worker awareness of potential slippery/uneven surfaces and tripping hazards plus inspection and policing of debris.	**L**
	1b. Biological hazards.	1b. See Biological Hazards AHA, which must be used in conjunction with this AHA if applicable.	**L**
	1c. Endangered/threatened flora/fauna.	1c. Conduct reconnaissance IAW approved WP and avoid endangered/threatened species if at all possible.	**L**
	1d. Vehicle and heavy equipment traffic in area.	1d. Be aware of any vehicles or heavy equipment in area and be certain to wear a hard hat, safety glasses and a high visibility safety vest when working around heavy equipment. Establish arm and hand signals or radio communication with the equipment operator and be certain the equipment is grounded and shut off when within the arc of the boom, shovel, etc.	**L**
	1e. Lifting hazards	1e. Ensure that you, and if there is another individual assisting you, both have solid footing, leather work gloves and use the proper lifting technique, bend at the knees keeping your back as straight as possible and lift with your knees, not your back. Ensure you have good visibility in the direction you are carrying an item. Do not attempt to carry anything by yourself in excess of 50 lbs. or any item that blocks your visibility or is cumbersome to carry alone.	**L**

Job Steps	Hazards	Controls	RAC
	1f. Cold/Heat Stress	1f. All site activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	L
	1g. Contact with chemical agent or other hazardous chemicals.	1g. Personnel will don the proper PPE commensurate with the chemical hazard encountered and the work is being accomplished. Inherent with PDS operations, both the PDS Tent and Monitoring Tent are needed to be maintained at temperatures greater than 68°F. Electrical floor heating units are prohibited in the PDS or Monitoring Tent. Portable propane heaters can be used, but these cause “off gassing” of carbon monoxide (CO^{2}). A CO^{2} Meter capable of reading levels from 0 – 25ppm is required and will be periodically observed for current levels. If the level is reached or exceeded; the heating unit will be turned off; the PDS and Monitoring Tent will be opened and allow fresh air to ventilate through, until CO^{2} level is below 25ppm.	L
	1i. Noise in excess of OSHA standards	1i. If the heavy equipment and/or power tools used are louder than 85dB (A) then the appropriate hearing attenuation PPE must be worn. This could be ear plugs, ear muffs or both depending on the noise level. The site safety officer will measure the noise level of the equipment and prescribe the applicable noise attenuation PPE to be worn.	L
	1j. Fire/Explosion	1j. Refueling of all vehicles, heavy equipment and other fueled equipment will be conducted in accordance with the SSHP, applicable SOPs and EM 385-1-1, Chapter 18. Proper fire extinguishers will be on site and serviceable. There will be no “Hot Fueling” authorized at any time.	L
	1k. Pressurized cylinders – sudden release of contents	1k. Periodic inspection of all pressurized cylinders by field crew. Proper storage of cylinders in accordance with SOPs. Some operations require the use of a Cascade System (multiple pressurized cylinders) to provide breathable air for downrange team. The valves, gauges and connections are needed to be visibly checked hourly while team is downrange.	L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Rescue litter and retrieval device 2. Appropriate PPE for selection operation, at minimum – a. Long Sleeve Shirt b. Long Legged Pants c. Sturdy Work Boots d. Leather Gloves e. Safety Glasses, when required f. Hard Hat, when required g. Safety Vest, when required h. Additional PPE to conduct other operations, as directed 3. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable A:BC rated 2.5lb or larger fire extinguisher 4. Other vehicles designated as personnel conveyance will be equipped with – a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing 5. Two forms of Communications a. Project issued Radio b. Project supplied or personal Cellular Phone	Qualified Personnel 1. First Aid/CPR – UXOSO or site safety officer and one other individual. 2. Site Manager or SUXOS 3. Selected site personnel performing Rescue will be trained and practice Rescue procedures 4. UXO Personnel must be certified as an EOD-trained and must have the necessary experience for the position filled. 5. All personnel involved in this operation that are required to wear Self-Contained Breathing Apparatus (SCBA) or a full-face Air Purifying Respirator (APR) will be certified under 29 CFR1910.134 Training 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Flora/Fauna endangered/threatened 7. Daily safety and operational briefing 8. Site visitor training	1. Initial (Site Selection) – General inspection of assigned or designated area. Equipment will be inspected daily by operator prior to use in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. 2. Daily- Housekeeping of assembly and work areas for debris and hazards. UXOSO will perform audits and spot checks to verify compliance. Periodic communication checks between Field Office or UXOSO and Field Crews, as deemed necessary, to ensure crew's status and relay emergency information. Field Office and UXOSO will maintain a telephonic roster of all site personnel's cellular phone numbers to ensure two forms of communications. In the event that a field crew fails to make a communications check, they will cease operations and relocate to re-establish communications link with the Field Office or UXOSO. 3. Weekly – First Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment. 4. Final (Site Departure) – Inspection of the entire area to ensure the site is left in the same or better than when we arrived.

Training Requirements: Only qualified personnel will be allowed to operate rescue litter and retrieval device.

Training Acknowledgement:

Printed Name	Signature	Date

Activity Hazard Analysis (AHA)

Activity/Work Task: **DECONTAIMINATION STATION FOR PERSONNEL, EQUIPMENT AND RCW MATERIAL**	Overall Risk Assessment Code (RAC) (Use highest code)	**M**

Project Location:

Contract Number:

Date Prepared: 29 DECEMBER 2011

Prepared by (Name/Title): Michael E. Short/Technical &Ops. Dir

Reviewed by (Name/Title): Ed Grunwald, CIH

Notes: (Field Notes, Review Comments, etc.)

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart
E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Job Steps	Hazards	Controls	RAC
1. Establish location for desired work area to conduct operations, to include: a. Establish Work Area Control Zones (EZ, CRZ and SZ); b. Erection of PDS Tent or Shelter;	1a. Slip, trip and fall.	1a. Worker awareness of potential slippery/uneven surfaces and tripping hazards plus inspection and policing of debris.	**L**
	1b.Biological hazards.	1b. See Biological Hazards AHA, which must be used in conjunction with this AHA if applicable.	**L**
	1c. Endangered/threatened flora/fauna.	1c. Conduct reconnaissance IAW approved WP and avoid endangered and threatened species if at all possible.	**L**
	1d. Cold/Heat Stress	1d. All site activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	**L**
	1e. Contact with chemical agent or other hazardous chemicals	1e. Personnel will don the proper PPE commensurate with the chemical hazard, the control zone where work is being accomplished and a Rescue Team is on standby. Ensure all personnel are halted before crossing into an established zone without proper PPE.	**L**

Job Steps	Hazards	Controls	RAC
	1f. MEC/UXO Hazards	1f. Inspect the area selected for the PDS to be cleared of the presence of UXO using a magnetometer to assist in finding items in brush and dense vegetation. If an MEC item is encountered alert the rest of the team and conduct an inspection of the item IAW the approved WP, SOP and EM 385-1-97.	M
	1g. Lifting hazards.	1g. Ensure that you, and if there is another individual assisting you, both have solid footing, leather work gloves and use the proper lifting technique, bend at the knees keeping your back as straight as possible and lift with your knees, not your back. Ensure you have good visibility in the direction you are carrying an item. Do not attempt to carry anything by yourself in excess of 50 lbs. or any item that blocks your visibility or is cumbersome to carry alone.	L
	1h. Hand and Power tool operation	1h. When operating power tools they will be handled, operated and maintained IAW the manufactures instructions, the approved WP and any applicable SOPs. The power tool will be inspected prior to use to ensure that all of the hand and safety guards are in place and that the chain, if present, is properly tightened and that the tool is otherwise in good working order. Depending on the power tool PPE will vary and it too must be serviceable, operable and free of any defect. PPE will be worn IAW the approved WP and inspected by the user prior to donning. Hand and power tool use will be IAW EM 385-1-1, Chapter 13.	L
	1i. Electrical Shock.	1i. Due to the nature of PDS operations and the abundant use of water, the electrical services should be “hard-wired” into the PDS by a certified electrician. In the event that this cannot be accomplished, all electrical power lines need to be securely fastened to the upper frames of the structure or tent and used with GFCI connections. All electrical appliances, equipment will have a third prong for proper grounding and all electrical outlets will have three pronged receptacles and meet the requirements of EM 385-1-1, Chapter 11.	L
	1j. Pressurized cylinders – sudden release of contents	1j. Periodic inspection of all pressurized cylinders by PDS crew. Proper storage of cylinders in accordance with SOPs and EM 385-1-1, chapter 20.	L

Job Steps	Hazards	Controls	RAC
	1k. Vehicle and heavy equipment traffic in area.	1k. Be aware of any vehicles or heavy equipment in area and be certain to wear a hard hat, safety glasses, and a high visibility safety vest when working around heavy equipment. Establish arm and hand signals or radio communication with the equipment operator and be certain the equipment is grounded and shut off when within the arc of the boom, shovel, etc.	L
2. PDS Tent is operational and ready for use for the following:	2. The Hazards itemized in Hazard 1 are applicable to Hazard 2.	2. The Controls itemized in Control 1 are applicable to Control 2.	
a. Processing of Personnel b. Processing of RCW Material c. Processing of Equipment	2a. Contact with chemical agent or other hazardous chemicals	2a. Inherent with PDS operations, both the PDS Tent and Monitoring Tent are needed to be maintained at temperatures greater than 68°F. Electrical floor heating units are prohibited in the PDS or Monitoring Tent. Portable propane heaters can be used, but these cause “off gassing” of carbon monoxide (CO^2). A CO^2 Meter capable of reading levels from 0 – 25ppm is required and will be periodically observed for current levels. If the level is reached or exceeded; the heating unit will be turned off; the PDS and Monitoring Tent will be opened and allow fresh air to ventilate through, until level is below 25ppm. PDS personnel will process, clean and “double bag” all equipment and any RCW Material, prior to turning these items over for continued evaluation. At no time, will PDS personnel open and remove an item that was originally processed as “bagged”. Should a bag appear to be opened, cut or torn, the PDS Supervisor will notify UXOSO for instructions.	L
	2b. Pressurized cylinders – sudden release of contents	2b. The cylinders in question will be the propane heaters, if used and the SCBA tanks used by the field team and possibly the PDS personnel. The SCBAs will be handled IAW the WP and SOP. The propane heater will be checked once an hour to ensue it is operating properly and there are no obstructions in front of the jet.	L
3. Emergency Operations - a. Injured Down Range Member b. Rescue Crew sent to assist Team Down Range	3. The Hazards itemized in Hazard 1 and 2 are applicable to Hazard 3.	3. The Controls itemized in Control 1 and 2 are also applicable to Control 3.	

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Tent or Structure for PDS 2. Wooden Stakes/Plastic Pin Flags 3. Power and Hand Tools 4. Decontamination Equipment – a. Decontamination solution of 5% bleach b. Scrub Brushes c. 5-gal Decontamination Buckets d. Hand Sprayers e. Shuffle Pans f. 30-gal Trash bags g. Detergent (Soap) h. Water i. 6-mil Plastic bags and sheeting material j. RCWM repackaging k. Plastic bags (various sizes) 5. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable A:BC rated 2.5lb or larger fire extinguisher 6. Other vehicles designated as personnel conveyance will be equipped with – a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing 7. Two forms of Communications a. Project issued Radio b. Project supplied or personal Cellular Phone	Qualified Personnel 1. First Aid/CPR – UXOSO or site safety officer and one other individual. 2. Site Manager or SUXOS 3. All personnel operating heavy equipment will provide proof of competency (documentation of training or experience) to the UXOSO prior to operating the equipment. 4. All personnel involved in this operation that are required to wear Self-Contained Breathing Apparatus (SCBA) or a full-face Air Purifying Respirator (APR) will be certified under 29 CFR1910.134 5. UXO Personnel must be certified as an EOD-trained and must have the necessary experience for the position filled. Training 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Flora/Fauna endangered/threatened 7. Daily safety and operational briefing 8. Site visitor training	1. Initial (Site Selection) – General inspection of assembly area. Equipment will be inspected daily by operator prior to use in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. 2. Daily- Housekeeping of assembly and work areas for debris and hazards. UXOSO will perform audits and spot checks to verify compliance. UXOSO will update site's MSDS files on all items, supplies and material brought onto site. Periodic communication checks between Field Office or UXOSO and Field Crews, as deemed necessary, to ensure crew's status and relay emergency information. Field Office and UXOSO will maintain a telephonic roster of all site personnel's cellular phone numbers to ensure two forms of communications. In the event that a field crew fails to make a communications check, they will cease operations and relocate to re-establish communications link with the Field Office or UXOSO. 3. Weekly – First Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment. 4. Final (Site Departure) – Inspection of the entire area to ensure the site is left in the same or better than when we arrived.

Training Requirements: Only qualified personnel will be allowed to operate tent or structure for PDS, wooden stakes/plastic pin flags, and hand and power tools.

Training Acknowledgement:

Printed Name	Signature	Date

Activity Hazard Analysis (AHA)

Activity/Work Task: **Interim Holding Facility (IHF) Entry Operations**	Overall Risk Assessment Code (RAC) (Use highest code) **L**
Project Location:	
Contract Number:	
Date Prepared: 29 DECEMBER 2011	
Prepared by (Name/Title): Michael E. Short/Ops & Technology Dir.	
Reviewed by (Name/Title): Ed Grunwald, CIH	
Notes: (Field Notes, Review Comments, etc.)	

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

	RAC Chart
"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.	
"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible	**E = Extremely High Risk** **H = High Risk**
Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.	**M = Moderate Risk** **L = Low Risk**

Job Steps	**Hazards**	**Controls**	**RAC**
1. Request, Delivery, Site Set-up, Placement and establishment of physical security for an IHF unit.		**NOTE:** The IHF will be provided by the Department of Defense (US Army PM, Non-Stockpile) as part of the approval process of the specific Chemical Safety Submission (CSS). The delivery; placement; site set-up and establishment of physical security requirements are addressed in both the CSS and referenced Work Plan Appendix. The prime contractor is responsible for erecting security perimeter fencing; electrical hook-up for power and lighting; appropriate lightning protection and providing the required physical security of the IHF (static or roving guard patrols). These operations are addressed by separate AHAs. Refer to the necessary AHA.	L
2. IHF Entry Operations, to include – a. Initial Entry, after first RCWM item has been placed; and b. Every subsequent entry into the IHF		**NOTE:** This operation is under the direct supervision and control of Edgewood Chemical and Biological Command (ECBC) and Technical Escort Unit (TEU) personnel (US Government). The IHF Entry Team (ECBC and TEU) Leader is solely responsible for conducting these operations IAW established SOPs, directives and guidelines. The IHF Entry Team Leader will establish an Exclusion Zone for each IHF Entry operation. Since this operation is conducted by an outside agency, the prime contractor will be provided written procedures on this operation to ensure that all safety protocols are enforced. The prime contractor may provide additional	L

Job Steps	Hazards	Controls	RAC
		support to the IHF Entry Team by – 1) The UXOSO assisting in visibly searching the area and marking the limits of the EZ with appropriate warning signs or other acceptable markings; and 2) Use of additional personnel, serving as Road Guards, to ensure no unauthorized personnel enter into the established EZ set by IHF Entry Team Leader for the specific operation.	

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Air Monitoring Equipment; Pumps; Stands 2. Hand and Power Tools 3. Appropriate PPE for selection operation, at minimum – a. Long Sleeve Shirt b. Long Legged Pants c. Sturdy Work Boots d. Leather Gloves e. Safety Glasses, when required f. Hard Hat, when required g. Safety Vest, when required h. Additional PPE to conduct other operations, as directed 4. Heavy equipment, if applicable 5. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable A:BC rated 2.5lb or larger fire extinguisher 6. Other vehicles designated as personnel conveyance will be equipped with – a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing 7. Two forms of Communications a. Project issued Radio b. Project supplied or personal Cellular Phone 8. Approved packaging material and Multiple Round Containers (MRC) provided by TEU 9. Emergency Personnel Decontamination Station equipment, at a minimum – a. Decontamination solution of 5% bleach b. Scrub Brushes c. Soapy Water d. Hand Sprayers e. Shuffle Pans	Qualified Personnel 1. First Aid/CPR – UXOSO or site safety officer and one other individual. 2. Site Manager or SUXOS 3. Heavy equipment operator, if applicable 4. All personnel operating heavy equipment, to include ATVs, will provide proof of competency (documentation of training or experience) to the UXOSO prior to operating the equipment. 5. Trained and Certified Air Monitoring Operator 6. All personnel involved in this operation that are required to wear Self-Contained Breathing Apparatus (SCBA) or a full-face Air Purifying Respirator (APR) will be certified under 29 CFR1910.134 Training 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Flora/Fauna endangered/threatened 7. Daily safety and operational briefing 8. Site visitor training	1. Initial (Site Selection) – General inspection of assembly area. Equipment will be inspected daily by operator prior to use in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. 2. Daily- Housekeeping of assembly and work areas for debris and hazards. UXOSO will perform audits and spot checks to verify compliance. UXOSO will update site's MSDS files on all items, supplies and material brought onto site. Periodic communication checks between Field Office or UXOSO and Field Crews, as deemed necessary, to ensure crew's status and relay emergency information. Field Office and UXOSO will maintain a telephonic roster of all site personnel's cellular phone numbers to ensure two form s of communications. In the event that a field crew fails to make a communications check, they will cease operations or relocate to re-establish communications link with the Field Office or UXOSO. 3. Weekly – First Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment. 4. Final (Site Departure) – Inspection of the entire area to ensure the site is left in the same or better than when we arrived.

Training Requirements: Only qualified personnel will be allowed to operate air monitoring equipment, pumps, stands, and hand and power tools.

Training Acknowledgement:

Printed Name	Signature	Date

ACTIVITY HAZARD ANALYSIS

Activity: General Crane Operations

Summary: A Grove GMK 5120 mobile crane will be used to lift equipment on the Spring Valley CWM Removal Project.

Principal Steps	Potential Safety/Health Hazards:	Recommended Controls
Vehicle Inspection (Before operating)	Vehicle and heavy equipment traffic in work area	Operation of vehicles in accordance with the SSHP and applicable SOPs. Be alert when working around heavy equipment. Ground guide for the backing of vehicles and heavy equipment. Before operations begin, close the work area to other pedestrian and vehicle traffic.
	Pinch and Cut Hazard	Operators need to be aware of potential pinch and cut hazards when performing inspections inside the engine compartment; around doors; latches and lift gates.
	Exposure to potential corrosive or flammable liquids	Operators need to be aware of potential exposure to corrosive and/or flammable liquids when conducting vehicle inspections. Operators will not eat, drink or smoke when performing these tasks. Any visible leaking will be immediately reported to their supervisor. Any spills of vehicle additives (anti-freeze, oil, hydraulic fluids, etc.) will be cleaned up immediately.
	Failure of Safety Equipment (Vehicle Integral or Site Issued)	During the inspection of the equipment, the operator noticed that any of the vehicle's integral safety equipment (boom angle indicator, telescoping boom blocks, etc) is inoperable; that vehicle is no longer operational and can not be used until repaired. Any additional issued safety equipment issued (first aid kit, fire extinguisher, etc) will be replaced before the vehicle is operated.
Crane Operation	Lifting and Loading Material	Operator will be properly trained on the specific equipment to be used. Crane operator will be licensed and certified. Operator will maintain awareness of surroundings at all times, as conditions around the equipment will change continuously. Load charts will be reviewed and followed prior to a lift. Critical lifts or lifts over critical equipment will be conducted following completion and approval of a Lift Plan. All personnel will stand clear of the suspended load until the crane has released the entire weight of the load. Operators and field crews will use hand signals and verbal commands to communicate potential hazards and/or work stoppages. Proper lifting procedures will be followed at all times as described in the health and safety plan. At no time will any person be permitted to pass beneath a suspended load. Crane operator will ensure that all persons are clear of the intended path of the load prior to beginning lifting procedures. Only personnel necessary for the safe and efficient lifting and loading of material shall be in the area of the crane operation. Proper PPE will be worn at all times including the use of leather gloves when securing or removing loads. Employees will use stairs or ladders to gain access to the equipment as necessary. No climbing up or jumping down from the equipment will be allowed.
	Struck by Equipment	Accessible areas within the swing radius of the rear of the rotating superstructure of the crane shall be barricaded in such a manner as to prevent workers from being struck or crushed by the crane.

	Noise	Hearing protection will be worn in hazardous noise areas (85dBA or greater). Hearing conservation program in place. Post warning signs. Hearing Protection – Ear Plugs, either in custom molded, formable, and pre-molded or ear muffs.
	Eye/Foot/Head and Hand Hazards	Eye/Face Protection – Safety glasses with side shields (ANZI Z87.1); Appropriate footwear as required, but safety toed footwear may be required depending on task; Sturdy leather work gloves as required, and a Hard Hat.
	Ergonomic Hazards	Reduce bending, twisting, and kneeling, by using alternating work, rotating workers and periodic stretching break to reduce static or awkward postures. Use team lifting, and lifting aids to minimize lifting weights over 25-lbs above the shoulders, below the knees, or at arms length
	Thermal Stress	Train workers/supervisors in heat stress, cold stress/hypothermia recognition, prevention, and control. Use of WBGT (weather station) readings when working in extreme temperatures. Provide water/fluids. Provide adjacent thermal recovery (cool down/warm up) area.
	Equipment Tip Over	Limit personnel in area. Block off access. Ensure adequate set up room for outriggers, and use outriggers on all equipment so equipped. Stop all activities if the wind exceeds tolerances. Wind tolerances for the GMK 5120 is 18 miles per hour. Inspect location to ensure ground will support weight of the equipment and the operation. .
	Electric Power Lines	Prior to erecting the crane, operator and supervisor needs to survey area, to ensure that any overhead power lines are rerouted or disconnected.

Equipment to be used: Crane, Rigging and Slings

Personal Protective Equipment
Cotton coverall or work clothing
Hard Hat
Safety glasses with side shield
Steel Toe work boots
Leather gloves (riggers)
Hearing protection
High visibility vest

Inspection Requirements: Inspections requirements-Equipment will be inspected by a competent person prior to use in accordance with manufacturer's recommendations and the requirements of section 16 of EM 385-1-1 (Safety and Health Requirements Manual, September 2008). Whenever any crane and/or hoisting equipment is found to be unsafe, or whenever a deficiency that affects the safe operation of a crane and/or hoisting equipment is observed, the affected equipment shall be immediately taken out of service and its use prohibited until unsafe conditions have been corrected. Records of crane and hoisting equipment tests and inspections shall be maintained onsite.

Training Requirements: Operators will be trained and certified (from a nationally recognized accrediting agency) in the proper operation of the crane.

Analyzed By: Bradley Olson
Site Manager

Date: April 21, 2009

Approved By: Ed Grunwald, CIH
Project Safety and Health
Manager

Edward Grunwald

Date: April 21, 2009

ATTACHMENT D-3
DEMOLITION PLAN

Demolition and Disposal Plan

Demolish building
4825 Glenbrook Road, NW, Washington, DC, 20016

Revised Final

March 1, 2012
Prepared by:

Ron Feather

Demolition Services, Inc.
8136 Flannery Ct Manassas, Virginia 20109
Office: 703-257-4374 Fax: 703-257-4648

EMERGENCY CONTACT INFORMATION

NAME	DESIGNATION	PHONE NUMBER
Ronald J. Feather	General Superintendent	540-219-0900
Justin Stanley	Superintendent/ Site Safety and	703-656-1828
Ron Feather	President/ Project Manager	703-585-9058 (Desk) 703-257-4374 (Main Office)
Scott Wunschel	Parsons Site Manger	202-294-6991
Joe Kaputa	Parsons Site Construction Manager	703-899-4206

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A. Introduction

The purpose of this demolition and disposal plan is to establish methods and procedures for Demolition Services, Inc. (DSI) to follow during the safe and resourceful demolition of 4825 Glenbrook Road, NW, Washington, DC, 20016. All demolition and work procedures will follow Section 23 of the US Army Corps of Engineers Safety Manual, EM-385-1-1 (15 September 2008).

B. Building Description

The project includes demolition of the three (3) story Residential home. The residential home is approximately 2730 square feet per floor. The structure is 2 stories above ground setting on a full basement. The structure is constructed of standard wood framing with a brick exterior finish.

The scope of work includes demolition of the (3) three story structure located at 4825 Glenbrook Road, NW, Washington, DC, 20016, down to the slab of the property where possible. Specifically, all building structures above the first floor including the first floor and any extraneous non-structural walls within the basement shall be removed. The property is three stories, including the basement. Each floor is 2,730 square feet and the perimeter of the house is 230 feet. This demolition work is to include both the exterior and interior of the building. However, the exterior walls or floor of the basement will not be disturbed.

C. Demolition Guideline

1. DSI will coordinate and acquire all necessary permits (such as building permit and public space permit) to perform this work. Once permits are obtained they will be posted on-site.

2. Miss Utility will be notified at least 48 hours prior to commencement of any work.

3. Temporary fencing shall be erected by others.

4. Prior to demolition DSI will perform an engineering survey of the structure to determine structural hazards. The survey will be conducted by a registered Professional Engineer. The survey results will be provided to USACE for review prior to the start of work.

5. Prior to demolition DSI will perform an environmental survey of the structure. Results of environmental survey will also be provided to USACE. This will include asbestos and lead based paint.

6. Prior to beginning work DSI will obtain a copy of the Site-Specific Work Plan for 4825 Glenbrook Road Remedial Action. The demolition activities will be performed in accordance with the Parsons' Accident Prevention Plans included in the 4825 Glenbrook Road Site-Specific Work Plan for Remedial Action.

7. Prior to demolition DSI will disconnect all utility lines (including electrical, gas, water, and sewer) at property line and remove universal waste stream (i.e. light bulbs and ballast). Utility lines will be capped at the property line. Any overhead power lines will be de-energized or protected according to Miss Utility's procedures.

8. Prior to demolition, the AC units will be removed and Freon from these units will be collected by a licensed company. The collection of Freon will be documented and a close out report will be provided to the owner.
   *See attached AHA provided by Freon Recovery Company.

9. Pre-demolition meeting will be held onsite.

10. Access to the site will be restricted to authorized personnel only and patrolled by a contracted security guard after hours. Privacy fencing will be installed along Glenbrook Road and around the perimeter of the Parsons Command Post compound. After hours and on weekends, access points to the site will be locked with a key and key log will be maintained by the Parsons Site Manager. Portable restrooms will be available to site workers as needed.

11. All demolition activities shall be conducted with minimal disruption to the community. Dust will be controlled by wet demo methods. Water will be supplied by an on-site water supply/source. Noise will be controlled by working within the allowed hours of operations for the community. Normal working hours are 8am to 5pm , M-F.

12. Demolition activities cannot disturb soil surfaces surrounding the structure. Any part of the building which comes into contact with subsurface material is to remain in place. This will include but is not limited to the basement walls on the west, south, and east side of the building. No demolition of the residence is to be performed below the slab of the house. The entire wall on the north side of the building (where the garage doors are located), including the basement wall, will be knocked down to the slab. The basement supporting walls will remain intact (i.e., do not remove structural or load bearing walls that support the exterior basement walls. In the event that suspected American University Experiment Station (AUES) item or items are accidently uncovered or exposed all work will stop immediately. A Spring Valley low probability Contingency Plan will be initiated. The jobsite will be secured and turned over to the USACE. A Spring Valley low probability Contingency Plan is included in Attachments.

13. Structural demolition will be performed systematically from top of building to bottom, using a 200 series Track Excavator (73,000 LBS). All demolition shall be conducted using the mentioned equipment. All hand work will be conducted from the ground such as separation of wood debris from metal or concrete. Heavy equipment will enter the property from the driveway entrance and locate in the driveway in front of the garage for the demolition activities.

14. All construction debris will be hauled offsite using roll offs and/or demo trailers

15. Construction debris will be taken to an appropriate landfill. All metals, concrete, and brick will be taken to a recycler.

16. The site will be cleaned and cleared before departing each day to the approval of the Parsons Site Manager. If at any time materials cannot be hauled off site before departing for the day materials will be neatly stored and secured.

17. DSI will provide traffic controls to conduct demolition activities. Traffic controls will be conducted during loading and unloading of equipment and haul trucks or at times when traffic will be impacted due to demolition activities. Traffic controls will be set up as a two man operation using stop and slow signs to direct traffic. The traffic controllers will be required to wear Class III high visible vest. High visible vest is a DSI company standard for all employees and site visitors to work or access the jobsite. Approximately 50 trips are estimated for the demolition effort.

D. ***Safety Procedures***

a. Activity Hazard Analysis (*see attached)

b. Public Protection

Temporary safety fence will be provided by others.

c. Fire Protection and Prevention

If hot work is being performed, all heating apparatus will be provided in accordance with OSHA and NFPA regulations. If a “Hot Work Permit” is required, DSI will request said permit from the USACE. Hot work will not proceed until a permit is issued.

1. Cables (lines) will be placed so as to ensure that they will not be cut and/or severed by falling debris. Any lines that may run from a man lift shall be secured against the floor and sides of the building (if there are walls to attach to). Lines will not be secured into the ground.

2. Areas below cutting or welding operations will always be kept clear.

3. Goggles and cutting shields shall be used for eye protection and to prevent flash burns. Eye protection is required while chipping, grinding and dressing of welds.

4. Placement of any supply lines and connections will be such that they are not fire or tripping hazards.

5. Cutting operations will be shielded with noncombustible or flameproof screens wherever practicable.

6. Fire extinguishers will be readily available when cutting or heating on the job.

7. Proper ventilation will be provided whenever cutting or heating is performed.

8. One person will be designated as “Fire Watch”. The person on Fire Watch will have no other jobs to perform; he will be on his post for all hot work. Fire-watch person will communicate with torch operators by use of air horn.

*Hot work is not expected to be performed during the demolition. The purpose to include fire protection in this plan is in case of equipment failure. If we should have a bucket or steel member crack or break this is to establish methods to make repairs. This section is not put in the plan for day to day operations.

E. Daily Housekeeping

Good daily housekeeping is the foundation for a safe work environment. Proper daily housekeeping prevents accidents and fires, as well as creates an organized and secure workplace atmosphere.

- All materials shall be stored in a stable manner so that they will not be subject to falling, shifting, or spilling.

  Rubbish, scraps, and debris will be removed from the work area on a daily basis to jobsite dumpsters, trucks, or stockpiled, as required.

- Materials and supplies will not be left in walkways or outside the work area. Work areas shall be inspected by a designee of the DSI Superintendent at the end of each work shift.

F. Personal Protective Equipment (PPE)

1. Personal protective equipment will be worn as necessary to safely complete this project.

2. Employees must check with their supervisor regarding any portion of their job and/or PPE that they are not familiar with.

3. Goggles, face shields, helmets and other comparable equipment are required to fit the eye and face protection needs of each individual employee.

4. Hard hats shall be ANSI approved. Hard hats, Steel Toe Shoes, Eyewear and High Visibility Safety Vests (HSVS) are DSI company-required safety gear on every project.

5. Long-sleeved shirts and welding shirts and/or jackets, will be worn as required.

6. Gloves as necessary

7. ANSI Approved Steel Toed Boots are required on this and all projects.

8. Respiratory protection will be used as a safeguard against hazardous fumes. When respiratory protection is utilized, Fit Test Records will be supplied.

9. Material Safety Data Sheets (MSDS) present on job site at all time. MSDS binders are assembled based on the materials stored in job trailers and site trucks. If at any time new materials are delivered MSDS forms will be inserted.

10. The use of <u>Full body harnesses</u> is required when working on elevated work

where there is no guard rail protection and on suspended scaffolds over 6 feet above finish grade and or floor level.

11. Employees are expected to utilize proper judgment in their personal habits when they report to work each morning; they must be in fit condition to meet daily obligations.

12. Ear protection must be worn during operation of heavy equipment.

13. DSI will comply with health and safety regulations applicable to UXO operations included in EM 385-1-1 (September 2008).

14. Parsons will provide hand held radios to all active construction workers to facilitate communication between site workers and the Command Post. Hand signals will be established and reviewed during the morning safety briefings in the unlikely event of radio failure. Parsons Site Manager will be present during all construction activities.

G. Disposal

Demolition Debris will be separated into four (4) waste streams. They are:

1. Construction Debris (i.e. wood, trash)
2. Masonry materials (i.e. brick, concrete block)
3. Metals
4. Universal waste (I.e. fluorescent bulbs, ballast, and mercury containing switches)

Construction debris will be separated and disposed of at East End Landfill and Cox's Darbytown Road Landfill in accordance with all Local, State, and Federal guidelines. The disposal permits are included in the attachments.

Concrete, masonry, and metal materials will be hauled to a recycler.

If any universal wastes (fluorescent bulbs, ballasts, mercury switches) are identified, they will be disposed of along with any identified environmental waste as determined by the environmental survey performed prior to demolition. The waste will be transported and temporarily stored in a fenced area at the Federal Property with the SVFUDS until disposal facility is selected. At a later time, the waste will be transported to the approved disposal facility selected based on the environmental survey results.

All waste streams will be disposed of in accordance with all Local, State, and Federal guidelines.

A signed receipt by the disposal site operator will be returned to the USACE within thirty (30) days of disposal. The receipt will indicate the date of receipt, and the quantity of material received. The receipt will also indicate the condition of the materials as delivered to the landfill and the location where the debris will finally rest.

H. Emergency Procedures

When an emergency develops, the Site Superintendent should:

1. Secure the area tightly and quickly.
2. Site Superintendent is to call emergency phone numbers of significance (911 or ONSITE EMERGENCY CONTACT FIRST)
3. Once Emergency contacts are notified Site Superintendent is to notify Parsons and Demolition Services, Inc. Site Project Manger.
4. Once site notifications have been made, Parsons will notify USACE of developing emergency.
5. See attached for route and location of nearest Hospital.

Sections 01.D and 01.E, US Army Corps of Engineers, EM 385-1-1, 15 September 2008 will be used for additional guidelines for emergency procedures.

Fire Procedures:

1. Have fire extinguishers on hand during work. Make sure all workers are aware of the location of fire extinguishers.
2. In case of fire, use proper fire extinguisher and/or water hose on all SMALL, centrally located fires.
3. Call Fire Department
4. Hot Work Permit will be requested as necessary

Sections 10.C, US Army Corps of Engineers, EM 385-1-1, 15 September 2008 will be used for additional guidelines on fire procedures.

A list of pertinent emergency phone numbers will be established and listed at the project site.

I. ***Additional Items***

Utilities: The existing electric, steam, gas, water, telephone, and other utility lines will be located and disconnected by DSI prior to the commencement of any demolition activities. The disconnections will be verified by DSI. Care will be taken to insure that no disruption of utility services will occur to any other facility structures.

J. ***Emergency Contact Information***

NAME	DESIGNATION	PHONE NUMBER
Ronald J. Feather	General Superintendent	540-219-0900
Justin Stanley	Superintendent/ Site Safety and Health Officer	703-656-1828
Ron Feather	President/ Project Manager	703-585-9058 (Desk) 703-257-4374 (Main Office)

Scott Wunschel	Parsons Site Manger	202-294-6991
Joe Kaputa	Parsons Site Construction Manager	703-899-4206

K. ***<u>Summary</u>***

To minimize pollution, degradation, and exploitation of the environment, all work will be performed in accordance with contract specifications and all applicable Federal, DC, and local laws and regulations.

Attachments

Spring Valley Low Probability Contingency Plan

Project Schedule

Directions to nearest Hospital and George Washington University Hospital

AHA's

Disposal Permits

Site Map

Low Probability Contingency Plan

This low probability contingency plan was included as Attachment 1 to the APP in Appendix D of the Spring Valley Site-Wide Work Plan (USACE 2007) under the previous contact (Contract No. W912DY-04-D-0005 Delivery Order 0007). It is still applicable to the new contact (Contract No. W912DY-09-D-0062 Delivery Order 0006).

USACE 2007 *Site-Wide Work Plan for the Spring Valley Formerly Used Defense Site, Spring Valley, Washington D.C., March 2007.*

16.13 MEC/RCWM CONTINGENCY PLAN FOR LOW PROBABILITY SITES

16.13.1 Introduction

16.13.1.1 The purpose of this contingency plan is to define the procedures that will be followed in the unlikely event that items potentially related to the American University Experiment Station (AUES) are encountered during non-intrusive activities at the SVFUDS, or during intrusive activities at low probability sites. For purposes of differentiation between this plan and the contingency plan used for higher probability sites, this plan will be referred to as the Low Probability Contingency Plan.

16.13.2 Definitions

16.13.2.1 Items that are potentially related to AUES will be defined as "potential AUES items" for the purposes of this Low Probability Contingency Plan. These items include but are not limited to:

- Any item identified as potential MEC/RCWM or as being related to MEC/RCWM; or
- Any sealed container that cannot be positively identified to be unrelated to AUES (e.g., paint cans, etc. are known to be unrelated to AUES activities); or
- Any unsealed container or identifiable fragment thereof that cannot be positively identified to be unrelated to AUES (e.g., beer bottles, etc. are known to be unrelated to AUES activities); or
- Any other item that is potentially agent-related material or that potentially contains agent-related material; or
- Any other item that cannot be positively identified as an obvious cultural feature or a post-1918 feature (obvious cultural features or post 1918 features include such items as root ball baskets, poly vinyl chlorinated [PVC] piping, wiring, etc.).

16.13.3 Low Probability Contingency Plan Initiation

16.13.3.1 The Low Probability Contingency Plan will be initiated if any potential AUES items (as defined above) are encountered during site activities, or if personnel at a low probability site exhibit symptoms that may be attributable to a chemical exposure (i.e., respiratory irritation and/or irritation of the eyes or skin).

16.13.3.2 In the event that the Low Probability Contingency Plan is initiated for any reason, intrusive activities will be halted immediately. EXCEPTION: see Paragraphs 16.13.8.2 through 16.13.8.4.

16.13.4 Initiation Procedures for Potential AUES Items

16.13.4.1 In the event that the Low Probability Contingency Plan is initiated because potential AUES items are encountered during site activities, subsequent actions taken will be determined according to the nature of the potential item. This procedure is summarized in Figure D1-16-1 and in Sections 16.13.5 through 16.13.8.

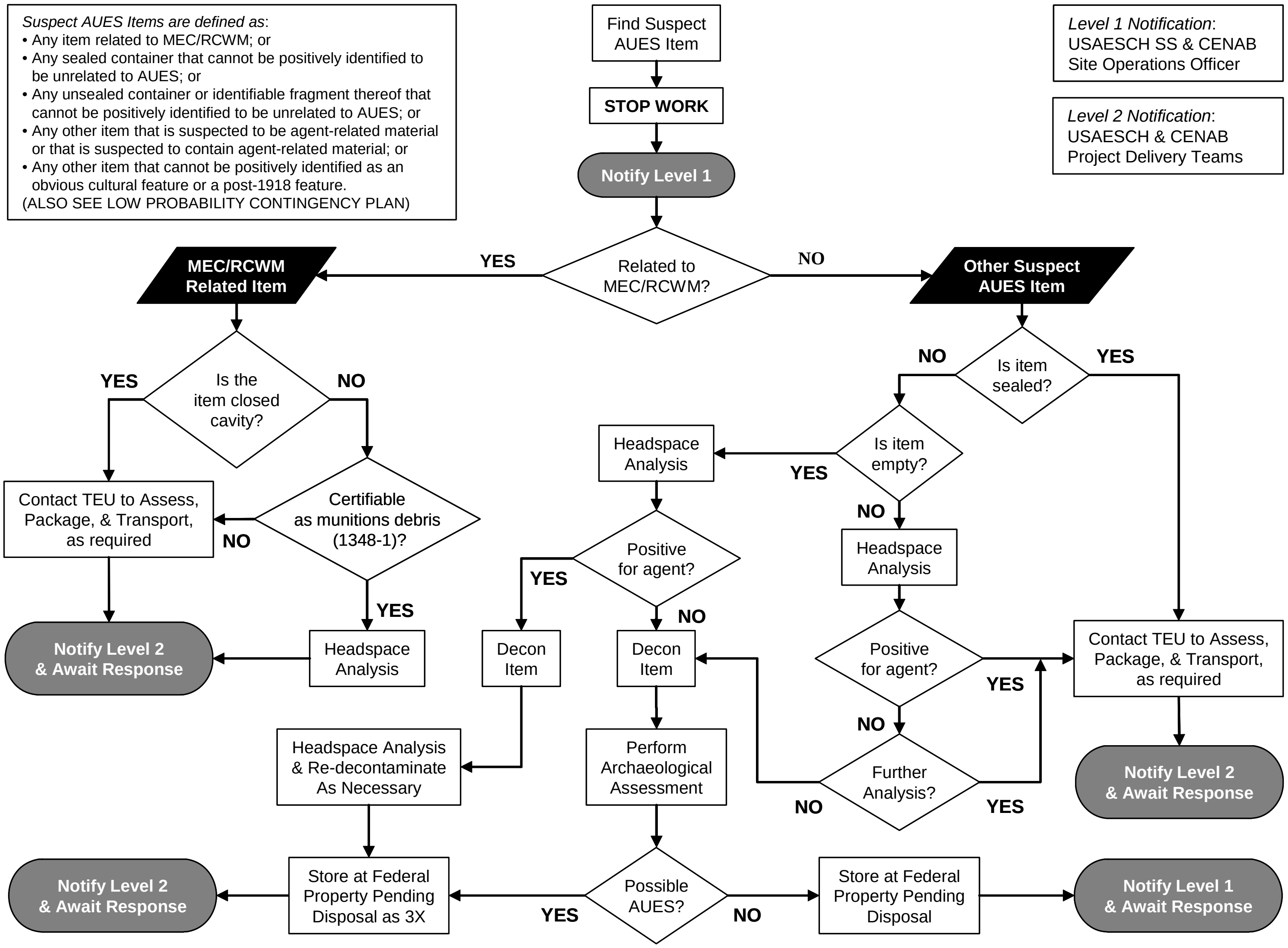
16.13.4.2 After initiation of the Low Probability Contingency Plan and the cessation of intrusive activities, the Site Manager or designate will contact the USAESCH Safety Specialist and CENAB Site Operations Officer and inform them that the Low Probability Contingency Plan has been initiated. The USAESCH Safety Specialist will coordinate further response with USAESCH, TE, and the Air Monitoring Team, as necessary. The CENAB Site Operations Officer will notify other outside agencies, as required. EXCEPTION: see Paragraphs 16.13.8.2 through 16.13.8.4.

16.13.5 Initiation Procedures for MEC/RCWM-Related Items

16.13.5.1 If the potential item is potentially related to MEC/RCWM, the following step-by-step procedure will be followed:

- If the potential item requires closed cavity assessment or is not certifiable as munitions debris in accordance with DoD Regulation 4160-21.M, the USAESCH Safety Specialist will contact TE so that the item can be assessed, photographed, packaged, and transported, as appropriate, in accordance with TE SOPs. After TE has been contacted, the USAESCH Safety Specialist and the CENAB Site Operations Officer will contact their respective PDTs to apprise them of the situation.

Figure D1-16-1
Low Probability Contingency Plan Decision Flowchart



Suspect AUES Items are defined as:
- Any item related to MEC/RCWM; or
- Any sealed container that cannot be positively identified to be unrelated to AUES; or
- Any unsealed container or identifiable fragment thereof that cannot be positively identified to be unrelated to AUES; or
- Any other item that is suspected to be agent-related material or that is suspected to contain agent-related material; or
- Any other item that cannot be positively identified as an obvious cultural feature or a post-1918 feature.

(ALSO SEE LOW PROBABILITY CONTINGENCY PLAN)

Level 1 Notification:
USAESCH SS & CENAB
Site Operations Officer

Level 2 Notification:
USAESCH & CENAB
Project Delivery Teams

- If the potential item is certifiable as munitions debris in accordance with DoD Regulation 4160-21.M, then the item will be double-bagged in plastic lock bags by personnel wearing Nitrile gloves. The item will be given a tracking number in accordance with Section 16.13.10, and also be photographed unless it is considered unsafe to do so. The item will then be transferred to the Air Monitoring Team for headspace analysis for mustard and lewisite in accordance with their SOPs, and the excavation area will be covered with polyethylene sheeting and anchored at the edges with sandbags pending the analysis results. Once the item has been packaged for transfer, the USAESCH Safety Specialist and the CENAB Site Operations Officer will contact their respective PDTs to apprise them of the situation.
- Intrusive activities will not resume at the site until authorization to continue is received from the USAESCH and CENAB PDTs, via the USAESCH Safety Specialist.

16.13.6 Initiation Procedures for Potential Sealed Items

16.13.6.1 If the potential item is sealed, the USAESCH Safety Specialist will contact TE so that the item can be assessed, photographed, packaged, and transported, as appropriate, in accordance with TE SOPs. After TE has been contacted, the USAESCH Safety Specialist and the CENAB Site Operations Officer will contact their respective PDTs to apprise them of the situation.

16.13.6.2 Intrusive activities will not resume at the site until authorization to continue is received from the USAESCH and CENAB PDTs, via the USAESCH Safety Specialist.

16.13.7 Initiation Procedures for Potential Unsealed Items Containing Liquids or Solids

16.13.7.1 If the potential item is unsealed and contains a liquid or a solid substance, the following step-by-step procedure will be followed:

- The item will not be moved and the excavation area will be secured and covered with polyethylene sheeting, and anchored at the edges with sandbags.
- The USAESCH Safety Specialist will then contact the Air Monitoring Team to request that they come to the site to perform headspace analysis of the potential item for mustard and lewisite in accordance with their SOPs.
- If the item is positive for agent, the USAESCH Safety Specialist will contact TE so that the item can be assessed, photographed, packaged and transported, as appropriate, in accordance with TE SOPs. After TE has been contacted, the USAESCH Safety Specialist and the CENAB Site Operations Officer will contact their respective PDTs to apprise them of the situation.
- If the item is not positive for agent, the SSHO will perform a visual assessment of the item to evaluate whether the contents should be recommended for further analysis. Agent-related material may be viscous (oil-like) liquid that is clear,

yellow, brown, black, or milky in appearance, or unidentifiable solid that is white, yellow, green, brown, or black in appearance.

- If the SSHO deems that there is any reason for the contents to undergo further analysis, the USAESCH Safety Specialist will contact TE so that the item can be assessed, photographed, packaged, and transported, as appropriate, in accordance with TE SOPs. After TE has been contacted, the USAESCH Safety Specialist and the CENAB Site Operations Officer will contact their respective PDTs to apprise them of the situation. Intrusive activities will not resume at the site until authorization to continue is received from the USAESCH and CENAB PDTs, via the USAESCH Safety Specialist.
- If the contents of the item clearly appear to be uncontaminated soil, mud, or groundwater, the SSHO will request the USAESCH Safety Specialist's concurrence with this assessment. If the USAESCH Safety Specialist does not concur with the SSHO's assessment, TE will be contacted as described in the previous step. However, if the USAESCH Safety Specialist does concur with the assessment, the item will be photographed, decontaminated in a container of 5% bleach solution, and then double-bagged, labeled (Section 16.13.10), and transferred to the Project Archaeologist for archaeological assessment. The item will be placed into the decontamination solution using tongs or other method to avoid physical contact with the item during decontamination, and the decontamination solution used will be kept segregated until after the results of the archaeological assessment, to allow analysis of the solution if necessary. Following this archaeological assessment, if the item is determined not to be AUES-related, the USAESCH Safety Specialist and the CENAB Site Operations Officer will be informed and may then give permission for intrusive activities to continue at the site. The decontaminated item will be held in a labeled drum at the Federal Property, pending appropriate disposal, and the segregated decontamination solution will be placed in the decontamination water drum.
- If the item is determined to be potentially AUES-related following this archaeological assessment, the USAESCH Safety Specialist and the CENAB Site Operations Officer will contact their respective PDTs to apprise them of the situation. Intrusive activities will not resume at the site until authorization to continue is received from the USAESCH and CENAB PDTs, via the USAESCH Safety Specialist. The decontaminated item will be held in a labeled drum at the Federal Property, pending disposal as 3X scrap, and the segregated decontamination solution will be kept in a labeled container, pending the decision on whether or not it requires analysis.

16.13.8 Initiation Procedures for Other Potential AUES Items

16.13.8.1 If the potential item is neither MEC/RCWM-related nor a sealed item, and it does not contain any liquid or solid substances, the following step-by-step procedure will be followed:

- The item will be photographed and then double-bagged in plastic lock bags by personnel wearing Nitrile gloves. The item will then be transferred to the Air Monitoring Team for headspace analysis for mustard and lewisite in accordance with their SOPs, and the excavation area will be covered with polyethylene sheeting and anchored at the edges with sandbags pending the analysis results.
- If the item is positive for agent, the item will be decontaminated in a container of 5% bleach solution, and then tested again using headspace analysis to confirm decontamination. The item will be placed into the decontamination solution using tongs or other method to avoid physical contact with the item during decontamination. If the item is still positive for agent following this decontamination process, it will be decontaminated again and retested using headspace analysis. This two-step process will be repeated as necessary until decontamination is confirmed. Once the item is decontaminated, it will be double-bagged and labeled in accordance with Section 16.13.10. The USAESCH Safety Specialist and the CENAB Site Operations Officer will contact their respective PDTs to apprise them of the situation and the decontaminated item will be held in a labeled drum at the Federal Property, pending disposal as 3X scrap. Intrusive activities will not resume at the site until authorization to continue is received from the USAESCH and CENAB PDTs, via the USAESCH Safety Specialist.
- If the item is not positive for agent, the item will be decontaminated in a container of 5% bleach solution and then double-bagged, labeled (Section 16.13.10), and transferred to the Project Archaeologist for archaeological assessment. The item will be placed into the decontamination solution using tongs or other method to avoid physical contact with the item during decontamination, and the decontamination solution used will be kept segregated until the results of the archaeological assessment are known, to allow subsequent analysis of the solution if necessary. Following this archaeological assessment, if the item is determined not to be AUES-related, the USAESCH Safety Specialist and the CENAB Site Operations Officer will be informed and may then give permission for intrusive activities to continue at the site. The decontaminated item will be held in a labeled drum at the Federal Property, pending appropriate disposal, and the segregated decontamination solution will be placed in the decontamination water drum.
- If the decontaminated item is determined to be potentially AUES-related following this archaeological assessment, the USAESCH Safety Specialist and the CENAB Site Operations Officer will contact their respective PDTs to apprise them of the situation. The decontaminated item will be held in a labeled drum at

the Federal Property, pending disposal as 3X scrap, and the segregated decontamination solution will be kept in a labeled container, pending the decision on whether or not it requires analysis. Intrusive activities will not resume at the site until authorization to continue is received from the USAESCH and CENAB PDTs, via the USAESCH Safety Specialist.

16.13.8.2 The above procedure may be modified in the event that multiple potential items are recovered that are neither MEC/RCWM-related, nor sealed items, and that do not contain any liquid or solid substances (e.g., the team are digging in an area of trash). Under these circumstances, the field team will not be required to stop work and may continue with excavation activities at the low probability site as long as the following conditions have been met:

- The initial potential item find(s) have been sent for headspace analysis and no agent has been detected.
- The USAESCH and CENAB PDTs have been informed of these finds and have agreed to allow the modification of the procedure.

16.13.8.3 Under these conditions, any potential items recovered that are neither MEC/RCWM-related, nor sealed items, and that do not contain any liquid or solid substances will be containerized (e.g., placed 55-gallon drum) and sent for headspace analysis at the end of each day. Results of these analyses will be reported to the USAESCH and CENAB PDTs the following morning, via the USAESCH Safety Specialist and the CENAB Site Operations Officer, respectively,. Excavation will halt if agent has been detected.

16.13.8.4 Subsequent to this procedure modification, in the event that any items are recovered that are addressed in Sections 16.13.5, 16.13.6, or 16.13.7 of this Low Probability Contingency Plan, or if the Parsons Site Manager, USAESCH Safety Specialist, or CENAB Site Operations Officer otherwise deem it necessary, further intrusive activities will be halted immediately and the appropriate Contingency Plan procedures will be followed.

16.13.9 Initiation Procedures for Possible Agent Exposure

16.13.9.1 In the event that the Low Probability Contingency Plan is initiated because site personnel exhibit symptoms that may be attributable to a chemical exposure, the following step-by-step procedure will be carried out:

- Personnel will move upwind of the excavation or other potential source of exposure.
- The USAESCH Safety Specialist and CENAB Site Operations Officer will be contacted and informed that the Low Probability Contingency Plan has been initiated. The USAESCH Safety Specialist will coordinate further response with USAESCH, TE, and the Air Monitoring Team, as necessary. The CENAB Site

Operations Officer will notify and coordinate with other outside agencies, as required.

- Potentially exposed personnel may be processed through the EPDS, if signs of exposure are observed on their skin or clothing. Areas of the body suspected to be exposed will be flushed with copious quantities of water. Potentially exposed clothing or PPE will be removed and decontaminated in accordance with the procedures described in Chapter 13 of this SSHP.
- George Washington Hospital will be notified (telephone: 202-934-3211) and, if present, the onsite ambulance will be contacted and used to transport any personnel exhibiting chemical exposure symptoms, or other personnel potentially exposed, to that facility. If no ambulance is on-site, George Washington Hospital will be notified and 911 will be called. At this time, George Washington Hospital will be informed whether the potentially exposed personnel have been processed through the EPDS, though they will be advised that the potentially exposed personnel may require additional decontamination upon arrival at the hospital if decontamination has not been confirmed on site using agent monitoring.
- The excavation area will be covered with polyethylene sheeting and anchored at the edges with sandbags and the USAESCH Safety Specialist will contact the Air Monitoring Team to perform headspace analysis at the excavation. Also, the USAESCH Safety Specialist and the CENAB Site Operations Officer will contact their respective PDTs to apprise them of the situation.
- Intrusive activities will not resume until authorization to continue has been received from the USAESCH and CENAB PDTs, via the USAESCH Safety Specialist.

16.13.10 On-Site Tracking for Low Probability Contingency Plan

16.13.10.1 Every potential item uncovered that causes the Low Probability Contingency Plan to be triggered will be tracked using unique alphanumeric tracking numbers. General details of the numbering systems to be used are described below, though specific details will be included in each SSWP.

16.13.10.2 The Site Manager will enter descriptions of all potential items in the Field Log Book (e.g., dimensions, color, material of construction, other notable features). Photographs will be taken of potential items, as specified in Section 16.13.6. All photographs of potential items will include a visual scale in order that the dimensions of the item can be estimated using the photograph.

16.13.10.3 On any day that the Low Probability Contingency Plan is initiated, the Site Manager will complete a Contingency Plan Initiation Summary and include it in the Daily Report (Section 4.9 of the WP). Both the Site Manager and the USAESCH Safety Specialist will sign this Contingency Plan Initiation Summary.

16.13.10.4 Items Removed by TE

16.13.10.4.1 If the item has been removed by TE during a low probability intrusive investigation, Parsons will assign a unique alphanumeric tracking number for internal reference and tracking purposes. The first two characters of this number will be “TE” (to denote an item removed by TE). The next set of characters will denote the overall site location (e.g., “4801GR” for 4801 Glenbrook Road). The next four characters will indicate the specific location at which the item was recovered (AN for anomaly number). The last number will be a unique number assigned to each item recovered at that location which is removed by TE.

16.13.10.5 The following is an example of designations for items removed by TE:

TE-4801GR-AN22-010, TE-4801GR-EX22-011, etc.

16.13.10.6 Munitions Debris

16.13.10.6.1 Each item of munitions debris encountered during a low probability intrusive investigation will be given a unique alphanumeric tracking number. The first three characters of this number will be “SCR” (to denote munitions debris). The next set of characters will denote the overall site location (e.g., “4710WL” for 4710 Woodway Lane). The next four characters will indicate the specific location at which the item was recovered (AN for anomaly number). The last number will be a unique number assigned to each munitions debris item recovered at that location.

16.13.10.6.2 The following is an example of munitions debris item designations:

SCR-4710WL-AN22-010, SCR-4710WL-AN22-011, etc.

16.13.10.7 Other Potential Items

16.13.10.7.1 Other potential items encountered during low probability, intrusive investigations will be given a unique alphanumeric tracking number, which will be marked on the bag in which the item is placed. Additionally, the date of generation will be marked on the bag. The first two characters of this number will be “PI” (potential item). The next set of characters will denote the overall site location (e.g., “5058SegS” for 5058 Sedgwick Street). The next four characters will indicate the specific location at which the item was recovered (AN for anomaly number). The last number will be a unique number assigned to each potential item recovered at that location.

16.13.10.7.2 The following is an example of designations for other potential items:

PI-5058SegS-AN01-001, PI-5058SegS- AN01-002, etc.

16.13.10.7.3 In the event that the procedures detailed in Paragraphs 16.13.8.2 through 16.13.8.4 are followed, other potential items will be containerized and tracked by batch using a unique alphanumeric tracking number, which will be marked on the container in which each batch of items is placed. Additionally, the date of generation will be marked on the container. The first two characters of this number will be "PI" (potential item). The next set of characters will denote the overall site location (e.g., "5058SegS" for 5058 Sedgwick Street). The next four characters will indicate the specific location at which the item was recovered (AN for anomaly number). The next part of the code will be "BATCH" to denote that this tracking number refers to multiple items. The last number will be a unique number assigned to each potential item recovered at that location.

16.13.10.7.4 The following is an example of designations for other potential items using the modified procedures:

PI-5058SegS-AN01-BATCH-001, PI-5058SegS- AN01- BATCH-002, etc.

Project Schedule

DEMOLITION SERVICES INC.
D.S.I
8136 Flannery Ct Manassas, Virginia 20109

4825 Glenbrook Road, NW, Washington DC

The below schedule is only to be used for a base line schedule. All work will follow the approved Demolition & Disposal plan, Health & Safety plan, and the USACE EM385-1-1

Events in numerical order

1. **Pre-Deconstruction**
   - Review submitted AHA, H&S Plan, and Demolition & Disposal Plan.
   - Review schedule
   - Review work established work area layout
   - Post permits on-site

2. **Utility disconnect**
   - Verify with Parsons and USACE utility disconnect area is correct
   - Disconnect utilities

3. **Mobilize Equipment**
   - 200 excavator
   - Hand tools
   - Portable Bathroom

4. **Structural Demolition**
   - Remove porch roof systems that can be reached from drive way.
   - Demolition of the main structure will start at the top working to the ground floor.
   - Demolition will be started on the garage side of the structure to ensure

that building debris is brought to the ground within the foot print of the building.

- During the demolition of the above ground floors the basement floor will be collapsed in a manor to act as containment. To the best of our ability the exterior wall will not be compromised. In the event that the walls are compromised the jobsite will be shut down and secured and turned over to the USACE.
- During the process of demolition debris will be hauled off site to approved landfills

5. **Site walk with Parsons and USACE**
   - Establish that all contracted scopes of work are completed and satisfactory.

6. **Demobilization**
   - Removal of equipment
   - Clean up all misc. debris
   - Remove portable bathroom

Route to Nearest Hospital

mapquest

Trip to:
2150 Pennsylvania Ave NW
Washington, DC 20037-3201
4.13 miles / 12 minutes

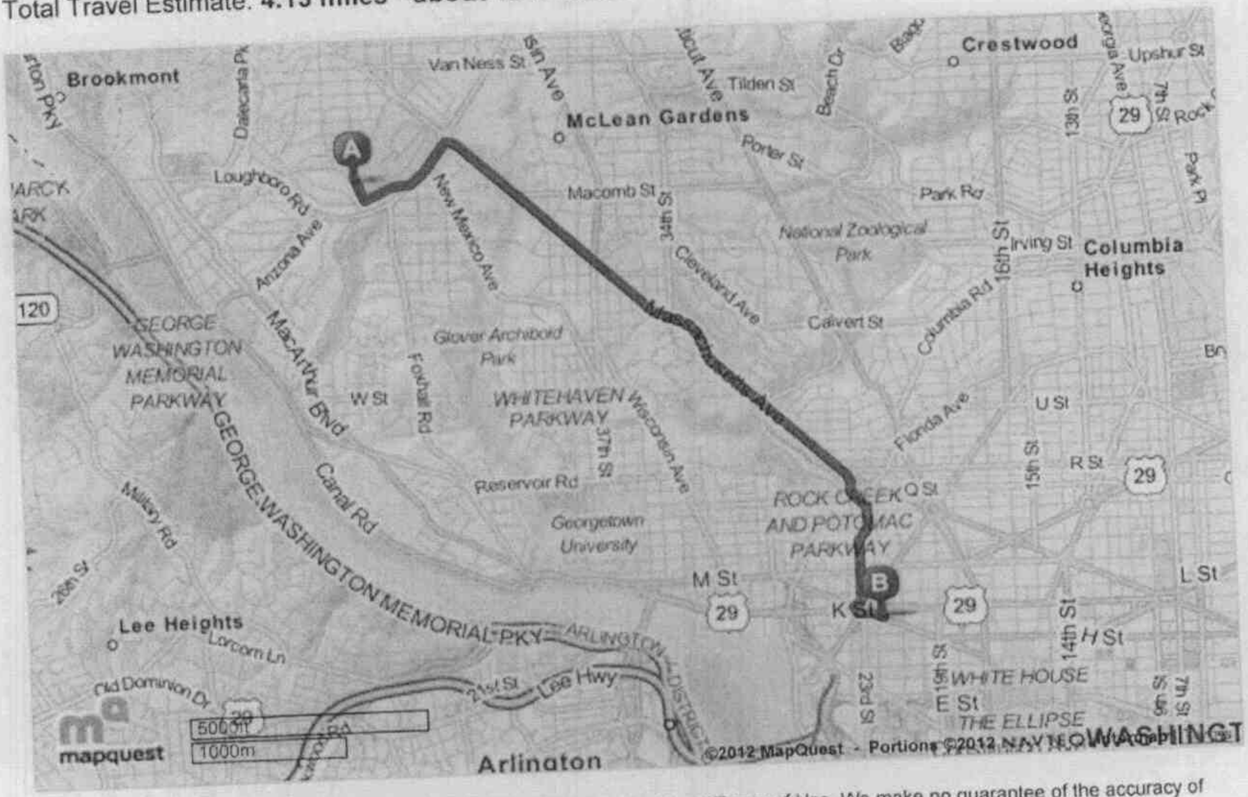
Notes

4825 Glenbrook Rd NW, Washington, DC 20016-3245

●	1. Start out going **southeast** on **Glenbrook Rd NW** toward **Rockwood Pky NW**. Map	**0.09 Mi**	*0.09 Mi Total*
↰	2. Turn **left** onto **Rockwood Pky NW**. Map	**0.2 Mi**	*0.3 Mi Total*
↖	3. Turn **slight left** onto **Nebraska Ave NW**. Map	**0.3 Mi**	*0.6 Mi Total*
↗	4. Turn **slight right** onto **Ward Cir NW**. Map	**0.01 Mi**	*0.6 Mi Total*
↗	5. Turn **slight right** onto **Massachusetts Ave NW**. Map	**2.6 Mi**	*3.2 Mi Total*
↱	6. Enter next roundabout and take the 1st exit onto **23rd St NW**. Map	**0.7 Mi**	*3.9 Mi Total*
↗	7. Enter next roundabout and take the 5th exit onto **Pennsylvania Ave NW**. Map	**0.2 Mi**	*4.1 Mi Total*
■	8. **2150 PENNSYLVANIA AVE NW** is on the **right**. Map		

2150 Pennsylvania Ave NW, Washington, DC 20037-3201

Total Travel Estimate: **4.13 miles - about 12 minutes**



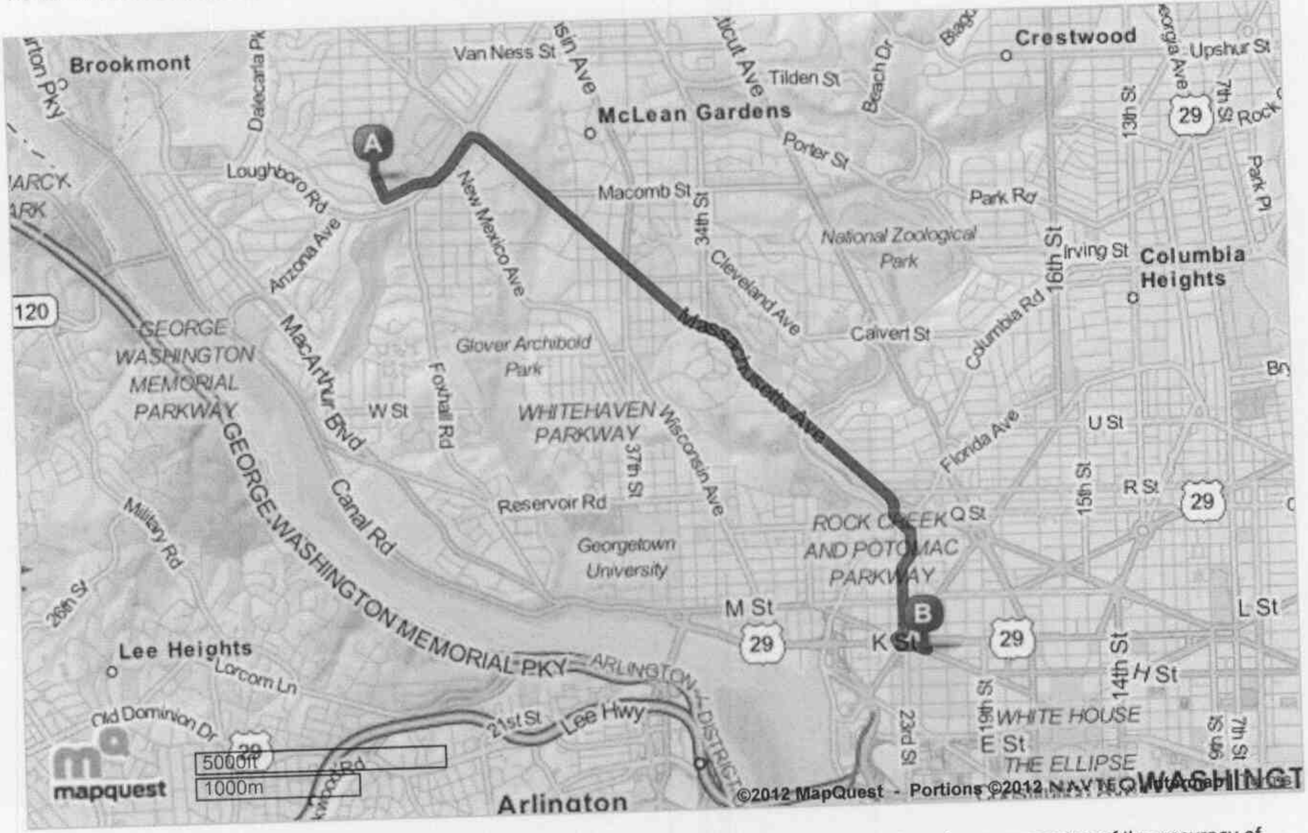
mapquest

Notes

Trip to:
2150 Pennsylvania Ave NW
Washington, DC 20037-3201
4.13 miles / 12 minutes

A	**4825 Glenbrook Rd NW**, Washington, DC 20016-3245	
●	1. Start out going **southeast** on **Glenbrook Rd NW** toward **Rockwood Pky NW**. Map	**0.09 Mi** *0.09 Mi Total*
↰	2. Turn **left** onto **Rockwood Pky NW**. Map	**0.2 Mi** *0.3 Mi Total*
↖	3. Turn **slight left** onto **Nebraska Ave NW**. Map	**0.3 Mi** *0.6 Mi Total*
↗	4. Turn **slight right** onto **Ward Cir NW**. Map	**0.01 Mi** *0.6 Mi Total*
↗	5. Turn **slight right** onto **Massachusetts Ave NW**. Map	**2.6 Mi** *3.2 Mi Total*
↱	6. Enter next roundabout and take the 1st exit onto **23rd St NW**. Map	**0.7 Mi** *3.9 Mi Total*
↗	7. Enter next roundabout and take the 5th exit onto **Pennsylvania Ave NW**. Map	**0.2 Mi** *4.1 Mi Total*
■	8. **2150 PENNSYLVANIA AVE NW** is on the **right**. Map	
B	**2150 Pennsylvania Ave NW**, Washington, DC 20037-3201	

Total Travel Estimate: **4.13 miles - about 12 minutes**



Activity Hazard Analysis

Activity Hazard Analysis (AHA)

Activity/Work Task: Demolition – 4825 Glenbrook Road	**Overall Risk Assessment Code (RAC) (Use Highest Code)**	**L**

Project Location: NW, Washington, DC

COMPANY: Demolition Services, Inc. (DSI)

Date Prepared: 12/8/11

Prepared By (Name/Title): Ron Feather, Project Manager

Reviewed By (Name/Title): Ron Feather, General Superintendent

Notes: Daily PPE requirements include Hard Hat, Safety Glasses, Reflective Vest, and Steel Toe Shoes. Any additional specific PPE requirements will be listed after Proper PPE

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	**Likely**	**Occasional**	**Seldom**	**Unlikely**
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1. Review each **"HAZARD"** with identified safety **"Controls"** and determine **RAC** (see above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible.

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart
E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Job Phases	Hazard	Controls	RAC
Mobilization	1. Slips and trips on uneven, wet, muddy, or icy surfaces	1. Wearing ***NON SLIP SOLE*** foot wear (rubber boots with steel toe & shank), EM-385-1-1 section 5.A.06(a) If the temperature is below freezing, work will be suspended as long as it takes to ensure that no icy surfaces exist. Keep area clear of clutter (good housekeeping).	1. L
	2. Poisonous Plants	2. Site personnel will be made aware of potential for injury by contact with poisonous plants indigenous to the area in and around the work area. EM-385-1-1 section 6.D.03	2.L
	3. Physical injury while lifting, unloading equipment or materials	3. All persons shall be physically, medically, and emotionally (ready, willing, and able) qualified for performing the duties to which they are assigned. EM- 01.C.01 Operators of any equipment or vehicle shall be able to read and understand the signs, signals, and operating instructions in use. EM-385-1-1 section 1.C.03	3.L
	4. Chemical Hazards	4. Project specific MSDS onsite in a conspicuous location. Daily Inspections of Equipment and Materials EM-385-1-1 section 1.B.05. Hazard communication training will be performed according to Parsons procedures.	4.L
	5. Hand Puncture or Laceration	5. Daily Toolbox Talks, Weekly Safety Briefings and Inspections	5.L
	6. Physical Danger to Public or other Trades	6. Danger/ Warning signs to keep out general public and/or other trades EM-385-1-1 section 8.A.01	6.L
	7. Fire Hazard	7. Daily clean up will be provided per the demo plan, taking into consideration the nature of the work. Regular cleaning shall be conducted in order to maintain safe conditions in the workplace. EM-385-1-1 section 2.B.01 Discuss Location of Fire Extinguishers EM-385-1-1 section 9.E.03 Emergency Contact Numbers will be clearly and conspicuously	7.L

		posted on site EM- 01.E.05	
	8. Noise Hazard	8. Supply Earplugs as necessary EM-385-1-1 section 5.C.01.b	8.L
Electrical Connections			
(Working around electrical energy, disconnections)	1. Burns	1. Safe work practices EM- 11.A, PPE- Gloves EM-385-1-1 section 5.I.02, Long Pants EM-05.A.06.a. (2)	1.L
	2. Electrical shock	2. Be familiar with locks/tags EM-385-1-1 section 12.D Always use GFCI's and cords in good condition. EM- 11.D	2.L
	3. Overhead electrical lines	3. Any overhead electrical lines within the demolition site will be de-energized by Miss Utilities. All heavy equipment will be used beyond the minimum clearance from energized overhead lines as specified in Table 11-1of EM-385-1-1.	3.L
	4.Physical Danger/ Death	4. Make sure electrical is locked out/tagged out prior to start of work. HEC(Hazardous Energy Controls) procedures will be discussed at daily safety meetings. EM-385-1-1 section 11.A.01.c Proper grounding methods/ GFCI's. EM-382-1-1 section 11.D	4.L
General Heavy Equipment Operation			
(Demolition, Loading Out, Maintenance)	1. Physical Injury / Crush hazard by heavy equipment or moving parts	1. All personnel shall wear High Visibility Safety Vests ***HVSV*** . Only those persons necessary for the operations shall be permitted in this area. EM-385-1-1 section 23.F.01 The Use of Spotters. **Establish eye contact with operators.** Applicable Machine Guards will always be in place. PPE – Gloves, Boots, Eyewear EM-384-1-1 section 6.B.-05.C	1 .M
	2. Slip, trip, or falls on wet or icy surfaces.	2. Wear the correct shoes for weather conditions (i.e., mud, rain, uneven surfaces). Wearing ***NON SLIP SOLE*** foot wear (rubber boots with steel toe & shank), EM-385-1-1 section 5.A.06(a) and section 05.E. If the temperature is below freezing, work will be suspended as long as it takes to ensure that no icy surfaces exist.	2. L
	3. Cuts / Physical Abrasions/ Physical Injury from hand tools	3. Safe work practices, take time, be aware of surroundings. EM-385-1-1 section 13.A.03, PPE- Eyewear, gloves, boots EM-385-1-1 section 6.B.-05.C On the job training for tools, and equipment	3. L
	4. Falls from elevated heights	4. Each worker who might be exposed to fall hazards from heights and using fall protection equipment shall be trained by a Competent Person for fall protection. EM-385-1-1 section 21.C.01 • Ladders at a 4:1 Ratio, EM-385-1-1 section 24.B • Fall Protection to include Full Body Harness w/ lanyard & locking snap hooks EM385-1-1 section 21.H.05.d (4) for connecting subsystems. • The SRL (self-retracting lanyard) shall automatically limit free fall distance to 2 ft or less and shall be capable of sustaining a minimum tensile load of 3,000 lbs. EM-385-	4. M

		1-1 section 21.H.05.d(4)c. • Proper fall protection will be required if heights are over 6'. We have included fall protection as a company standard. We do not intend on working from elevated surfaces to perform the demolition. If university waste is identified during the environmental survey and light bulbs need to be removed prior to the demolition, ladders will be used per a two man buddy system. If a fall occurs, the site-specific fall protection rescue plan requires that the person observing the fall will inform the DSI on-site safety officer and the Parsons site manager to seek medical attention for the injured person.	
	5. Injury from falling material or debris	5. During demolition, continuing inspections by a competent person shall detect hazards resulting from weakened or deteriorated floors, walls, or loosened material. EM-385-1-1 section 23.A.10 Use care in getting materials to ground EM- 23.B.02	5. L
	6. Physical Hazards during Maintenance	6. Mechanized equipment shall be shut down before and during fueling operations, and during maintenance. Closed systems, with an automatic shut-off that will prevent spillage if connections are broken, may be used to fuel diesel powered equipment left running. EM-385-1-1 section 16.A.06 Only certified mechanics or heavy equipment operators familiar with equipment parts and operation shall work on machinery. Hazard communication training will be performed according to Parsons procedures.	6. L
	7. Chemical Hazards	7. Store all materials safely and keep MSDS on hand. Emergency Contact Numbers will be clearly and conspicuously posted on site EM-385-1-1 section.1.E.05	7. M
	8. Intrusive activity (moving past heavy equipment or machinery)	8. Listening for BACK UP ALARM , keeping eye contact with the operator	8. M
	9. Being struck by trucks while loading out	9. Site Control Zones. Designating routes of ingress & egress with safety cones, "Right of Way" signage. The designated means of access shall be indicated on the site map. Other access ways (into work area/ jobsite) shall be indicated as not safe for access and closed at all times. EM-385-1-1 section 23.A.09.a	9. L
	10. Physical exhaustion	10. Break often, All Persons will be physically, medically, and emotionally qualified for assigned duties. EM-385-1-1 section 1.C.01	10. L
	11. Fire hazards of heavy equipment	11. Maintain equipment in good, safe working order; good housekeeping practices; Flammable or combustible liquids shall be drawn from, or transferred into, containers or tanks within a building or outside only through a close piping system, from safety cans, by means of a device drawing through the top, or from a container, or portable tanks, by gravity or pump, through an approved self-closing valve. EM-385-1-1 section 9.B.21.c	11. L
	12. Nuisance dust in adjacent work areas or public spaces	12. Water will be the main source of dust control. Water will be sprayed onto the structure from a ground guy controlling the hose. Water supply will be provided by existing hydrants.	12.L
	13. Overhead power lines	13. Any overhead lines within the demolition site will be de-energized by Miss Utilities. All heavy equipment will be used beyond the minimum clearance from energized overhead lines as specified in Table 11-1of EM-385-1-1.	

Hot Work **(General Fire Protection & Prevention)** Oxyacetylene welding -Compressed gases (stored in cylinders)	1. Breach of hoses and/or cables, tripping, falls	1. Areas below cutting/torching to be kept clear. Positioning cables, hoses, and other equipment clear of passageways, ladders, and stairways. Safe Work Practices, proper placement of supply lines. Communication with air horns No smoking. EM- 10.C.01, EM- 09.E.03,	1. L
	2. Equipment Crush Points, Pinch points	2. A spotter will be used to help locate personnel around the equipment while moving	2.L
	3. Burning of arms, hands, face/Flash burns	3. Wearing NON FLAMMABE protective PPE during HOT WORK torch cutting, Oxy Welding operations , Welding mask, gloves, and other PPE during use,	3.L
	4. Inhalation of smoke / Atmospheric Hazards	4. Proper/ Adequate Ventilation EM- 10.B.01 PPE- the use of burning/welding jackets with full-length sleeves, long pants EM- 10.A.09	4.L
	5. Injury from falling material /slag	5. Experienced Personnel on Hot Work / Allows use care in lowering materials that have been torch cut to the ground.	5.L
	6. Lines and compressed gas cylinders being struck by falling debris/ slag	6. Keep area below cutting/torching clear. Double Chaining of flammable materials and compressed gas cylinders EM- 10.D.02	6. L
	7. Fires	7. Positioning fire suppression equipment adjacent to ***HOT WORK PERMIT*** working areas. a. Inspecting Fire Extinguishers prior to starting ***HOT WORK*** b. Designating ***HOT WORK AREAS*** by means of safety cones, caution tape, Do Not Enter tape. c. Having ***HOT WORK PERMIT*** on site at all times d. Maintaining ***A DESIGNATEDFIRE WATCH*** during and up to ***60 minutes*** after hot work has stopped	7.L
	8. Damage to building materials	8. Fire Watch, Good Housekeeping	8.L
	9. Storage and transport of compressed gases	9. Compressed air or gas cylinders will be stored and transported in accordance of EM385-1-1, Local, State, and Federal guidelines • All cylinders will be stored in a well-ventilated location. • All cylinders will be secured with substantial fixed or potable racks or hand trucks. • Cylinder valves will be closed and valve caps in place when cylinders are in storage, in transit, not in use, or empty. • Cylinders transported by crane, hoist, or derrick, will be securely transported in cradles, nets, or skip pans, and never directly by slings, chains or magnets. • All cylinders will be labeled as to their contents and all storage areas will be	9.L

		properly placarded. • Cylinders will be protected from physical damage, electric current, and extremes of temperature. The temperature of the cylinders will not be allowed to exceed 130°F. • Cylinders will only be filled by qualified persons. • Smoking will be prohibited wherever cylinders are stored, handled, or used. • Leaking cylinders will be moved to an isolated location out of doors, the valve will be cracked, and the gas will be allowed to escape slowly. Personnel and ignition sources will be kept away and the cylinder will be tagged "DEFECTIVE." • All cylinders will be stored (full or empty) in an upright position. • Cylinders will be marked as to "FULL" or "EMPTY" and segregated.	
Site Cleanup & Demobilization	1. Fuel spill while loading equipment	1. Have fuel spill equipment handy and do not fuel hot or energized equipment.	1.L
	2. Slip, trip, and fall hazards while loading equipment	2. Keep hands and feet from moving parts	2.L
	3. Danger of losing equipment, tools, chains during transport	3. Inspect stowage of equipment for transport offsite	3.L
	4. Improper loading of equipment	4. Properly secure (with lines/chains) any/all equipment on trailers for transport off-site.	4.L
	5. Disposal of any spilled materials	5. In the event of spilled materials, contaminated materials will be collected and disposed of in accordance with all Local, State, and Federal guidelines.	5. L

Activity Hazard Analysis (AHA)

Equipment to be Used	Training Requirements	Inspection Requirements
1. Rubber tire backhoe	1. In house training on all equipment	1. Daily safety inspections: seat belt, back up alarm
2. Excavator	2. In house training	2. Daily safety inspections, seat belt, windshield, back up alarm
3. Track skid steer	3. In house OSHA safety training	3. Daily safety inspections, seat belt, back up alarm
4. Equipment Trailer	4. In house OSHA safety training	4. Daily inspections
5. Man Lift, Full body harness	5. Boom Lift Certification, proper use and how to wear FBH SHALL BE reviewed by Competent Person	5. Daily inspections
6. Hand Tools	6. On the job training	6. Work shift inspections
7. Compressed cylinders, torches	7. Gas Cylinder Safety & Handling Training	7. Daily inspection of cutting tips, regulators & gauges, hose connections, MSDS on site. Hazard communication training will be performed according to Parsons procedures.
8. Two 10 lb. Fire Extinguishers	8. Knowledge of how to operate extinguishers (in house safety training)	8. Daily inspection
9. One 25 MAN FIRST AID kit	9. First Aid & CPR	9. Certification on Site
10. Chop saw	10. Operational, safety and hands on training	10. Daily inspections
11. Fuel container	11. Experienced operator	11. Metal can with ground screen, labeled, and MSDS. Hazard communication training will be performed according to Parsons procedures.
12. Fuel Spill Containment Kit	12. How to apply, use and dispose of USED supplies	12. Check spill kit inventory, replace missing supplies

Date: **December 9, 2011**

Subcontractor: **Demolition Services, Inc. (DSI)**

Competent Persons (EM- 01.A.13.c): **Ron Feather, 703-585-9058** ______________________________

Justin Stanley, 703-656-1828 ______________________________

ACTVITY: Recover refrigerant from HVAC systems
ANALYZED BY: Scott Dykstra, Rapid Recovery®

DATE: July 13, 2011

Principal Steps Identify the principal steps involved and the sequence of work activities	Potential Safety/Health Hazards Analyze each potential step for potential hazards	Recommended Controls Develop specific controls for each hazard
Hook up Recovery equipment	Tripping hazard, refrigerant release	Route hoses carefully to avoid tripping. Use of low loss refrigerant connections. Check hoses and connections. Make sure area is clear of debris Keep non construction personnel out of area All users and bystanders must wear proper PPE
Recover refrigerant	Refrigerant release	Monitor equipment, hoses PPE must be worn Proper gloves, hearing protection and safety glasses must be worn

Equipment to be used	Inspection Requirements	Training Requirements
List equipment to be used in the work activity	List inspection requirements for the work activity	List training requirements, including hazard communication
Recovery machine	Pre-activity inspection Daily safety inspection	EPA certified refrigerant course for proper handling of refrigerants

Disposal Permits

East End Landfill

Cox's Darbytown Road Landfill

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
PIEDMONT REGIONAL OFFICE
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L. Preston Bryant, Jr.
Secretary of Natural Resources

David K. Paylor
Director

Gerard Seeley, Jr.
Regional Director

SOLID WASTE FACILITY PERMIT
PERMIT NUMBER 524

Facility Name: East End Landfill

Facility Type: Construction/Demolition/Debris Landfill **Latitude:** 37^{0}29'53"N

Site Location: Henrico County **Longitude:** 77^{0}22'26"W

Location Description: The facility is located approximately 1.7 miles northwest of Laburnum Avenue, and approximately 1000 feet North of Oakland Road, on the east side of Darbytown Road in Eastern Henrico County. The facility is located approximately 1,600' off of Darbytown Road. The total permitted landfill property is approximately 100 acres.

Background: The facility is to serve as a construction/demolition/debris landfill in compliance with 9 VAC 20-80-10 et seq., Amendment 1. The facility is designed to accept 170 cy/day. The disposal area for Cell I is 5.1 acres, the disposal area for Cell II is 4.9 acres. The combined disposal area for the site is approximately 10 acres. Acceptable wastes are outlined in Section V.B of the Operations Manual. On July 7, 2005, the Part A Application for a lateral expansion of the landfill was approved. This approval increased the authorized disposal area to 29.92 acres (Cells I-VI). The facility has submitted a Part B Application to construct and operate Cell III. A Temporary Authorization for the construction of Cell IIIA was issued on December 8, 2005.

Permit Highlights: This permit was originally issued on July 19, 1988. It was later amended on June 16, 1999 to update all areas of the permit but specifically to incorporate the design of Cells IIA and IIB.

Permit Amendments: This minor permit amendment is the second modification of Permit Number 524. This permit amendment is to change the name from Simons Hauling Company Debris Landfill to East End Landfill. In addition, the landfill ownership will transfer from Simons Hauling, Inc., to East End Landfill, LLC. A major permit amendment was completed in 1999 to generally update all removed and disposed of at a facility permitted to accept it, typically in a designated asbestos disposal cell at a sanitary landfill or at a special purpose landfill.

v. Other Wastes

Polychlorinated biphenyl (PCB) waste is defined as material containing more than 50 parts per million (ppm) PCB (9 VAC 20-80-650). PCBs are no longer being made in the United States, but are still present in many electrical transformers, capacitors, and insulating fluids. They have a heavy, oil-like consistency, and are clear to yellow in color. PCB waste, or waste containing PCB, is not acceptable at this facility.

Radioactive wastes are also not acceptable for disposal at this facility. Medical treatment facilities are the most common sources of radioactive waste.

Pesticides are prohibited from disposal at this facility.

Tires are only allowed for disposal at this facility if they are split or shredded. Otherwise, they must be segregated and stored in a designated area, pending proper treatment or disposal.

Lead-acid batteries and used oil are prohibited from disposal at the facility.

Construction and demolition drums and other bulk containers, as discussed previously, may only be accepted if they are empty, properly cleaned, opened at both ends, and crushed, as explained in Section II.A.1.ii of this plan, and can be defined by as a construction waste, demolition waste, or debris waste by 9 VAC 20-80-10. Pesticide containers are not accepted at this facility.

All free liquids are unacceptable. Free liquids that are absorbed onto a solid CDD waste material are acceptable, as long as they are not classified as hazardous.

2. Remove Unauthorized Waste

Facility personnel will be trained in the proper steps to take if unauthorized waste is accepted at the facility, following the response actions and reporting requirements discussed in Section IV. The training will include procedures for segregating and containing the waste. Personnel will immediately notify the Facility Manger if unauthorized waste is discovered or accepted at the facility. The Facility Manager will then follow the requirements of 9 VAC 20-80-113.B. to remove the unauthorized waste, segregate it, and to provide to the department a record identifying that waste and its final disposition. No waste that has been discharged at the facility may be back-loaded and sent off-site. Upon notifying the DEQ, the Facility Manager may arrange for a permitted transport contractor to remove the waste from the facility for disposal or treatment at an approved facility or request a special waste authorization.

In the event unauthorized waste is detected in vehicles prior to tipping or during inspections, the driver of the vehicle will be directed to leave the site. If unauthorized waste is

iii. Regulated Medical Waste

Regulated medical waste is defined as any solid waste that is capable of producing an infectious disease, or is likely to have been contaminated by a pathogenic organism that can cause disease. Regulated medical wastes (RMW) include cultures and stock of microorganisms and biological materials; blood and blood products; tissues and other anatomical wastes; sharps used in patient care or veterinary practice; animal carcasses and body parts; residue resulting from the cleanup of a spill of RMW; and any solid waste that is mixed with RMW.

Medical waste is typically stored at the generator and delivered to disposal facilities in labeled, red, liner bags to render the waste easily visible and recognizable.

iv. Asbestos

There are two main types of asbestos waste: friable and nonfriable. This facility is permitted to accept most nonfriable asbestos waste, and is not permitted to accept friable asbestos. Each type of asbestos waste is discussed in the following paragraphs.

Nonfriable asbestos-containing material (ACM) is any material containing more than 1% asbestos and cannot be crumbled, pulverized, or reduced to powder by hand pressure. Nonfriable ACM is acceptable waste for disposal at this facility. Category I nonfriable ACM includes materials such as packings, gaskets, resilient floor covering, and asphalt roofing products. Category II nonfriable ACM includes all other ACM that cannot be crumbled, pulverized, or reduced to powder by hand pressure and are not included in Category I. This material must be covered with soil prior to compaction or other mechanical action to ensure that the material does not become friable.

Friable ACM is defined as any waste material containing more than 1% asbestos that, when dry, is capable of being crumbled, pulverized or reduced to powder by hand pressure. This facility is not permitted to accept friable ACM for disposal.

Regulated ACM (RACM) is defined in 9 VAC 20-80-640.A as friable asbestos waste material; Category I nonfriable ACM that has become friable; Category I nonfriable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading; and Category II nonfriable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations. RACM is typically generated in manufacturing, fabrication, and spraying operations, as well as during building demolition and renovation. RACM is required to be placed in leak-tight containers and wrapped with warning labels prior to being transported and disposed of. Also, approved transport vehicles are required to contain markings and signs indicating asbestos. This facility is not permitted to accept RACM for disposal.

Category I and II nonfriable ACM that do not meet the requirements of RACM may be disposed of at this facility. Should any RACM be identified in incoming waste loads, it must be

AUTHORIZED AND UNAUTHORIZED WASTES

AUTHORIZED WASTE

Acceptable materials allowed for disposal at this facility are construction and demolition debris, white goods, and discarded tires. Acceptable waste materials (refuse) shall include only those materials permitted by state or federal law. Refuse considered to be acceptable for disposal are listed below.

- Ash but not including coal-combustion by products and other MSW or industrial wastes;
- Category I and II Non-friable asbestos;
- Construction debris;
- Debris waste;
- Demolition debris;
- Land clearing debris;
- Tires (split, cut, or shredded);
- Authorized special wastes;
- White goods (chlorofluorocarbons and PCBs must be removed from white goods prior to placement on the working face); and,
- Packaging materials for construction materials.

UNAUTHORIZED WASTE

Unacceptable or Prohibited Materials - Materials considered to be unacceptable or prohibited include, but are not limited to, the following:

Non-hazardous solid waste such as the following:

- Abandoned vehicles, trucks or parts generated from vehicles;
- Animal and agricultural wastes such as manure or crop residues;
- Compressed gas cylinders;
- Commercial waste;
- Dead animals or animal carcasses or parts resulting from medical research activities or destruction of diseased animals;
- Drums that are not empty, crushed, both ends knocked out, and are triple-rinsed;
- Friable asbestos containing material;
- Garbage;
- Hazardous waste as defined by the USEPA and DEQ, pathological wastes, explosives, or radioactive materials;
- Household waste;
- Industrial waste;
- Liquid waste or any waste, except residential and household trash, containing free liquids as determined by the EPA Paint Filter Liquids Tests outlined in the EPA Publication SW-846 entitled, "Test Methods of Evaluating Solid Waste, Volume C: Laboratory Manual Physical/Chemical Methods," Third Edition, dated November 1986;

COMMONWEALTH of VIRGINIA

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Preston Bryant
Secretary of Natural Resources

David K. Paylor
Director

Gerard Seeley, Jr.
Regional Director

July 20, 2006

Mr. Mathew P. Appleget, President
The East End Landfill, LLC
2126 Bancroft Place, NW
Washington, D.C. 20008

RE: **East End Landfill, Permit No. 524**
Draft Permit Amendment
Henrico County, Virginia

Dear Mr. Appleget:

Enclosed are replacement pages for Permit No. 524 for the East End Landfill. The attached pages should serve as replacements to pages from the draft permit sent to you under a cover letter dated May 12, 2006. The permit has been amended to upgrade operation and design standards and include information specific to the design, operation and maintenance of Cell III.

No comments were received from the general public during the public participation period, but minor technical revisions were submitted by the applicant. The revised sections of the technical specifications, construction quality assurance plan and design drawings have been incorporated into the final permit amendment. A copy of the revised pages in addition to clean copies of the permit preamble and Module I are attached to this correspondence.

As provided by Rule 2A:2 of the Supreme Court of Virginia, you have 30 days from the date of service of this decision to initiate an appeal of this decision, by filing notice with:

David K. Paylor, Director
Virginia Department of Environmental Quality
ATTN: Waste Division
P.O. Box 10009
Richmond, Virginia 23240-0009

In the event that this decision is served to you by mail, three days are added to that period. Please refer to Part Two of the rules of the Supreme Court of Virginia, which describes the required content of the Notice of Appeal, including specification of the Circuit Court to which an appeal is taken, and additional requirements governing appeals from decisions of administrative agencies.

Please note that it is the responsibility of applicant to obtain any other permits or authorizations that may be necessary. If there are any questions, please contact Kurt Stafford, Environmental Engineer Senior, at (804) 527-5033.

Sincerely,

Robert Timmins, Jr
Regional Waste Program Manager

Attachments: Permit Preamble (without draft watermark)
Module I (without draft watermark)
Revised pages submitted by Applicant

cc: DEQ – Patrick Bishop, PRO (letter only)
DEQ – Geoff Christe, CO (w/ attachments)
DEQ – Kurt Stafford, PRO (w/ attachments)
DEQ – File #524 – PMT (w/ attachments)

Mr. Carlton Dudding, PE (w/ attachments)
Executive Vice President
TEEL, LLC
1820 Darbytown Road
Richmond, VA 23231

Mr. William Hase, PE (w/ attachments)
Draper Aden Associates, Inc.
8090 Villa Park Drive
Richmond, Virginia 23228

Permit Preamble and Module I (without draft watermark)

COMMONWEALTH of VIRGINIA

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L. Preston Bryant, Jr.
Secretary of Natural Resources

David K. Paylor
Director

Gerard Seeley, Jr.
Regional Director

SOLID WASTE FACILITY PERMIT
PERMIT NUMBER 524

Facility Name: East End Landfill

Facility Type: Construction/Demolition/Debris Landfill

Site Location: Henrico County

Latitude: 37°29'53"N

Longitude: 77°22'26"W

Location Description: The facility is located approximately 1.7 miles northwest of Laburnum Avenue, and approximately 1,000 feet North of Oakland Road, on the east side of Darbytown Road in Eastern Henrico County. The facility is located approximately 1,600 feet off of Darbytown Road. The facility address is 1820 Darbytown Road, Richmond, VA 23231.

Background: The facility is to serve as a CDD landfill and accepts construction, demolition, and debris waste in compliance with 9 VAC 20-80-10 et seq. (VR 672-20-10). Waste will be received from Henrico County and the surrounding localities. Currently, this permit covers waste disposal for Cells I, IIA, IIB, IIIA and IIIB. The facility site area is approximately 52.9 acres. The original permit covered approximately 10 acres of waste disposal area within the 22 acres. Cell I has a disposal area of 5.1 acres and began receiving waste in July 1988. Cell IIA began receiving waste in June 1999 while Cell IIB started receiving waste in February 2001. The combined disposal area of Cells IIA and IIB is 4.9 acres. In February 2001, Cell I and portions of Cell IIA received final cover. On July 7, 2005, a Part A Application for a lateral expansion of the landfill was approved. Under this expansion, the total permitted acreage is 40.7 acres of which an additional 20 acres have been designated as waste disposal area. This addition brings the total waste disposal area to approximately 30 acres. Cell II is currently active. Cell IIIA, approximately 2.6 acres, is lined and is permitted to receive CDD waste. Cell IIIB, approximately 2.8 acres, is also lined and is permitted to receive CDD waste. The future Cells IV, V and VI encompass approximately 14.7 acres. CDD wastes will be delivered to the site by private haulers and other commercial vehicles. The wastes accepted will conform to those wastes listed in Permit Module II (Section V.B.2 of Operations Manual). The landfill capacity for Cells I through IIIB is estimated to be 1,000,000 cubic yards. The remaining capacity for Cells II through IIIB is approximately 669,700 cubic yards over a design life of 5.1 years (assuming a waste density of 0.6 tons/cy).

Permit Limits: The facility encompasses 40.7 acres, of which approximately 29.9 acres have been designated as waste disposal area. The approved design capacity for Cells II through IIIB is approximately 669,700 cubic yards with an estimated site life of 5.1 years. The landfill is limited to an average daily intake rate of 227 tons per day and maximum daily intake rate of 900 tons per day based on the facility's Design Report and Operations Manual in the permit.

Permit Highlights: This permit is based on the modular concept to assure completeness and consistency of the documents. It includes several permit modules which specify general permit conditions and facility requirements and provide for appropriate design, operation, maintenance, closure, post-closure, and monitoring of the solid waste management facility permitted. Various attachments further describe the approved plans for the design and operation of the facility.

The soil liner system for Cells IIIA and IIIB consists of (from bottom to top):

- Compacted subgrade
- Minimum 12" thick compacted soil liner, K $\leq 1\times10^{-7}$ cm/sec
- Minimum 12" thick drainage layer, K ≥ 0.05 cm/sec

The final cover system will consist of the following (from bottom to top):

- Minimum 12" thick intermediate cover
- Minimum 18" thick soil infiltration barrier layer (soil cap) (K $\leq 1\times10^{-7}$ cm/sec)
- Minimum 12" thick erosion support layer
- Minimum 6" thick top soil or amended soil

Leachate from the facility is pumped to holding tanks where it will be pumped and hauled to a Publicly-Owned Treatment Works (POTW). The maximum 7-day leachate holding capacity of the facility during and prior to operation of Cell IIIA and IIIB will be 86,100 and 115,500 gallons, respectively.

Permit Amendments: This is the fourth modification of Permit Number 524. This major permit amendment describes the design, operation, closure and post-closure care requirements for Cell III. It also upgrades all sections of the permit. The facility submitted a Part B Application to construct and operate Cell III, which will be broken down into two phases, Cell IIIA and IIIB. The third amendment (minor) modified the ownership information from East End Landfill, LLC, to The East End Landfill, LLC. The second amendment (minor amendment) modified the name of the facility from Simons Hauling Company Debris Landfill to East End Landfill. In addition, the second amendment transferred the ownership of the facility from Simons Hauling, Inc., to East End Landfill, LLC. A Temporary Authorization for the construction of Cell IIIA was issued on December 8, 2005. The first permit amendment (major amendment) was completed in 1999 to generally update the permit and incorporate the design of Cells IIA and IIB.

THIS IS TO CERTIFY THAT:

The East End Landfill, LLC
3450 Charles City Road
Richmond, VA 23231

is hereby granted a permit to construct, operate, and maintain the facility as described in Permit Modules I, II, IV, X, XI, XII, XIII and associated Permit Attachments. These Permit Modules and Permit Attachments are as referenced hereinafter and are incorporated into and become a part of this permit.

The herein described activity is to be established, modified, constructed, installed, operated, used, maintained, and closed in accordance with the terms and conditions of this permit and the plans, specifications, and reports submitted and cited in the permit. The facility shall comply with all regulations of the Virginia Waste Management Board. In accordance with § 1408.1(D) of the Code of Virginia, prior to issuing this permit, any comments by the local government and general public have been investigated and evaluated and it has been determined that the proposed facility poses no substantial present or potential danger to human health or the environment. The permit contains such conditions and requirements as are deemed necessary to comply with the requirements of the Virginia Code, the regulations of the Board, and to prevent substantial or present danger to human health or the environment.

Failure to comply with the terms and conditions of this permit shall constitute grounds for the revocation or suspension of this permit and for the initiation of necessary enforcement actions.

The permit is issued in accordance with the provisions of § 10.1-1408.1.A, Chapter 14, Title 10.1, Code of Virginia (1950) as amended.

Issued : July 19, 1988
Amendment 1: June 16, 1999 (Major Amendment 1)
Amendment 2: May 1, 2006 (Minor Amendment 2)
Amendment 3: May 11, 2006 (Minor Amendment 3)
Amendment 3: July 19, 2006 (Major Amendment 4)

APPROVED:

Gerard Seeley, Jr.

DATE: 7/21/06
Amendment No. 4

COMMONWEALTH of VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
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James S. Gilmore, III
Governor

John Paul Woodley, Jr.
Secretary of Natural Resources

Dennis H. Treacy
Director

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SOLID WASTE FACILITY PERMIT
PERMIT NUMBER *525*

Facility Name:	Cox's Darbytown Road Landfill		
Facility Type:	CDD Landfill	**Latitude:**	*37°29'51"*
Site Location:	Henrico County	**Longitude:**	*77°22'30"*

Location Description: The facility is located in eastern Henrico County, approximately 1.7 miles northwest of Laburnum Avenue, or approximately 0.2 miles northeast of the intersection of Darbytown Road and Bickerstaff Road, on the eastern side of Darbytown Road. The facility is approximately 34 acres in size, with 21 acres designated for disposal.

Background: The facility was initially permitted as a sanitary landfill by Permit No. 188, which was issued on July 3, 1975. That area is designated as Cell 1, and is approximately 13 acres in size. That permit was amended June 20, 1989, by Permit No. 525, which superseded Permit No. 188. The purpose of that amendment was to incorporate an expansion area designated Cell 2, which is approximately 8 acres in size. Cell 2 was permitted with a liner and leachate collection system; however, it was not ever developed. This current amendment is to amend the liner and leachate collection system of Cell 2 to comply with current standards. A Part A application was submitted for the Cell 2 area, and it was approved with conditions on January 17, 1995. The facility's intent is to serve as a CDD landfill, in compliance with 9 VAC 20-80-10 et. seq. (VR 672-20-10), Amendment 1. The facility is designed to accept 2000 cubic yards of CDD waste per day, and with a Cell 2 design volume of approximately 470,000 cubic yards, should have a design life of six years. The service area of the landfill consists of the City of Richmond and surrounding counties.

Permit Highlights: This permit amends the existing permit which was issued July 3, 1975, and last amended on June 20, 1989. This permit includes permit modules and associated permit attachments which are, in general, based on information submitted in the permit application.

Variances: In conjunction with this major amendment, the permittee petitioned the director for a variance to the Virginia Solid Waste Management Regulations. Specifically, the permittee seeks relief from 9 VAC 20-80-260.B.14.a.(2) [§ 5.2.B.14.a.(2), VR 672-20-10], which requires that clay liners must be installed at a minimum 2% slope, and 9 VAC 20-80-260.B.14.b.(4) [§ 5.2.B.14.b.(4), VR 672-20-10], which requires that synthetic liners must be installed at a minimum 2% slope. The variance will allow the permittee to install either the clay or synthetic liner options at a minimum slope of 1.0% from the southern limits to the center of the cell, and at a minimum slope of 2.5% from the center towards the sump boxes. The permittee has demonstrated that after settlement the entire liner will be inclined at a slope of approximately 2%.

THIS IS TO CERTIFY THAT:

Cox's Darbytown Landfill, Inc.
5200 Hatcher Street
Richmond, Virginia 23231

is hereby granted a permit to construct, operate, and maintain the facility as described in the attached Permit Modules I, II, IV, X, XI, XII, and XIII. These Permit Modules and Permit Attachments are as referenced hereinafter and are incorporated into and become a part of this permit.

The herein described activity is to be established, modified, constructed, installed, operated, used, maintained, and closed in accordance with the terms and conditions of this permit and the plans, specifications, and reports submitted and cited in the permit. The facility shall comply with all regulations of the Virginia Waste Management Board. In accordance with Chapter 14, § 10.1 - 1408.1(D) of the Code of Virginia, prior to issuing this permit, any comments by the local government and general public have been investigated and evaluated and it has been determined that the proposed facility poses no substantial present or potential danger to human health or the environment. The permit contains such conditions and requirements as are deemed necessary to comply with the requirements of the Virginia Code, the regulations of the Board, and to prevent substantial or present danger to human health or the environment.

Failure to comply with the terms and conditions of this permit shall constitute grounds for the revocation or suspension of this permit and for the initiation of necessary enforcement actions.

The permit is issued in accordance with the provisions of § 10.1-1408.1.A, Chapter 14, Title 10.1, Code of Virginia (1950) as amended.

Issued: July 3, 1975
Amendment: June 20, 1989

APPROVED:

Leslie A Romanchik
for Dennis H. Treacy

DATE: January 20, 2000
Amended

I. GENERAL

The Operations Manual will serve as the document to describe how the design and construction plan will be implemented throughout the active life of the Darbytown Road Landfill Cell 2 expansion and the post-closure care period. The permitting of the Darbytown Road Landfill expansion is addressed through amending the existing landfill Permit No. 525. The Darbytown Road Landfill will continue to accept only Construction, Demolition, and Debris (CDD) waste as defined by the Virginia Solid Waste Management Regulations (VSWMR). Operations for this expansion will be in accordance with the requirements set forth in Section 5.2.C. of the VSWMR.

II. SERVICE INFORMATION

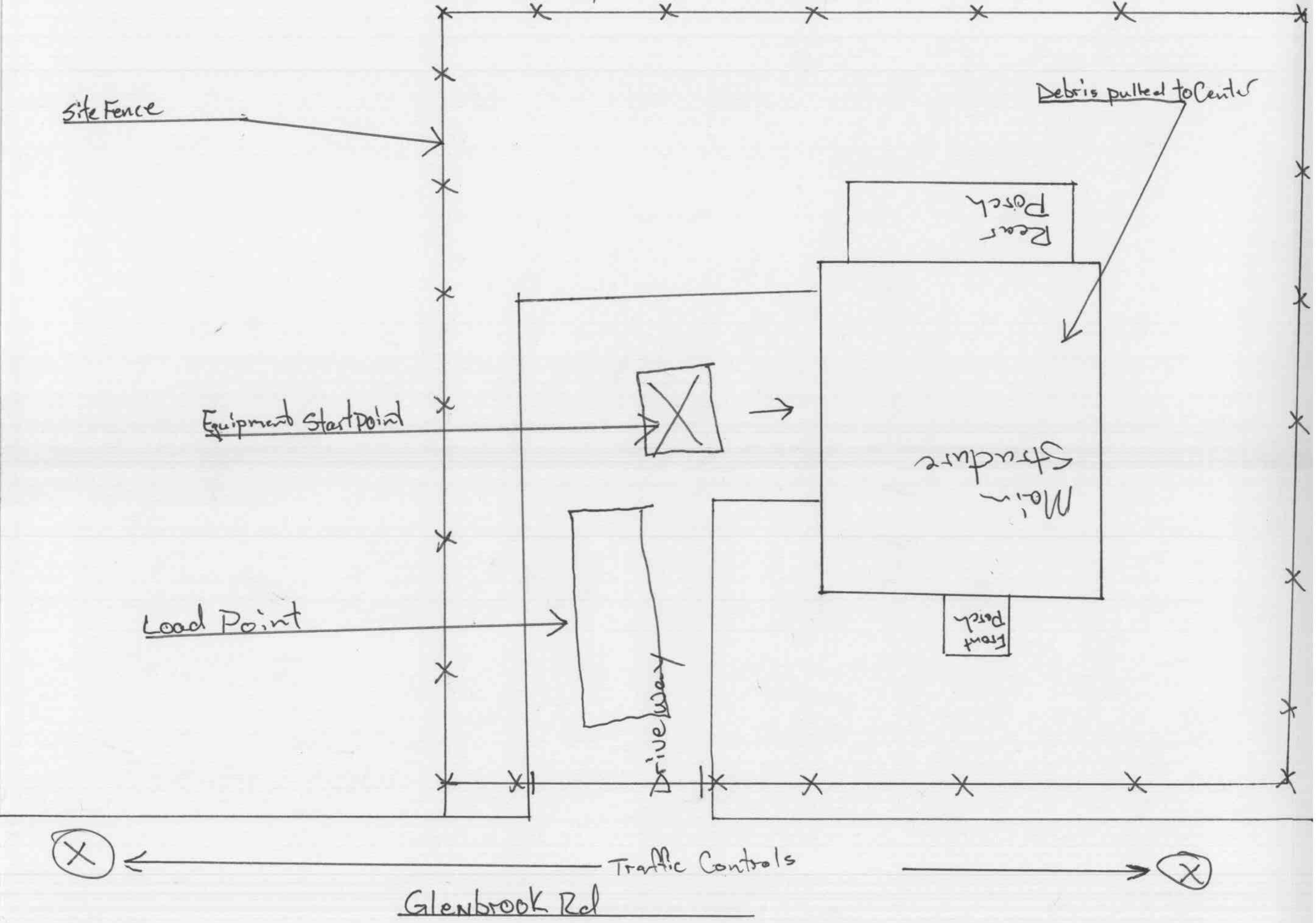
The waste accepted at the Darbytown Road Landfill will be composed of CDD waste as defined by the VSWMR.

- Construction wastes include, but are not limited to, lumber, wire, sheetrock, broken brick and block, shingles, glass, pipes, concrete, paving materials, and metal and plastics if the metal or plastics are parts of the materials of construction or empty containers for such materials. Occasionally, waste materials resulting from the manufacture of building products are accepted.
- Demolition waste is defined as solid waste which is produced by the destruction of structures and their foundations.
- Debris waste is defined as waste resulting from land clearing operations. These include, but are not limited to stumps, wood, brush, leaves, soil, and road spoils.

Darbytown Road Landfill will not accept municipal solid wastes, hazardous wastes, friable asbestos, any free liquid, compressed gases or semi-liquids.

Site Map

Site Map for Illustration only



ATTACHMENT D-4
STANDARD OPERATING PROCEDURES

STANDARD OPERATING PROCEDURE
NUMBER 4

PERSONAL PROTECTIVE EQUIPMENT

SOP 4 - PERSONAL PROTECTIVE EQUIPMENT

4.1 INTRODUCTION

4.1.1 This personal protective equipment (PPE) SOP specifies procedures to protect personnel from safety and health hazards when performing field operations. This plan addresses U.S. Army Corps of Engineers PPE requirements contained in Section 5 of the USACE Safety and Health Requirements Manual (EM 385-1-1, 15 Sep 2008) and the Occupational Safety and Health Administration (OSHA) requirements as specified in 29 CFR 1910.132 (Personal Protective Equipment).

4.1.2 The purpose of PPE is to shield, isolate, or secure individuals from hazards that may be encountered when administrative or engineering controls are not feasible or cannot provide adequate protection.

4.1.3 The selection of the appropriate PPE is a complex process that takes into consideration a variety of factors. Key factors involved in this process are the identification of suspected hazards; their routes of exposure (inhalation, skin absorption, ingestion, and eye or skin contact); and the performance of the PPE materials in providing a barrier to these hazards. The anticipated levels of protection are outlined below. Compliance with the PPE selection requirements will be enforced by the SSHO.

4.2 PROTECTIVE ENSEMBLES

Descriptions of the PPE ensembles and project-specific applications are provided in the Work Plan.

4.3 DONNING AND DOFFING OF PPE

4.3.1 Donning of PPE will be accomplished in accordance with the manufacturer’s instructions and only after an inspection of the item to ensure its operability, continuity and to be certain there are no “critters” making a home of the item. This inspection should include peering into and the shaking and slapping together of leather gloves prior to putting them on. The same procedure goes for the work boots and head protection. Be certain to conduct a visual inspection and then shake and bang the items against a hard object to dislodge any would be intruders.

4.3.2 Doffing of PPE is accomplished in accordance with the manufacturer’s instructions and includes a complete inspection to ensure the item is free of dirt or anything else that may be clinging to it as well as an inspection for operability and continuity. Any item found to be torn, or inoperable must be replaced and the defective item either properly disposed of or repaired.

4.4 MAINTENANCE AND STORAGE OF PPE

4.4.1 Maintenance of PPE will only be conducted in accordance with the manufacturer's instructions and, in the instance of Level A and B, PPE, only by personnel that have received proper instruction in the maintenance of the PPE. Replacement items or parts will be those provided by the manufacturer and at no time will pieces from different brands of PPE be used to “fix” a defective piece of PPE. Any PPE used inside an Exclusion Zone (EZ), which is contaminated with HTRW or CWM shall be cleaned in accordance with the documented decontamination procedures. This cleaning will involve the use of one or more decontamination solutions and a fresh water rinse, and all re-usable PPE should be dried, or hung to dry, and stored in a clean environment, free from exposure to chemicals, dust, moisture, sunlight or extreme temperatures. Level D PPE, such as leather gloves, hard hats and safety glasses will be cleaned of dirt or anything clinging to the items that should not be there after every use.

4.4.2 PPE must be stored properly to prevent damage or malfunction due to exposure to dust, moisture, sunlight, damaging chemicals, extreme temperatures, and impact. Many equipment failures can be directly attributed to improper storage. Storage of PPE will include storing in such a way that the natural shape of the PPE is not compromised. All PPE must be stored in such as manner as to prevent “critters” from crawling into the item and presenting a possible injury from a bite or sting. Establish a location and procedure for the proper storage of PPE. The bed of the pick-up truck or floor of the SUV are not acceptable locations for the storage of PPE.

4.4.3 Different types of clothing and gloves should be stored separately to prevent issuing the wrong material by mistake. Protective clothing should be folded or hung in accordance with manufacturer's recommendations.

4.4.4 Reusable clothing (outer gloves, boots) must be thoroughly decontaminated before being reused if they were used on a CWM or HTRW environment.

4.5 TRAINING AND PROPER FITTING

The SSHO or other qualified person will train Parsons Employees and subcontractors in the proper use of protective equipment prior to field operations. At a minimum, the training should explain the user's responsibilities and should address the following issues, using a combination of classroom lecture and field simulation:

- OSHA and USACE PPE requirements;
- Proper use and maintenance of the selected PPE, including capabilities and limitations;
- Nature of the hazards and the consequences of not using the PPE;
- Instruction inspection, donning, doffing, decontaminating, checking, fitting, and using the selected PPE;
- User's responsibility (if any) for decontamination, cleaning, maintenance, and repair of PPE; and

- Emergency procedures and self-rescue in the event of PPE failure.

4.6 PPE PROGRAM EVALUATION

At a minimum, the PPE program should be reviewed monthly by the SSHO to evaluate the effectiveness of the following factors:

- Number of personnel-hours that are spent in various PPE ensembles;
- Degree to which the program complies with OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) and USACE requirements on PPE use, inspection, maintenance, and recordkeeping;
- Accident, injury, and illness statistics, and recorded levels of exposure;
- Aadequacy of operating procedures to guide the selection of PPE; and
- Recommendations for and results of program improvement and modification.

STANDARD OPERATING PROCEDURE
NUMBER 5

HEARING CONSERVATION

SOP 5 - HEARING CONSERVATION PROGRAM

5.1 INTRODUCTION

The purpose of this Hearing Conservation SOP is to provide protection for employees from adverse health effects associated with occupational exposure to noise. The program consists of: annual audiometric testing of workers, annual employee training, selection and use of hearing protection, and noise monitoring. All Parsons employees and subcontractors must comply with this program.

5.2 AUDIOMETRIC TESTING PROGRAM

5.2.1 Audiometric testing shall be made available to all employees whose exposures equal or exceed an 8-hour time - weighted average of 85 decibels or equivalently a dose of 50 percent Audiometric tests shall be performed by a licensed or certified audiologist, otolaryngologist, or physician who is certified by the Council of Accreditation in Occupational Hearing Conservation. Each employee assigned to noisy operations must receive a baseline audiogram prior to assignment and yearly testing thereafter for as long as that employee is exposed to excessive noise levels (8-hour time-weighted average of 85 decibels or greater). Each employee's annual audiogram is compared to that employee's baseline audiogram to determine if the audiogram is valid and if a standard threshold shift has occurred. (A standard threshold shift is a change in hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2,000, 3,000, and 4,000 Hz in either ear.) This comparison should be completed by a physician.

5.2.2 If a comparison of the annual audiogram to the baseline audiogram indicates a standard threshold shift has occurred, the employee shall be informed of this fact in writing, within 21 days of the determination. The following steps are taken by the SSHO when a standard threshold shift occurs:

- Employees not using hearing protectors shall be fitted with hearing protectors, trained in their use and care, and required to use them.
- Employees already using hearing protectors shall be refitted and retrained in the use of hearing protectors and provided with hearing protectors offering greater attenuation if necessary.
- The employee shall be referred for a clinical audiological evaluation or an otological examination, as appropriate, if additional testing is necessary.
- The employee is informed of the need for an otological examination if a medical pathology of the ear that is unrelated to the use of hearing protectors is suspected.

5.2.3 Audiometric tests shall be pure tone, air conduction, and hearing threshold examinations, with test frequencies including as a minimum 500, 1000, 2000, 3000, 4000, and 6000 Hz. Tests at each frequency shall be taken separately for each ear. Audiometric tests shall be conducted with audiometers (including microprocessor audiometers) that meet the specifications of, and are maintained and used in accordance with, American National Standard Specification for Audiometers. The functional operation of the audiometer shall be checked before each day's use by testing a person with known, stable hearing thresholds, and by listening to the audiometer's output to make sure that the output is free from distorted or unwanted sounds. Audiometer calibration shall be checked acoustically at least annually in accordance with OSHA requirement (29 CFR 1910.95 Appendix E)

5.3 HEARING PROTECTORS

The SSHO shall make hearing protectors available to all Parsons and subcontract employees exposed to an 8-hour time-weighted average of 85 decibels or equivalently a dose of 50 percent. Hearing protection for most projects will consist of earmuffs or foam fitting earplugs. The selection of the type of hearing protector will be based upon noise attenuation requirements for the task and worker comfort.

5.4 EMPLOYEE TRAINING

The SSHO will develop a hearing conservation training program for all employees assigned to noisy work. This training will be a component of the initial site safety training. As a minimum, the training shall consist of:

- The effects of noise on hearing.
- The purpose of hearing protectors, the advantages, disadvantages, and attenuation of various types, and instructions on selection, fitting, use, and care.
- The purpose of audiometric testing, and an explanation of the test procedures.

5.5 NOISE MONITORING

5.5.1 When operations are anticipated to exceed the 8-hour time-weighted average of 85 decibels, the SSHO may implement a noise-monitoring program. The sampling shall be used to:

- Verify that appropriate hearing protection is being used by employees
- Identify the boundaries of the noise hazard area in accordance with Section 05.C.08 of EM 385-1-1.

5.5.2 Noise level monitoring instruments used to measure employee noise exposure shall be calibrated and the calibration logged in the SSHO log to ensure accuracy.

5.5.3 Types of operations that may require noise monitoring are: use of heavy equipment, generators, or power tolls. Tasks involving vegetation removal, demolition, mechanical excavation etc.

STANDARD OPERATING PROCEDURE
NUMBER 6

LOCKOUT / TAGOUT

SOP 6 - LOCKOUT/TAGOUT PROGRAM

6.1 INTRODUCTION

6.1.1 Objective

This procedure shall be used by Parsons and subcontractor personnel to ensure that the machine or equipment being worked on is isolated from all potential hazardous energy sources, and locked out or tagged out before an employee performs any servicing or maintenance activity where the unexpected energization, start-up, or release of energy could cause an injury. Energy sources can be electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

6.1.2 Purpose

This procedure establishes the minimum safety requirements to ensure the proper deactivation of movable, electrically energized, pressurized equipment and systems; and systems containing hazardous materials prior to repairing, cleaning, oiling, adjusting, or similar work. This procedure complies with the requirements in 29 CFR 1910.147 and EM 385-1-1, Section 12 D and E..

6.1.3 Requirements

This procedure applies to all equipment that receives energy from electrical power, hydraulic fluid under pressure, compressed air, steam, energy stored in springs, potential energy from suspended parts, or any other source that may cause unexpected movement when it is necessary to perform work on that system. It also applies to similar functions performed on systems containing hazardous materials.

6.1.4 Definitions

- **Lockout** - The placement of a lockout device on an energy isolating device, in accordance with this procedure, is ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed. The lockout device can be key operated or a combination device.
- **Tagout** - The placement of a tagout device on an energy isolating device, in accordance with this procedures, is to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed by the authorized person who originally placed the tagout device in position.
- **Authorized employee -** A person who locks or implements a tagout system procedure on machines or equipment to perform the servicing or maintenance on that machine or equipment.

6.2 LOCKOUT/TAGOUT STEPS

Prior to initiating any repairs, modifications, and/or adjustments to operating equipment, these steps will be followed:

1. The immediate supervisor with jurisdiction over the equipment and all affected employees will be notified that the energy sources are to be deactivated.

2. All sources of power that must be locked out, blocked, or released will be identified by the immediate Supervisor and the employee who will work on the equipment.
3. In order to ensure that the equipment cannot be re-energized while maintenance activities are performed, the employee will lockout/blank out all potential energy sources. (Employees will be assigned padlocks with their names or identification numbers affixed to the locks. The locks will be individually keyed to prevent another employee from removing the lock inadvertently.) If more than one employee is assigned to work on the equipment, a multi-lockout hasp will be used so that all employees working on the equipment can apply their locks and ensure their safety.
4. A tagout device will be affixed to all components or systems de-energized to indicate that lockout has been performed.
5. After the servicing and/or maintenance is complete and the equipment is ready for normal operations, check the area around the machine or equipment. After all tools have been removed from the machine or equipment, guards have been reinstalled, remove all lockout or tagout devices. Operate the energy isolating devices to restore energy to the machine or equipment.

6.3 SPECIAL CONDITIONS

6.3.1 During certain operations it may be necessary to energize the equipment for a short period of time. Employees in the immediate area will be notified and directed to stay clear of the equipment. If the equipment is to be deactivated again, the employee should repeat steps 3 to 5 of this procedure before work resumes.

6.3.2 If the work is completed and a lock remains on the equipment, it shall not be removed until the employee responsible for the lock is found or the supervisor of the employee investigates and ascertains that the equipment is safe to operate. Unauthorized removal of a lock will subject the violator to disciplinary action up to dismissal.

6.4 TRAINING

Initial and annual training will be given to all employees to ensure that the purpose and function of this energy and control program are understood.

6.5 PERIODIC INSPECTION

The Site Safety and Health Officer will conduct an annual audit of the energy control program to ensure that the requirements of these procedures are being followed. A record of annual audits will be kept to comply with the requirement for periodic inspections.

STANDARD OPERATING PROCEDURE
NUMBER 7

MEDICAL SURVEILLANCE, CONTROL/ACCESS TO EMPLOYEE MEDICAL RECORDS, AND EMERGENCY CARE

SOP 7 - MEDICAL SURVEILLANCE, CONTROL/ACCESS TO EMPLOYEE MEDICAL RECORDS, AND EMERGENCY CARE

7.1 INTRODUCTION

The medical surveillance program is a major element in the Parsons Health and Safety Program. The three major components of the medical surveillance program are: (1) routine medical monitoring of the health of Parsons personnel whose work may expose them to health hazards, (2) arrangements for emergency medical care in the event of a work-related injury, and (3) maintenance of employee medical records.

7.2 MEDICAL SURVEILLANCE

7.2.1 Enrollment Criteria

7.2.1.1 A medical examination is essential to assess and monitor a worker's health and fitness both before placement and during the course of work. The criteria for medical surveillance enrollment is dependent upon the employee's exposure potential. An employee whose work involves the regular, potential exposure to toxic substances or physical agents above established short-term exposure limits (STELs), OSHA permissible exposure limits (PELs), OSHA action levels, or American Conference of Governmental Industrial Hygienist (ACGIH) threshold limit values (TLV) shall be enrolled in the medical surveillance program. Examples of operations where employee enrollment would be necessary include.

- Field investigations or remedial operations at gasoline stations or bulk storage terminals;
- Field investigations in a designated exclusion zone;
- Work requiring respirator usage;
- Laboratory use of hazardous substances;
- Asbestos or lead sampling or abatement;
- Stack sampling and source evaluation operations; and
- Industrial wastewater and process water characterization surveys.

7.2.1.2 An employee assigned to a task where there is no reason to believe there is a potential for exposure above STELs, OSHA PELs, OSHA action levels, or ACGIH TLVs would be exempt from the medical surveillance program. Examples of exempted operations would include the following:

- Project management oversight from support zone;
- Property transfer audits where there is no environmental sampling;
- Laboratory operations confined to dip and read tests;

- Brush clearing and land survey operations; and
- Ecological surveys.

7.2.2 Medical Oversight Contractor

7.2.2.1 Parsons has hired a medical oversight contractor (MOC) to manage its medical surveillance program. The MOC is Work Care, (phone: 800-455-6155). The responsibilities of the MOC are:

- Develop medical examination protocols specific to Parsons' operations;
- Contract local clinics;
- Issue employee medical reports to the Program Health and Safety Manager (PHSM);
- Track personnel enrolled in medical monitoring program; and
- Archive employee medical and exposure records.

7.2.2.2 The MOC provides Parsons with consistency in examination content and quality.

7.2.3 Clinic Selection

The sector certified industrial hygienist (CIH) will perform initial clinic selection by contacting the MOC and providing the location of the project site. The MOC will then identify a suitable clinic that it ideally located as close as possible to the project site.

7.2.4 Pre-Placement Screening

All employees who will be involved in the medical surveillance program will have an initial physical examination before assignment to work requiring regular health monitoring. The pre-placement screening has two major functions: (1) to determine the employee's fitness for duty, including the ability to work while wearing protective equipment and (2) to establish a baseline physiological profile for comparison with future medical data. The physical examination will be given by an approved clinic and will follow the examination protocol established by the MOC. In the event the project site is a CWM site, then the MOC will be asked to review Department of Army Pamphlet 40-173, Occupational Guidelines for the Evaluation and Control of Occupational Exposure to Mustard Agents H, HD, and HT. As a result the MOC will add additional medical tests or exams as appropriate.

7.2.5 Periodic Examinations

Physical examinations are repeated annually for personnel involved in HTRW, OE, and CWM projects. Records of project personnel working on the project will be checked to ensure that a periodic examination has occurred within the last year.

7.2.6 Termination Examination

A physical examination shall be performed as a part of the checkout procedure for terminating employees. The content of this examination shall comply with the protocol established by the MOC. Each Parsons employee who works on a CWM or HTRW site will also receive a project termination physical as directed by the MOC – in accordance with DA Pamphlet 40-173.

7.2.7 Special Examination

Special medical examinations and counseling will be provided in cases of known or suspected exposure to a toxic substance above its occupational exposure limit. The SSHO must approve special testing after consulting with the Program H&S Manager and MOC physician.

7.2.8 Information Provided to the Examining Physician

Each employee participating in the medical surveillance program will present to the examining physician a completed History and Physical Form at the time of the examination. The History and Physical Form is designed to elicit information necessary for the physician to understand the employee's past and current health status. Additionally, the form provides an opportunity for the employee to express possible concerns about his or her occupational environment.

7.2.9 Medical Examination Reports

7.2.9.1 Data obtained during the examination is sent to the MOC physician for analysis. After reviewing the data, the MOC physician submits a report to the Program Health and Safety Manager who forwards the results to the SSHO. This report contains the following information:

- Physician's opinion of the employee's fitness to perform their assigned duties;
- Any recommended limitations upon the employee's assigned duties; and
- Statement that the employee has been informed of the physician's findings and of any medical conditions that require further examination or treatment.

7.2.9.2 Additionally, the employee receives a report from the MOC physician that discusses all aspects and findings of the medical examination.

7.2.10 Disposition of Medical Records of Terminated Employees

When an employee leaves Parsons, the MOC shall seal the employee's medical file for archiving. The medical file will be maintained in the custody of the MOC for 30 years after the employee's termination date.

7.2.11 Confidentiality of Reports

The medical report that is submitted to the PHSM and forwarded to the SSHO shall not reveal any specific findings or diagnoses unrelated to occupational exposures, illnesses, or accidents. Reports shall be maintained either electronically (encrypted) or in paper format (in file with access restricted). Access to the physician's report shall only be accessible to the SSHO and Program Health and Safety Manager unless authorized in writing by the employee or except where the opinions are required for settlement of workers' compensation claims.

7.2.12 Subcontractor Medical Certification

Subcontractors assigned to work on the project are required to furnish the SSHO with a copy of the doctor's certification identifying the employee's ability to wear personal protective equipment. The certification should be dated not more than 1 year before the employee begins on-site work.

7.3 EMERGENCY MEDICAL CARE

7.3.1 Emergency treatment is integrated into the Emergency Response and Fire Prevention Plan (SOP 8.0). This plan requires posting of the name, a map showing its location, phone number, and address of the nearest emergency care center. In addition, phone numbers and procedures for contacting fire, police, LifeFlight and ambulance services are included in the emergency response portions of this plan. The Emergency Response and Fire Prevention Plan designates roles and responsibilities to be assumed by personnel in an emergency. At least two members of the field team will be currently certified in cardiopulmonary resuscitation (CPR) and first aid.

7.3.2 A map with directions to the nearest medical facility will be posted at the worksite. All personnel working at the site should know the location of the nearest medical facility. The SSHO will report all incidents requiring emergency medical attention to the PHSM and GBU Safety Manager.

7.4 PROGRAM RESPONSIBILITY

The SSHO is responsible for assuring that site workers are incompliance with this SOP. In addition the SSHO or CIH sets-up employee exam through the MOC.

7.5 PROGRAM COSTS

Routine medical monitoring is the responsibility of Parsons, and the company will bear the entire cost of the program.

STANDARD OPERATING PROCEDURE
NUMBER 8

EMERGENCY RESPONSE AND FIRE PREVENTION PLAN

SOP 8 - EMERGENCY RESPONSE AND FIRE PREVENTION PLAN

8.1 PRE-EMERGENCY PLANNING

8.1.1 Situations requiring emergency response can be minimized by planning and approaching the circumstances in a calm, deliberate manner.

8.1.2 Agencies that may provide emergency response, such as the Emergency Management Agencies (EMAs), police department, Fire Department and medical support services will receive an operations schedule on a daily or weekly basis.

8.1.3 The SSHO will be the on-site project emergency coordinator (as conditions dictate) in case of an accident or incident requiring emergency response. All personnel will be briefed at the morning tailgate safety meetings the location of the cellular telephones and who has on-site radio communications. This information will also be included in all visitor briefings.

8.1.4 A warning system using a series of three five-second blasts on portable air horns or vehicle horns will notify site personnel that an accident or incident has occurred and evacuation is required. Upon hearing the evacuation warning, all personnel will immediately clear the site and respond to the designated rally point. This rally point will be revised based upon prevailing weather conditions and will be briefed by the SSHO at the morning tailgate safety briefing. At the rally point, all personnel will be accounted for and interviewed to assure no one has sustained injuries because of the accident or incident.

8.1.5 If an emergency response rescue operation is required, no personnel will re-enter the area until the situation has been assessed and it is determined that resources are on-hand to handle the rescue without jeopardizing additional personnel.

8.2 PERSONNEL ROLES AND LINES OF AUTHORITY

8.2.1 This plan describes the various roles, responsibilities, and communication procedures that will be followed by personnel working on this project in the event of an emergency.

8.2.2 The primary On-Site Project Emergency Coordinator for this site is the on-site Parsons SSHO or his designee (Site Manager). The on-site Emergency Coordinator will determine the nature of the emergency and take appropriate action.

8.2.3 Prior to field activities, the Parsons SSHO shall plan emergency egress routes and discuss them with all personnel who will be conducting fieldwork. Initial planning includes establishing and testing emergency warning signals and evacuation routes to prevent delays in the event of an emergency.

8.3 EMERGENCY CONTACTS

Emergency telephone numbers for the closest hospitals capable of providing emergency service, EMAs, Poison Control Center, local Police and Fire Department, and key safety and management personnel from the Corps of Engineers (COE) District, and Parsons will be listed in the Work Plan and will be posted in the field trailer and other conspicuous locations. The SSHO will be responsible for taking necessary action and contacting the appropriate emergency contacts.

8.4 EMERGENCY RECOGNITION AND PREVENTION

Emergencies can take many forms: exposure to chemical agents or industrial chemicals of various types, illnesses or injuries, chemical exposure, fires, or sudden changes in the weather. The remaining sections of the ERCP outline general emergency and contingency planning procedures to be followed at the site. Emergency information and instructions shall be posted as appropriate.

8.5 EMERGENCY EVACUATION FROM EXCLUSION AND CONTAMINATION REDUCTION ZONES

Any personnel requiring emergency medical attention shall be evacuated immediately from Exclusion and Contamination Reduction Zones. The decision whether or not to decontaminate a victim prior to evacuation is based on the type and severity of the illness or injury and the nature of the contaminant. For some emergency victims, immediate decontamination may be an essential part of life saving first aid (e.g., victims contaminated with mustard or lewisite). For others, decontamination may aggravate the injury or delay life saving treatment. If decontamination does not interfere with essential treatment, it should be performed.

8.5.1 If decontamination can be performed:

- Wash external clothing and cut it away.

  NOTE: soap and water will be used to decontaminate injured victims potentially contaminated with mustard or lewisite.

8.5.2 If decontamination cannot be performed:

- Wrap the victim in blankets or plastic to reduce contamination of other personnel
- Alert emergency and off-site medical personnel to potential contamination; instruct them about specific decontamination procedures
- Send along site personnel familiar with the incident

8.6 FIRST AID

8.6.1 At least two people trained and certified in First Aid/CPR will be present on-site at all times during intrusive activities. This may include on-site staff or the Emergency Medical Technicians on-site. Life support techniques such as CPR and treatment of life threatening problems such as shock will be given top priority. Professional medical assistance shall be obtained at the earliest possible opportunity.

8.6.2 To provide first-line assistance to field personnel in the case of illness, injury, or fire the following items will be immediately available:

- First aid kit;
- Portable emergency eye wash;
- Supply of clean water and 5 percent bleach solution;
- Fire extinguisher;
- Portable spill kit or equivalent (30 gallon size);
- Air horn; and
- Cellular telephone or 2-way radio

8.7 EMERGENCY ACTIONS

If actual or suspected serious injury occurs, these steps shall be followed:

- Remove the exposed or injured person(s) from immediate danger.
- Render first aid if necessary. Decontaminate affected personnel after critical first aid is given, if chemical agent exposure is suspected.
- Obtain paramedic services or ambulance transport to local hospital. This procedure shall be followed even if there is no visible injury.
- Other personnel in the work area shall be evacuated to a safe distance until the Emergency Coordinator determines that it is safe for work to resume. If there is any doubt regarding the condition of the area, work shall be delayed until all hazard control issues are resolved.
- Notify USACE, Parsons Project Manager, and Project Health and Safety Officer. USACE will make the required notifications to State and County Agencies.

8.8 EMERGENCY EVACUATION PLAN

8.8.1 General Evacuation Plan

8.8.1.1 In the case of an operational shutdown due to severe weather conditions, or if other hazards exist on-site, the Emergency Coordinator or Site Manager will sound the alarm (three blasts each of five second duration on an air horn). All personnel in the work area will secure their equipment and proceed to the off-site assembly point, located a safe distance (designated at morning safety meeting) at an upwind location from the site. The Emergency Coordinator or his alternate will obtain the site entry/exit logs to ensure that all personnel have been safely evacuated. The Site Manager will coordinate with the Emergency Coordinator to determine when it is safe to re-enter the site and resume work.

8.8.1.2 In the general case of a large fire, explosion, or toxic vapor release, a site evacuation shall be ordered and the following steps implemented:

- Sound the alarm (three blasts each of a five-second duration on an air horn), notify appropriate emergency response agencies, and advise USACE and Parsons project management personnel.
- Evaluate downwind impact in order to assist emergency response agencies. All personnel will evacuate in the upwind direction.
- All personnel will assemble in an upwind area when the situation permits, and a head count will be taken.
- Determine the extent of the problem. Dispatch a response team in protective clothing and self-contained breathing apparatus on-site to evacuate any missing personnel (when conditions do not endanger safety of rescue personnel) and to correct the problem.

8.8.2 Evacuation Signals and Routes

8.8.2.1 Two-way radio communication, direct voice communication, or an air-horn (three blasts - each of five seconds duration) will be used to notify employees of the necessity to evacuate an area involved in a release/spill of a hazardous material. Each work location will have a two-way radio. A two-way radio will be in the Parsons command post to monitor for emergencies. Total site evacuation will be initiated only by the Emergency Coordinator. However, in his absence, the decision to preserve the health and safety of employees will take precedence.

8.8.2.2 Evacuation routes will be discussed and described in tailgate safety meetings. The route to the Medical Center will be posted in each work area. Periodic drills (before each new phase of work) will be conducted to familiarize each employee with the proper routes and procedures.

8.8.3 Evacuation Procedures

In the event evacuation is necessary, the following actions will be taken:

- The alarm will be activated.
- No further entry of visitors, contractors, or trucks will be permitted. Vehicle and equipment traffic within the site will cease to allow safe exit of personnel and movement of emergency equipment.
- Shut off all machinery and equipment, if safe to do so.

- All on-site personnel, visitors, and contractors in the Support Zone will assemble at the office trailer, or other designated area, for a head count and wait for further instructions from the Emergency Coordinator.
- Upon completion of the head count, the senior person will provide the information to the Emergency Coordinator.
- Visitors will also be accounted for.
- A final tally of persons will be made by the Emergency Coordinator or his designee. No attempt will be made to find persons not accounted for if the rescue attempt involves endangering the lives of employees.
- Personnel will be assigned by the Emergency Coordinator to be available at the main entrance point to direct and brief emergency responders.
- Re-entry into the site will be made only after clearance has been given by the Emergency Coordinator. At his direction, a signal or other notification will be given for re-entry into the facility.
- Drills will be held at the beginning of the intrusive fieldwork and at intervals during the intrusive work. Drills will be treated with the same seriousness as an actual emergency.

8.9 EMERGENCY ALERTING AND RESPONSE

To minimize hazards to the environment or to human health, the procedures listed below are to be implemented in the event of a spill or discharge involving a hazardous substance. It is the responsibility of on-site employees to report any such emergencies to the on-site Emergency Coordinator who will be responsible for implementing emergency response procedures.

8.9.1 Initial Notification

- <u>STEP 1</u>: Notify appropriate management personnel in the following order until one of these people are contacted. Senior ranking person will take over responsibilities when they arrive.

  Contact

  1st. Parsons Site Manager
  2nd. Parsons SSHO
  3rd. Parsons UXOQC

- <u>STEP 2</u>: If the emergency coordinator determines that assistance is needed to respond to the emergency, he/she can notify the appropriate personnel. The Emergency Contact List will be posted onsite.
- <u>STEP 3</u>: If the on-site Emergency Coordinator determines that a spilled material is “in such quantity or concentration as may be harmful or poses a foreseeable risk of harm to public health or welfare or to natural resources,” the coordinator will immediately notify the appropriate personnel.

- STEP 4: The USACE Project Representative will be notified immediately and given a copy of the spill report within 48 hours. He/she will be advised concerning all notification and response actions. Depending on type of spill, it may be necessary to notify local and state agencies. Determinations as to reportable quantities for specific chemicals or materials will be obtained by the Site Manager from state regulatory agency. The state notification will be accomplished after notifying USACE and following emergency response actions.
- STEP 5: The on-site emergency coordinator will contact the National Response Center (800-424-8802) when a hazardous substance is released in excess of the reportable quantity.

8.10 EMERGENCY SERVICES

All personnel shall be provided concise and clear directions and accessible transportation to local emergency services. A map outlining directions to the nearest hospital will be posted on-site.

8.10.1 Emergency Equipment

In the decontamination area, an emergency equipment station will be present. This station will consist of a combination emergency eye wash station, first aid kit, two-way radio or cellular phone, emergency alarm (e.g., air horn), and a fire extinguisher. Each piece of heavy equipment, site trailer, and each vehicle will be equipped with a fire extinguisher.

8.10.2 Critique of Response and Follow-up

All response actions will be evaluated for effectiveness by SSHO and Site Manager. Corrective actions will be communicated to personnel and procedures will be revised as required.

8.11 SPILL INCIDENT REPORTS

A written report detailing the spill or discharge shall include, at a minimum, the cause and resolution of the incident, the date the incident occurred, and any outside agencies involved. The report shall be submitted to the USACE within 48 hours of the incident.

8.11.1 Special Notifications and Procedures in the Event of a Spill

Additional notifications, including emergency telephone numbers, if needed, for local, state, and federal agencies which may require notification are included in the Notification Plan kept onsite.

- If the incident threatens human health or the environment outside of the project site boundaries, the emergency coordinator will notify the local Police Department first, then the local Fire Department, and the Emergency

Management Agency. Assistance will be provided to these organizations to determine if public evacuation is necessary.

- If a reportable quantity of a hazardous material is released off-site, the Emergency Coordinator will notify the National Response Center (800-424-8802). The following information will be provided to the National Response Center:
  - Name and telephone number
  - Name and address of facility
  - Time and type of incident
  - Name and quantity of materials involved, if known
  - Possible hazards to human health and/or the environment outside of the facility
- If hazardous waste has been released or produced through control of the incident, ensure that:
  - Waste is collected and contained
  - Containers of waste are removed or isolated from the immediate site of the emergency
  - Treatment or storage of the recovered waste, contaminated soil or surface water, or any other material that results from the incident or its control is provided
  - Ensure that all emergency equipment used is decontaminated, recharged, and ready for use before site operations are resumed

8.12 FIRE PREVENTION AND CONTINGENCY MEASURES

8.12.1 Because flammable materials are present at this site, fire is an ever-present hazard. Parsons and subcontractor personnel are not trained professional fire fighters. Personnel will attempt to extinguish incipient (early) stage fires using portable fire protection equipment. Therefore, in the event of any fire that cannot be extinguished using portable extinguishers, personnel will notify the Emergency Coordinator by radio and evacuate the area. The Emergency Coordinator will immediately notify the local Fire Department.

8.12.2 The following procedures will be used to prevent the possibility of fires and resulting injuries.

- Sources of ignition will be kept away from areas where flammable materials are handled or stored.
- The air will be monitored for explosive vapors before and during hot work and periodically where flammable materials are present, and during confined space work. Hot work permits will be required for all such work.

- Fire extinguishers will be placed in all areas where a fire hazard may exist.
- Before workers begin operations in an area, the senior person will give instruction on egress procedures and assembly points.

8.12.3 The following procedures will be used in the event of a fire:

- Anyone who sees a fire will notify his or her Supervisor who will then contact the Emergency Coordinator by radio. Portable fire extinguishing equipment will be used to the extent practicable or the Emergency Coordinator will activate the emergency alarm (three blasts for site evacuation) and notify the local Fire Department.
- When the emergency alarm sounds, workers will disconnect electrical equipment in use (if possible) and proceed to the nearest exit point/assembly area.
- Work crews will be comprised of pairs of workers (buddy system) who join each other immediately after hearing the fire alarm and remain together throughout the emergency. Workers will assemble at the assembly point for the site for a head count.
- When a small fire has been extinguished, the Emergency Coordinator will be notified.

8.13 HAZARDOUS WEATHER CONTINGENCY MEASURES

8.13.1 The Emergency Coordinator will be responsible for assessing hazardous weather conditions (i.e., high winds, tornado, etc.) and notifying personnel of specific contingency measures. Notifications will include:

- Parsons employees, subcontractors, and visitors
- USACE Project Manager and the Ordnance and Explosives Site Safety (OESS)

8.13.2 Operations will not be started or continued when the following hazardous weather conditions are present:

- Lightning
- Heavy Rains/Snow
- High Winds (>40 mph)

8.13.3 The response to these conditions includes the following actions:

- Excavation/soil stockpiles will be covered with visqueen/plastic and temporary barricades will be placed along perimeter of open excavation.
- All equipment will be shut down and secured to prevent damage.
- Personnel will be moved to safe refuge, initially crew trailers. The Emergency Coordinator will determine when it is necessary to evacuate personnel to off-site locations.

8.14 CHEMICAL SPILLS OR RELEASES

The occurrence of chemical leaks or spills is anticipated to be remote, due to the preventative measures implemented on the site and the nature of the contaminated materials present. There is, however, a potential for the occurrence of spills or leaks due to spills from fuels, oils, etc., used in vehicles or heavy equipment. Salvage drums, spill containment, and sorbent material will be available for personnel to respond in the event that such a release should occur. Safe handling procedures will be implemented in order to minimize the handling required to over-pack the drums and stage them in a designated area. The following actions will be taken in the event of a release of any chemical, fuel, or contaminated water at the site:

- **Small Quantity Spill:** This will be defined as 25 gallons or less of liquid material. Before responding, make sure personnel are in the appropriate level of protection. Use sorbent material as necessary to effect cleanup, and containerize all liquids and debris. Make sure the incident is immediately reported to the USACE Project Manager and OESS.
- **Large Quantity Spill:** This will be defined as over 25 gallons of liquid material. Immediate notification will be made to the Site Manager and USACE Project Manager and OESS. The Site Manager will direct efforts to contain and mitigate the spill, as well as coordinate with the USACE Project Manager and local officials to determine if additional notification or area evacuation is required. The SSHO will be responsible for performing air monitoring.

8.15 SPILL PREVENTION AND CONTROL PROCEDURES

8.15.1 During site preparation, primary staging areas will be constructed. Proper bermed and lined staging areas will reduce the amount of cleanup required as a result of spills or leaking drums.

8.15.2 A sufficient supply of appropriate emergency response cleanup and personal protective equipment will be visually inventoried and inspected on a weekly basis by the SSHO.

8.15.3 The materials listed below may be kept on-site for spill control. The majority of this material will be located in the support zone inside a supply trailer. Small quantities of appropriate materials may be placed on pallets and located in the active work areas.

- Sand or clay to solidify/adsorb liquid spills.

The following equipment will be kept on-site and dedicated for spill cleanup:

- Sausage-shaped absorbent booms for diking liquid spills, drains, or sewers;
- Sorbent sheets (diapers) for absorbing liquid spills;
- Over-pack drums for containing leaking spills; and

- Fifty-five gallon open-top drums for containing waste materials.

8.15.4 All contaminated soils, absorbent materials, solvents, and other materials resulting from the cleanup of spilled or discharged substances will be properly stored, labeled, and disposed of off-site.

8.16 CHEMICAL SPILL CONTINGENCY MEASURES

In the event of release or spill of a hazardous material the following measures will be taken immediately:

- Administer first aid to injured/contaminated personnel. Any person observing a spill or release will act to remove and/or protect injured/contaminated persons from any life-threatening situation. First aid and/or decontamination procedures will be implemented as appropriate.
- Warn unsuspecting person/vehicles of the hazard. All personnel will act to prevent any unsuspecting persons from coming in contact with spilled materials by alerting other nearby persons.
- Stop the spill at the source, if possible. This may involve activities such as uprighting a drum, closing a valve, or temporarily sealing a hole with a plug.
- Using radio communications, notify the Emergency Coordinator of the spill/release, including information on material spilled, quantity, personnel injuries, and immediate life threatening hazards.
- Follow procedures outlined earlier for the notification of proper on-site personnel and off-site agencies.

8.16.1 Containment and Control Measures

8.16.1.1 The Emergency Coordinator will make a rapid assessment of the spill/release and direct confinement, containment and control measures. Depending upon the nature of the spill, measures may include, but not be limited to:

- Constructing a temporary containment berm using on-site clay absorbent earth.
- Digging a sump, installing a polyethylene liner, and diverting the spill material into the sump placing drums under the leak to collect the spilling material before it flows over the ground.
- Transferring the material from its original container to another container.

8.16.1.2 Supplies necessary to clean up a spill will be immediately available on-site. Such items may include, but are not limited to: backhoe or trackhoe, shovel, rake, clay absorbent, polyethylene liner, personal safety equipment, and miscellaneous hand tools. The major supply of material and equipment will be located in a supply trailer in the Support Zone. Smaller quantities of supplies will be kept at active work locations for emergencies.

8.16.2 Cleanup Inspection and Notification

8.16.2.1 The Emergency Coordinator/Site Manager will jointly inspect the spill site to determine that the spill has been cleaned up. If necessary, soil, water or air samples may be taken and analyzed to demonstrate the effectiveness of the spill clean-up effort.

8.16.2.2 The Emergency Coordinator will determine the cause of the spill and determine remedial steps to ensure that recurrence is prevented. The Emergency Coordinator will review the cause with the SSHO, PSHO, and USACE Project Manager and obtain concurrence with the remedial action plan.

8.17 TRANSPORTATION SPILL INCIDENTS

Spillage resulting from site transportation incidents will be immediately reported to the Emergency Coordinator, who will send personnel to contain and clean up the spill (if possible without risk to personnel). Any soils contaminated by the spill incident will be removed and processed as described in the Work Plan.

8.18 FIRE AND AIRBORNE RELEASE PROCEDURES

8.18.1 The following preventative measures will be implemented to minimize the potential for airborne chemical release and fire incidents:

- Operate the intrusive excavation and trenching operations in accordance with the Work Plan (Section 3) and the APP (Appendix D) for this site.
- Perform air monitoring activities to evaluate airborne releases of chemical agent and industrial chemicals.

8.18.2 In addition, the following fire prevention measures will be implemented on site:

- Sources of ignition other than heavy equipment will be prohibited inside the Exclusion Zone during intrusive activities.

STANDARD OPERATING PROCEDURE
NUMBER 9

HAZARD COMMUNICATION

SOP 9 - HAZARD COMMUNICATION

9.1 INTRODUCTION

9.1.1 The OSHA Hazard Communications Standard (29 CFR 1910.120) was promulgated to ensure that all chemicals would be evaluated and information regarding the hazards associated with these chemicals would be communicated to employers and employees. The goal of the standard is to reduce the number of chemically related occupational illnesses and injuries.

9.1.2 In order to comply with the OSHA Hazard Communication Standard, this SOP has been established by Parsons for work at this site. All Parsons and subcontractor personnel working at the site are included in this program. A copy of this written program will be maintained at the office trailer for inspection by employees.

9.2 HAZARDOUS CHEMICAL INVENTORY LIST

The SSHO will maintain an inventory of hazardous chemicals being used at the site (fuels, oils, solvents, etc). The inventory should include the chemical identity, quantity, and storage location. For each chemical identified on the inventory list there should be a corresponding Material Safety Data Sheets (MSDS). Subcontractors must understand that they are required to inform the SSHO whenever they import a hazardous chemical on-site.

9.4 MATERIAL SAFETY DATA SHEETS (MSDS)

9.4.1 MSDSs are prepared by manufacturers or producers to provide specific information on the safety precautions and health effects of a particular chemical or mixture. MSDSs contain at a minimum the following information:

- Chemical and common names;
- Physical and chemical characteristics;
- Physical hazards;
- Health hazards;
- Primary routes of entry;
- Exposure limits;
- Carcinogenic potential;
- Handling and protective precautions;
- Control measures;
- Emergency and first aid procedures;

- Date of MSDS preparation; and
- Name and address of manufacturer.

9.4.2 When chemicals are ordered, the Site Manager or his designee will specify on the purchase order that chemicals are not to be shipped without corresponding MSDSs. When chemicals and MSDSs arrive, the SSHO will review them for completeness. If any MSDS is incomplete, the manufacturer will be immediately notified and the additional information requested. Parsons or its subcontractors will not accept any shipped chemical without an MSDS.

9.4.3 A complete file of MSDSs for all on-site hazardous chemicals will be kept in the office trailer on site. When an MSDS is discovered missing the SSHO or Project Safety and Health Officer will obtain a replacement MSDS from the manufacture.

9.5 LABELS AND OTHER FORMS OF WARNING

9.5.1 The Hazard Communication Standard requires that manufacturers label the hazardous chemicals they produce. The label must contain the following:

- Chemical identity;
- Appropriate warnings; and
- Name and address of manufacturer, importer, or other responsible party.

If the labels are incomplete or missing, Parsons personnel will refuse the shipment.

9.5.2 When chemicals are transferred from the manufacturer’s containers to secondary containers, the SSHO will ensure that the secondary containers are labeled with the identity of the chemicals and appropriate hazard warnings. Labels for secondary containers can be obtained from the SSHO.

9.5.3 The labeling procedure will be periodically reviewed by the SSHO and changed as necessary.

9.6 EMPLOYEE INFORMATION AND TRAINING

9.6.1 Prior to starting work, Parsons personnel and subcontract employees will attend a site specific health and safety training course. This course will include Hazard Communication Training and will be performed by the SSHO. The format will be classroom training.

Training Topics

- An overview of the requirements of the Hazard Communication Standard
- The labeling system and how to use it
- How to review MSDS and where they are kept

- Chemicals present in work operations
- Properties and characteristics of chemical warfare agents
- Physical and Health effects of hazardous chemicals
- Methods and observation techniques used to determine the presence or release of hazardous chemicals in the area
- Personal protective equipment and work practices to reduce or prevent exposure to chemicals
- Steps to be taken to prevent or reduce exposure to chemicals
- Safety-emergency procedures to follow if exposure occurs
- Location and availability of written program/MSDSs

9.6.2 Following the training session(s), each employee will sign and date the training record.

9.6.3 Additional training may be provided by the SSHO when new chemicals are imported to the site. Records of additional training will be maintained by the SSHO.

9.7 PROGRAM REVIEW

This written hazard communications program will be reviewed by the SSHO and/or PSHO on a monthly basis and updated as necessary.

Reviewed and Approved by:

Project Safety and Health Officer: ____________________________
Ed Grunwald

Site Manager: ____________________________

Site Safety and Health Officer: ____________________________

STANDARD OPERATING PROCEDURE
NUMBER 10

ELECTRICAL SAFETY

SOP 10 - ELECTRICAL SAFETY

10.1 INTRODUCTION

10.1.1 Objective

Parsons and subcontract personnel working on electrical systems and equipment will follow standards set by the National Electrical Code (NEC) and OSHA. Only qualified personnel will be permitted to work on electrical systems and equipment.

10.1.2 Purpose

This procedure specifies the requirements for electrical equipment and methods and is an overview of the requirements of 29 CFR 1926, Subpart K-Electrical. If work is to be performed on any electrical circuit, lockout/tagout may be required. Refer to the Lockout/Tagout procedure SOP. Fieldwork may involve work at temporary facilities and will use temporary electrical systems. To prevent electrical shocks electrical safety must be emphasized.

10.2 GENERAL REQUIREMENTS.

- No electrical work is done on an energized circuit.
- Only approved, qualified electricians are permitted to work on electrical equipment or electrical wiring.
- Use proper clearance and grounding procedures. All electrical circuits and equipment is de-energized and locked out before maintenance or repair work is started.
- Single-phase electric hand tools and other single-phase portable electrical equipment must be approved by a recognized testing agency, and all exposed non-current-carrying metal parts must be grounded or double insulated.
- Before each use, portable electrical tools are to be examined for obvious defects in the appliance, cord, and plug. If any deficiency is noted, the tool is not to be used.
- Extension cords are to be kept clean, dry, free of kinks, and protected from oil, hot or sharp surfaces, and chemicals. Extension cords used outdoors shall be equipped with Ground Fault Circuit Interrupters (GFCI) and rated for outdoor use.

10.3 PORTABLE ELECTRICAL EQUIPMENT

- Portable electrical tools not provided with grounding protection are not to be used on-site.

- Portable electrical appliances and equipment with non-current-carrying metal parts that can contact personnel shall be grounded by a continuous conductor from the device to a grounded receptacle. The SSHO shall resolve any questions that arise as to whether or not a particular appliance should be grounded.
- Grounding of receptacles shall be accomplished in one of two ways:
  - A built-in ground wire of green color may be attached to the ground pole of the receptacle.
  - The conduit system, if installed in an approved manner, may be relied upon for grounding of a receptacle serving single phase appliances with ratings up to 230 volts.

  At outside locations, all single-phase 15- and 20-ampere receptacle outlets (operating at 230 volts or less) which are not a part of the permanent wiring of the building or structure must have GFCI for personnel protection. The GFCI should be located at the power source so that all extension cords and tools are protected by the GFCI.
- The outlet box for portable extension cords for outdoor use shall be of weatherproof type maintained in good condition.

10.4 ELECTRICAL GUARDING

- Suitable access and working space shall be provided and maintained around all electric equipment to permit ready and safe operation and maintenance.
- The dimensions of the access and working space around energized parts in switchboards, control panels, fused switches, circuit breakers, panel boards, motor controllers, and similar equipment (which require examination, adjustment, servicing, or maintenance while energized), shall not be less than 36” in depth (30” for installations built prior to 1981) and 30” wide or the width of the equipment, whichever is greater.
- The access and working space shall not be used for storage purposes. The “keep clear” area may be identified with suitable markings and/or posting of signs or decals on the equipment.
- Energized parts of electrical equipment operating at 50 volts or more shall be guarded against accidental contact by the use of approved cabinets or enclosures.
- Entrance to rooms and other guarded location containing exposed energized parts shall be marked with a conspicuous warning sign forbidding unqualified persons to enter.
- Temporary covers, warning signs, and/or barricades are to be used when it is necessary to remove covers of electrical panels during construction, major refurbishment, or for the purpose of providing temporary power to an area.

- All openings in boxes, enclosures, or fittings shall be effectively guarded or closed to afford protection substantially equivalent to that of the wall of the box, enclosure, or fitting.
- All electrical components over 230 volts shall have signs stating “High Voltage.”

10.5 EXTENSION CORD REQUIREMENTS

- Use of indoor extension cords greater than 50 feet in length is to be discouraged. All extension cords shall include a grounding conductor within the cable jacket and shall be equipped at each end with either explosion-proof or non-explosion-proof three-wire, grounded receptacles and plugs (but not with one of each), depending on the location and intended use. (No “hybrid,” ungrounded or external ground wire extension cords are allowed.)
- If a cord is damaged, it shall be shortened or replaced by an electrician - never patched with electrical tape.
- Cords shall be protected against contact with oil, hot surfaces, and chemicals.
- Cords must not be hung over nails or other sharp edges or places where vehicles may run over them.

10.6 ELECTRICAL FUSE REQUIREMENTS

- Circuits must be de-energized by lockout and tagout procedures before attempting to replace fuses.
- Bridging of fuses or circumventing the normal operation of circuit breakers is prohibited.
- Blown fuses shall not be replaced with fuses having a higher amperage or voltage rating. Fuses should be replaced in kind to maintain proper circuit protection.
- Use a fuse puller to remove fuses.

10.7 ASSURED ELECTRICAL GROUNDING REQUIREMENTS

- This program provides the minimum requirements for an assured equipment grounding conductor program and reflects the requirements of 29 CFR 1910.304. It also applies to circuits and equipment not attached to a permanent building or structure.
- Parsons and its Subcontractors will implement either a written assured equipment grounding conductor program or use GFCI’s when using temporary wiring (cords and plugs) in field work using any temporary electrical power source.
- Cords and equipment will be inspected prior to each use for damage or missing parts. Equipment that is found to be defective will be taken out of service and repaired.

- If an Assured Equipment Grounding Conductor Program is used it shall include the following:
  - This written program.
  - Designation of a competent person(s) – Site Safety and Health Officer – to implement the program.
  - Visual inspection of cords on a daily basis for deformed and missing pins, insulation damage, and indications of possible internal damage. Equipment found damaged or defective will be removed from service and repaired or expended.
  - Cords and electrical circuits will be tested for the following:
    - ◊ Electrical grounding continuity
    - ◊ Correct attachment of grounding conductor
  - Tests outlined above shall be performed before the first use, before being returned to use after repair, after possible damage (such as being run over by a vehicle), and at least every three months.
  - The tests outlined above must be recorded in the Health and Safety logbook along with the ID of the cords that were tested.

STANDARD OPERATING PROCEDURE
NUMBER 11

CONFINED SPACE ENTRY

SOP 11 - CONFINED SPACE ENTRY

11.1 INTRODUCTION

11.1.1 Background

Hundreds of fatal accidents occur each year in “confined spaces.” The causes of these fatalities include lack of knowledge, improper procedures, and inappropriate equipment for entry and work in confined spaces. The greatest dangers posed by confined spaces are atmospheric hazards and the leading cause of confined space fatalities is asphyxiation. This SOP conforms to EM 385-1-1, Section 34.

11.1.2 Classification of Confined Spaces

11.1.2.1 Confined spaces are classified based upon existing or potential hazards. The two classifications of confined spaces are non-permit confined space and permit-required confined space.

11.1.2.2 A non-permit confined space does not contain atmospheric hazards or have the potential to contain any hazard capable of causing death or serious physical harm. Examples of non-permit confined spaces include vented vaults or motor control cabinets. These spaces have either natural or permanent mechanical ventilation to prevent the accumulation of hazardous atmospheres, and they do not present engulfment or other serious hazards. Since non-permit spaces are free of atmospheric or safety hazards, they do not require special entry protocols. However, entry into these areas must comply with applicable OSHA and USACE requirements (i.e. proper illumination, proper ladder use, etc.).

11.1.2.3 A permit-required confined space has one or more of the following characteristics:

- Contains or has the potential to contain a hazardous atmosphere
- Contains a material that has the potential for engulfing a person
- Has an internal configuration such that a person could be trapped by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section
- Contains any other recognized serious safety or health hazard

11.1.3 Hazardous Atmospheres

There are three types of atmospheres that require special attention and monitoring.

11.1.3.1 Oxygen-Deficient Atmospheres. An oxygen-deficient atmosphere has less than 19.5 percent available oxygen (O_2). This percentage will be considered the minimum level for safe entry into a confined space without a breathing apparatus. The oxygen level in a confined space can decrease because of the work being done, e.g. welding, cutting, brazing, and stirring-up sludge. The oxygen level also can be decreased if displaced by a gas or vapor, such as carbon dioxide or methane. Oxygen deficient atmospheres can cause unconsciousness and death due to asphyxiation.

11.1.3.2 Flammable and Explosive Atmospheres. For a confined space to have an explosive or flammable atmosphere, three components are necessary: oxygen; a flammable or explosive gas, vapor or dust in the proper mixture; and a source of ignition (fire, hot work).

11.1.3.2.1 Work in a confined space will be prohibited (except work using intrinsically safe equipment and tools) when air monitoring indicates the presence of flammable vapors greater than 10 percent of the lower explosive limit.

11.1.3.2.2 An oxygen-enriched atmosphere is an environment with available oxygen above 22 percent. This type of atmosphere will cause flammable materials, such as clothing and hair to burn violently when ignited. Oxygen will not be used to ventilate a confined space since this will produce an oxygen-enriched atmosphere.

11.1.3.3 Toxic Atmospheres. All substances (liquids, vapors, solid materials, and dusts) should be considered hazardous in a confined space. Toxic substances can come from the following:

- The product stored or conveyed in a space: Toxic substance can be absorbed into walls and can give off toxic gas when cleanup or removal activities are performed. This is especially true, for example, in storage tanks due to the possible presence of sludges and decomposing material. Toxic gases that may be encountered in this type of confined space include ammonia, carbon monoxide, and hydrogen sulfide. Knowing the material(s) stored in a confined space is therefore crucial when selecting protective measures and air monitoring equipment.
- The work being performed in the space: Examples of work that can cause the creation of toxic substances are welding, cutting, brazing, cleaning, painting, scraping, and sanding.
- The process material in a confined space: Toxic atmospheres can be generated in various processes. For example, cleaning solvents are used in many industries. The vapors from these solvents are very toxic in a confined space.

11.2 EQUIPMENT AND PROCEDURES FOR PERMIT REQUIRED CONFINED SPACES

If unanticipated entry into a permit-required confined space becomes necessary, certain equipment and safety procedures will be used. The equipment and safety procedures are described in detail below.

11.2.1 Equipment

11.2.1.1 The following is a list of equipment that will be available for permit required confined space entry:

- Atmosphere-testing equipment to measure oxygen, flammable gases, and toxic vapors;
- A positive pressure, self-contained breathing apparatus or a positive pressure air line respirator with an escape SCBA;
- Protective clothing, including rubber boots, gloves, and hard hats or Level A suit if mustard/lewisite contamination is present;
- Explosion-proof lights if needed;
- Extraction harness;
- Communications equipment; and
- An extension ladder for entry.

11.2.1.2 Additional equipment or procedures will be evaluated by the Project Safety and Health Officer (PSHO), in consultation with the Site Safety and Health Officer(SSHO) based upon the hazard characteristics of the space.

11.3 ATMOSPHERIC TESTING OF CONFINED SPACES

11.3.1 As has been stated previously, the greatest danger of working in a confined space is a hazardous atmosphere. Atmospheric testing will be performed before any Parsons employee or subcontractor enters any confined space. If possible, initial atmospheric testing of a confined space should be performed before any ventilation of the space. This type of initial testing will afford the best opportunity to assess “worst case” conditions and/or identify toxic contaminants, which may be present in low concentrations.

11.3.2 Atmospheric testing of confined spaces: tests for oxygen content, flammable or explosive atmospheres and perhaps specific toxic contaminants. A combination meter may be used to test for oxygen and explosive vapors. A photoionization detector will be used to monitor for toxic industrial chemical contaminants (e.g., chlorinated solvents). The PSHO has the sole responsibility for deciding on additional tests for toxic contaminants based upon potential atmospheric hazards. During any atmospheric testing, all levels of the confined space will be tested.

11.3.3 Personnel working in permit-required confined spaces will be provided with continuous atmospheric monitoring device(s). Monitoring of the atmosphere shall be done according to the Confined Space Permit. Equipment use to monitor the atmosphere shall be explosion-proof.

11.3.4 Maintenance and calibration records for the air monitoring equipment will be maintained by the SSHO for industrial chemicals, and ECBC personnel or other entities designated to have the responsibility for chemical and warfare agents and some industrial chemicals.

11.4 MEDICAL, FIRST AID, AND RESCUE PROVISIONS

11.4.1 General Information

11.4.1.1 The list of hospitals, police, fire, and ambulance services, including phone numbers and directions to medical facilities included in this plan shall be maintained, with a first- aid kit at the entrance of the permit-required confined space. First aid kits shall be checked on a scheduled basis and before any work for which they may be needed. For entry there must always be someone readily available in the area of the permit-required confined space with current training in cardio-pulmonary resuscitation (CPR) and standard first-aid procedures.

11.4.1.2 Standby rescue personnel shall be trained, fully-equipped, and ready to conduct immediate rescue. The procedure to be used is:

- First, call for help either by radio or phone, if necessary;
- Next, put on respiratory protection and other necessary equipment before entering the confined space;
- After reaching the victim, assess the injury and the nature of the accident for the correct removal procedure; and
- Administer first-aid or breathable air to keep the victim alive until further medical assistance arrives.

11.4.2 Employee Information

The entrance to any permit-required confined space will be posted with a sign. The wording on the sign shall include, but are not limited to the following information:

DANGER

CONFINED SPACE

ENTRY BY PERMIT ONLY

11.4.3 Specific Work Requirements

When a specific work practice is performed or specific safety equipment is needed, that information shall be added, in large letters, to the warning sign: For example:

AIR LINE RESPIRATOR REQUIRED FOR ENTRY

11.5 GENERAL WORK PRACTICES

The following general work practices will be followed if permit-required confined space work is performed:

- If work is being done in a permit-required confined space, an attendant and stand-by personnel (number to be specified on permit described later) must be present in case of an emergency. Each stand-by person will be assigned appropriate respiratory protection.
- Personnel who are in the permit-required confined space will be provided with atmospheric monitoring device(s).
- If a worker begins to feel dizzy or light-headed, he must leave the space immediately. High temperatures and humidity can lead to heat stress or breathing difficulties.
- Hard hats must always be worn in confined spaces. Slick and wet surfaces will probably be encountered in the confined space. Slips and falls can cause injury. Falling objects are also a hazard.
- Hearing protection may be needed. Noise within a space may be amplified because of the acoustic properties of the space, and excessive noise can damage hearing as well as affect communication.
- Explosion-proof lights and intrinsically safe equipment will be used in the permit required space.
- Electrical tools used must be equipped with ground fault interrupters and workers should be warned that wet surfaces increase the potential for, and effect of, electrical shock.

11.6 PERMIT-REQUIRED CONFINED SPACE TRAINING

11.6.1 Personnel are made aware of the hazards and procedures associated with confined space entry during the initial site health and safety training. Personnel who may be assigned to work in a permit-required confined space, or in support of those working in a permit-required confined space, will receive the following additional training before entry:

- Roles and responsibilities;

- Emergency entry and exit procedures;
- Emergency rescue;
- Use of applicable respirators;
- Safety equipment including rescue equipment used;
- Fire fighting;
- Traffic control procedures;
- Permit requirements;
- Work practices; and
- Communications.

11.6.2 Permit-required confined space/rescue and training drills will be conducted before personnel enter the space.

11.7 PERMITS

11.7.1 Entry into an area defined as a permit-required confined space will be by permit only.

11.7.2 A permit is a written authorization and approval that specifies the location and type of work to be done. It certifies that all existing hazards have been evaluated by a qualified person and necessary protective measures have been taken to insure the safety of each employee. For work at this site, the SSHO, in consultation with the PSHO, is responsible for identifying, evaluating, and authorizing entry into any permit-required confined space.

11.7.3 A completed confined space permit will include the following:

- Hazards that may be encountered;
- Complete isolation checklist, including blanking or disconnecting; electrical lockout; and mechanical lockout;
- Special clothing and equipment, including personal protective equipment and clothing; safety harness or lines; and approved tools and electrical equipment;
- Atmospheric testing readings, including oxygen level, flammability or explosive levels, and toxic substance levels;
- Atmospheric monitoring while work is being performed;
- Personnel training;
- Standby persons(s) as named on the permit;
- Authorization signature; and
- Emergency procedures.

11.7.4 The confined space entry permit for project activities is shown in Figure 11.1.

FIGURE 11.1

CONFINED SPACE ENTRY PERMIT

Location of work: ____________________

Description of Work: ____________________

Entrants: ____________________

Attendant(s):____________________

Entry Supervisor:____________________

Rescue Personnel:____________________

Entry Date/Time: ____________________

Outside Contractors: ____________________

Circle Applicable Items

Isolation Checklist:

- Blanking and/or Disconnecting
- Electrical
- Mechanical
- Other

Hazardous Work:

- Burning
- Welding
- Brazing
- Open Flame
- Other

Hazards Expected:

- Corrosive Materials
- Hot Equipment
- Flammable Materials
- Toxic Materials
- Drains Open
- Cleaning (i.e., chemical or water lance)
- Spark-producing Operations
- Spilled Liquids
- Pressure Systems
- Other

Fire Safety Precautions: ____________________

____

Personal Safety: Circle Applicable Items and State Specifics

- Ventilation Requirements ____________________
- Respirators ____________________
- Clothing ____________________
- Heat, Hand, and Foot Protection ____________________
- Shields ____________________
- Retrieval Lines and Harness ____________________
- Lighting ____________________
- Communications ____________________
- Employee Qualified ____________________
- Buddy System ____________________
- Standby Person ____________________

FIGURE 11.1 (CONTINUED)
CONFINED SPACE ENTRY PERMIT

Emergency Egress Procedures ____________________
Training Sign Off ____________________
(Supervisor and Qualified Person) ____________________
Remarks: ____________________

Atmospheric Gas Tests

	Tests Performed	Location	Reading
Example:	(oxygen)		(19.5%)
	(flammability)		(Less than 10% LEL)
	________	________	________
	________	________	________

Remarks: ____________________

Calibration performed by:____________________
(signature)

Test performed by: ____________________
(signature)

Time: ____________________

Authorizations:
Site Safety and Health Officer: ____________________
Project Safety and Health Officer: ____________________

Entry and Emergency Procedures Understood::
Standby Person: ____________________
Rescue: ____________________
Telephone: ____________________

Permit Expires: ____________________

STANDARD OPERATING PROCEDURE
NUMBER 12

HEAVY EQUIPMENT AND VEHICLE SAFETY

SOP 12 - HEAVY EQUIPMENT AND VEHICLE SAFETY

12.1 INTRODUCTION

12.1.1 Motor vehicle usage presents the most significant work risk to employees. The United States Bureau of Labor Statistics indicates that motor vehicle deaths and injuries continue to be the number one cause of work-related death and serious injury. Accordingly, it is essential that an effective vehicle safety program be instituted for each worksite.

12.1.2 This SOP establishes requirements for safe operation of vehicles and heavy equipment. Vehicles are defined as any automobile (car, truck, or otherwise) used on the project to transport personnel or haul equipment to, around, and from the site. Heavy equipment refers to backhoes, track hoes, skid loaders, forklifts, or any other piece of heavy machinery used to move equipment or for excavation. This procedure is an overview of the guidelines in the EM385-1-1 Chapter 18, “Machinery and Mechanized Equipment, All Terrain Vehicles, Utility Vehicles, and Other Specialty Vehicles”.

12.2 OBJECTIVE

The objective of this document is to outline requirements and safe practices for operation of heavy equipment and vehicles.

12.3 PURPOSE

This document provides information and procedures in order for personnel to operate heavy equipment and vehicles safely.

12.4 REFERENCES

Procedures and information contained in this document were obtained from the below listed references:

- USACE EM 385-1-1, Safety and Health Requirements Manual;
- USACE EM 385-1-97, Explosives Safety and Health Requirements Manual;
- USACE EP 1110-1-18, Engineering and Design;
- OSHA Regulation 29CFR1926, Subpart P, Appendix A and 29CFR1926.652, Subpart P, Appendix F, Safety and Health Requirements for Construction;
- AR 385-55, Prevention of Motor Vehicle Accidents;
- DA Pam 385-16, System Safety Engineering and Management; and
- Parsons Corporate Health and Safety Manual

12.5 RESPONSIBILITIES

12.5.1 Driver/Operator

The driver of contractor owned, rented, or leased vehicles or heavy equipment is responsible for:

- Operating the motor vehicle while in possession of a valid driver's license;
- Operating the vehicle in a safe and legal manner;
- Refraining from eating, drinking, smoking, or using a cellular telephone while the vehicle is in motion;
- The safety of passengers; and
- Reporting immediately any motor vehicle that is found to be defective or not operating properly.

12.5.2 Site Safety and Health Officer

The Site Safety and Health Officer (SSHO) is responsible for the following:

- Ensuring that all vehicle accident reports are processed and the required number of copies submitted to local, state, and federal agencies, to the resource manager and to the insurance carrier.
- Ensuring that appropriate individuals, beginning with the Project Safety and Health Officer (PSHO), GBU Safety Manager, and GBU president are notified by telephone of accidents that involve fatalities or multiple serious injuries.
- Verifying that all accidents are documented and investigated. The investigation should be of sufficient depth to determine the cause and action required to prevent recurrence. Copies of all motor vehicle investigations shall be forwarded to the PSHO and the Corporate Health and Safety Manager and entered into the Parsons Incident Reporting System.
- Ensuring that during the selection process for leased or purchased vehicles, consideration is given to obtaining vehicles with essential safety devices. Such devices include: anti-locking brakes, air bags, both front and rear seat shoulder harnesses, and all season traction tires. Motor vehicles must be equipped with first aid kits. Shoulder safety belts must not be attached to doors.

12.5.3 Inspections

12.5.3.1 Before initial use, equipment not otherwise inspected by State or local authorities will be inspected by a qualified mechanic and found in safe operating condition. The inspection will be documented in writing and available upon request.

12.5.3.2 The vehicle and heavy equipment operators are responsible for inspecting their equipment daily to assure that the following parts, equipment, and accessories are in safe operating condition and free of apparent damage that could cause failure while in use:

- Service brakes, including trailer brake connections;
- Parking system (hand brake);

- Emergency stopping system (brakes);
- Tires;
- Horn;
- Steering mechanism;
- Coupling devices;
- Seat belts;
- Operating controls;
- Accessories including lights, reflectors, windshield wipers, and defrosters where such equipment is necessary; and
- Safety devices.

12.5.3.3 Records of inspection and maintenance will be kept at the site and available upon request. All vehicles operated during the night will have the following lights:

- Two headlights, one on each side of the front;
- At least one red taillight and one red or amber stoplight on each side of the rear;
- Directional signal lights (both front and back); and
- Three emergency flares, reflective markers, or equivalent portable warning device.

12.5.4 Brake systems

All vehicles, except trailers having a gross weight of 5,000 pounds or less will be equipped with service brakes and manually operated parking brakes. Service and parking brakes will be adequate to control the movement of, to stop, and to hold the vehicle under all conditions of service. Service brakes on trailers and semi-trailers will be controlled from the driver's seat of the prime mover. Braking systems on every combination of vehicle will be designed in approximate synchronization on all wheels and develop the required braking effort on the rear-most wheels first. The design will also provide for application of the brakes by the driver of the prime mover form the cab. The only exception is vehicles in tow by an approved tow bar hitch.

12.5.5 Required equipment

12.5.5.1 All motor vehicles (cars and trucks) will have the following equipment:

- An operable speedometer;
- An operable fuel gage;
- An operable audible warning device (horn) in operating condition;
- A windshield equipped with an adequate windshield wiper;
- An operable defrosting and defogging device;
- An adequate rear view mirror or mirrors;
- Cabs, cab shields, and other protection to protect the driver from the elements and falling or shifting materials;

- Non-slip surfaces on steps; and
- A power-operated starting device
- Lap and shoulder belts
- Operating brakes

12.5.5.2 Glass in windshields, windows, and doors will be safety glass. Any cracked or broken glass will be replaced.

12.5.6 Defects

All defects shall be corrected before the vehicle is placed in service. These requirements also apply to equipment such as lights, reflectors, windshield wipers, defrosters, fire extinguishers, etc., where such equipment is necessary.

12.6 SEAT BELTS

OSHA has determined that the use of seat belts in motor vehicles can significantly reduce the seriousness of occupational motor vehicle accidents. Accordingly, all contractor employees driving motor vehicles on this project (including rental cars, pick-up trucks, personal vehicles which are used for company compensated business travel, etc.) shall ensure that all occupants use seat belts, both shoulder and lap belts.

12.7 STATE AND LOCAL LAWS

- Drivers shall operate vehicles in accordance with the law (ie posted speed limits).
- Drivers shall not operate vehicles that are known to be defective or in violation with the law.
- Drivers are responsible for the consequences of state and community violations.
- The use of devices designed to identify active police speed detection systems (i.e., radar detectors) is prohibited in all Parsons and subcontractor owned, leased, and rented vehicles, and in personal vehicles used for company compensated business travel.

12.8 SAFE DRIVING PRACTICES

- Personnel shall operate vehicles in a defensive manner, i.e., being always on the alert and trying to anticipate what might occur under the existing conditions and driving in such a manner as to avoid hazards.
- Personnel operating vehicles shall be considerate of, and courteous to, the traveling public and/or pedestrians and should yield the right-of-way to avoid accidents.
- Headlights will be switched to low beam when approaching oncoming traffic.
- Personnel will have headlights on during periods of darkness and during fog, smoke, rain, or unfavorable atmospheric conditions.
- Personnel shall drive at speeds consistent with posted speed limits and prevailing conditions, such as weather, traffic, and road conditions.

- Personnel shall drive at all times with sufficient space around the vehicle to provide time to see conflicts arising, to react quickly, and to stop. These five keys to defensive driving will help accomplish a good space cushion.
  - Aim high in steering;
  - Get the big picture;
  - Keep your eyes moving;
  - Leave yourself an out; and
  - Make sure they see you.

12.9 GENERAL SAFETY RULES

- **Blind Curves** - Slow down and sound horn when approaching a blind curve.
- **Driver's License** - Operation of a vehicle without a valid operator's license is prohibited. Personnel operating vehicles regulated by the United States Department of Transportation (DOT) shall have a current commercial driver's license (CDL).
- **School Buses** - Obey school bus laws. Slow down and prepare to stop when approaching school buses, children on foot, or on bicycles.
- **Emergency Vehicles** - Give ambulances, fire-fighting equipment, and other vehicles the right-of-way during emergencies and lend assistance if required.
- **Gasoline** - Gasoline and other flammable/combustible liquids shall not be carried in or on vehicles other than in permanent gas tanks or in UL approved safety cans. UL approved safety containers must be properly secured when being carried in the back of pick-up trucks.
- **Laws and Regulations** - Learn and obey all local, state, and federal laws.
- **Parking** - Equipment and vehicles shall be parked off roads and highways whenever possible. When it is not possible, the vehicle shall be marked by red lights or flares at night and red flags during the day. Wheels should be blocked or chocked. Vehicles will be attended until the motor has been shut off and the key removed from the ignition.
- **Passing** - Do not pass when visibility is restricted for any reason.
- **Pedestrians** - Be constantly alert for pedestrians. Remember they have the right-of-way.
- **Slow Down** - Slow down and use caution at blind intersections and crossings when visibility is limited or when passing work crews.
- **Speeding** - Speeding is strictly prohibited.
- **Visibility** - Make sure all windshields, side and rear windows, mirrors, and lights are clean before moving vehicles.
- **Warning Signs and Traffic Signals** - Be alert for and strictly obey all directional and warning signs and signals.

- **Seat Belts -** Operator and passengers must keep seat belts fastened at all times when vehicle is in motion.

12.10 DOT-REGULATED VEHICLES/EQUIPMENT

- **Commercial Driver's License -** All Parsons and subcontractor personnel operating a DOT-regulated vehicle must hold a valid Commercial Driver's License from their state of residence.
- **Defensive Driving Training -** All Parsons personnel are required to complete Defensive Drivers training classes though Parsons online University.
- **Backing Up -** Never start or back up equipment or vehicles until you are sure the way is clear. If necessary, have another person guide you safely. Back up alarms, when required, must be working and audible over the surrounding noise.
- **Ear Protection -** Earplugs or other approved ear protection shall be worn when necessary. Use of earplugs in cars or trucks on public highways may be against local laws.
- **Fueling and Repair -** No fueling or repair shall be made to equipment while it is in operations. The motor shall be turned off and the bucket, blade, gate, or boom shall be lowered to the ground or blocks.
- **Housekeeping -** Operators should keep deckplates, steps, rungs, and hand rails on equipment free of grease, oil, ice, and mud. The inside of the cabs shall also be kept clean and free of tools, equipment, and flammable items.
- **Inspections -** Equipment and vehicles shall not be used until known defects or discrepancies are corrected. Inspections shall be made daily and defects or discrepancies shall be reported to the supervisor immediately.
- **Jumping -** Jumping on or off equipment is prohibited. When climbing on or off equipment or vehicles, face the unit and use secure hand and foot holds to prevent slips and falls. Always look where you are stepping.
- **Know Your Equipment or Vehicle -** It is your responsibility to be thoroughly familiar with all features and manuals and if you are in doubt as to correct operating techniques or safety features, ask your supervisor at once.
- **Overloading -** Avoid overloading vehicle beds and equipment buckets and beds. Excessive material can damage the unit and falling material can cause serious injury.
- **Power Lines -** When operating trucks, cranes, shovels, or other units, always use caution around power lines and maintain a minimum safe clearance of 10 feet or more depending upon the voltage.
- **Riders -** Only authorized persons will be permitted to ride in equipment or vehicles. The number of passengers in a passenger-type vehicle will not exceed the number that can be seated.
- **Securing Loads -** The operator of the vehicle is responsible for ensuring that their load is secure and will not shift during transport.

- **Long Hauls -** On long hauls, binders should be checked periodically (at least during each rest or service stop) to make sure they are still secure and tight.
- **Overhanging and Oversize Loads -** When it is necessary to transport overhanging or oversize loads, the appropriate signs and red flags (not less than 144 in^2) and red lights will be used. When necessary, use flag cars.
- **Safety Chains -** Safety chains of sufficient size and strength shall be installed on all trailers being towed. Personnel are not permitted between towed loads and towing vehicles except when hooking or unhooking.
- **Safety Hooks -** Use safety hooks with latches on all winch truck cables.
- **Side Roads and Railroad Tracks -** Stop and look both ways before crossing railroad tracks or before driving onto a highway from a side road.
- **Stopping -** Do not stop vehicles in the middle of the road to talk to occupants in another vehicle. Always pull to the side or off the road to maintain a clear, safe road.
- **Turn Signals -** Always use turn signals, emergency and other signals as appropriate when turning, stopping, passing, or performing other vehicle operations.
- **Vehicle Maintenance -** It is the driver's responsibility to see that his vehicle is in good mechanical condition before and during operation. Special emphasis should be placed on ensuring the brakes, lights, horn, windshield wiper, tires, and steering assembly are in good order. Defects must be reported and corrected immediately.

12.11 HEAVY EQUIPMENT OPERATIONS

12.11.1 Team Composition

The minimum team make-up will be:

- One qualified operator, either a UXO Technician or Non-UXO trained individual;
- One ground guide, (the Safety Observer can fill this role and that of Safety Observer simultaneously if conditions permit); and
- One Safety Observer.

Team Leader - An UXO Technician III (Team Leader) will serve as the Team Leader and overall Safety Observer, directing the site personnel and equipment during the operation. Depending on the complexity of the operation, he may also serve as the backup guide. The Team Leader will be trained as a competent person for excavation operations when required.

Ground Personnel - Team members working on heavy equipment operations will be qualified through non-the-job training (OJT) and will perform such tasks as magnetometer checks, manual excavation and checks of the excavation for UXO items. When using a UXO Tech I for manual excavation, a UXO Technician II must be present to supervise.

Equipment Operators - All site personnel, regardless of affiliation, who operate heavy equipment, will be qualified formal training, equivalent previous employment experience or OJT. Documentation of operator training will be kept on file at the site. As a minimum, the operator, will perform daily inspection and maintenance of equipment as stated in the operation manual for that piece of equipment. Daily inspections must be documented (See figure 12.1).

12.11.2 Use of Non-UXO Personnel

Use of Non-UXO personnel as operators on UXO sites is authorized. There is no requirement for additional safety barriers or shielding during the operation, IAW EM 385-1-97, Chapter 1, Section 2. When the operation has come within one foot of the UXO item or anomaly being investigated, unless the operator has been designated essential personnel, the Non-UXO operator must move outside the pre-designated Minimum Safe Distance (MSD), until recalled by the UXO Technician III.

12.11.3 Equipment Procedures

12.11.3.1 The hazards associated with heavy equipment involve moving parts and exposure to possible pinch points. Safe operating procedures for each type of equipment or activity must be reviewed and followed. Safety protection, including equipment guards, which must not be removed, shall be provided to mitigate this problem. Site personnel operating or working within close proximity to heavy equipment will wear hard hats, eye protection, steel-toed boots, and hearing protection (as necessary).

12.11.3.2 Heavy equipment used on the site must meet the requirements of OSHA, DOT, and general industry standards. The operator will be responsible for completing daily written inspections of all heavy equipment and provide copies of the inspection as well as required certifications to the Site Manager (SM). All personnel who operate equipment must use any safety devices, such as seat belts, that the equipment is equipped with during operation. All operators will follow the following heavy equipment operating rules:

- Only personnel trained in the operation of heavy equipment are permitted to operate such equipment;
- Personnel may only operate equipment for which they have received training and certification. Trainees may operate heavy equipment, but only under competent supervision;
- Before operating any heavy equipment, the operator must conduct a pre-operational check of the piece of equipment. Brakes, hydraulic lines, light signals, fire extinguishers, fluid levels, steering, tires, horn, and other safety devices will be checked daily and maintained in good working order throughout the duration of its use. If it is found to be unsafe, the operator must report the condition immediately to the appropriate supervisor, and the piece of equipment placed in an unserviceable status until it has been repaired or replaced.
- Heavy equipment will not be backed up unless the vehicle has a reverse signal alarm audible above the surrounding noise level or a ground guide is used.
- Heavy equipment will be provided with necessary safety features including seat belts, roll-over protection, emergency shut-off during roll-over, backup warning lights, and audible alarms as applicable.

- Blades and buckets will be lowered to the ground and parking brakes will be set before shutting off any heavy equipment.
- Special consideration must be given to the proper functioning of tires, horns, lights, batteries, controllers, lift systems (including forks, chains, cable and limit switches), brakes, and steering mechanisms;
- All heavy equipment must be operated at an authorized safe speed, consistent with conditions, and at a safe distance from other vehicles. Heavy equipment must be under positive control at all times;
- No riders other than the driver are permitted on heavy equipment at any point;
- When heavy equipment is left unattended, loads must be lowered, controls neutralized, power shut off, and brakes set. Wheels should be chocked if the equipment is parked on an incline.
- Backhoe outriggers shall be equipped with cleated pads (or cribbing used) when operating in soft sandy soil rather than rubber pads (for hard surfaces).
- When working near a backhoe or excavator, field personnel will maintain sight contact with the operator. Field personnel shall not work within the swing radius of the equipment while the equipment is operating. The swing radius will be defined with traffic cones, barrier tape, or other suitable means, such as inscribing the radius on the soil surface using the backhoe bucket.
- Personnel will not cross the demarcated line without first establishing eye contact with the operator. The operator will cease vehicle operations and remove his hands and feet from the controls and/or turn the equipment off, before allowing personnel access to the area within the swing radius. Operations will resume only after all personnel have left the area within the swing radius.

12.11.4 Personnel Protective Equipment (PPE)

Level D PPE will be required for personnel engaged in heavy equipment operations. Clothing items will be:

- Coveralls or work clothing as prescribed by Accident Prevention Plan (APP);
- Work gloves, leather or canvas, as prescribed by APP;
- Safety glasses - as wind conditions and airborne particulate matter dictates;
- Hardhats;
- Highly Visible Safety Vests;
- Work Boots, steel toe - Sturdy and of sufficient height to aid in ankle support;
- Hearing Protection - Will be determined through a Noise Survey for any heavy equipment brought on site. Until the survey is completed and the degree of attenuation determined, personnel on the team will wear appropriate hearing protection; and
- Dust Masks - as wind conditions and airborne particulate matter dictates.

NOTE: If the heavy equipment is being used in support of other operations, PPE will be IAW that specific matrix.

12.12 GENERAL HEAVY EQUIPMENT SAFETY PRECAUTIONS

12.12.1 Underground Utilities

Utilities companies shall be contacted within established or customary local response times advised of the proposed work and asked to locate underground utilities (sewer, telephone, electric, water, gas or any other utility) prior to start of actual excavation. When these locations cannot be established, the excavation may proceed, provided the heavy equipment operation does so with caution, and only after site personnel, using detection equipment, have made an attempt to locate utilities. While the excavation is opened, and underground utilities exposed, they shall be protected, supported or removed as necessary to safeguard workers.

12.12.2 Exposure to Vehicle Traffic

Team members exposed to vehicular traffic shall be provided and wear warning vests or other suitable garment with a highly visible (reflector) material. Traffic direction paddles or saw horse type barricades may also be required to halt or redirect vehicular traffic around the excavation site.

12.12.3 Exposure to Falling Loads

No worker shall be permitted underneath loads handled by lifting or digging equipment. Workers are required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling material.

12.12.4 Equipment Warning Device

All heavy equipment will be equipped with an audile warning system that sounds when the equipment is backing up. Heavy equipment needing to be moved adjacent to an excavation or approach the edge, and the operator does not have a clear and direct view of the edge, will institute a warning system, such as barricades, stop logs or arm and hand signals from the safety observer.

12.12.5 Loose Rock or Soil

Workers will be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. All equipment or materials will be placed at least 2 feet (.61m) from the edge of excavations, or by use of retaining devices that are sufficient to prevent the equipment or material from falling or rolling into the excavation. Also scaling the excavation face to remove loose rock or soil and the installation of protective barriers at intervals on the face to stop or contain falling material will be used when appropriate.

12.12.6 Cave-In

Excavations will be protected from cave-ins by adequate protective systems (sloping and benching or shielding and support).

12.12.7 Operation of Heavy Equipment

Heavy equipment will not be operated without a spotter. This includes moving, repositioning, and using the front and rear attachments. Prior to starting an excavation, a safety arc will be etched in the ground with the front or rear boom, fully extended. If operating on a hard surface, the safety arc will be marked on the ground, with bright spray paint. Prior to anyone entering the safety arc, the operator will:

- Swing the boom fully to one side;
- Lower the bucket to the ground;
- Place engine in idle speed; and
- Hold his hands clear of the controls or in the "Hands Up" position.

12.12.8 UXO Precautions

All heavy equipment operations will adhere to the MSD, if applicable, as described in the site Work Plan. The lateral distances will be maintained when conducting heavy equipment operations on a UXO site. These distances may be reduced or extended by the Ordnance and Explosives Safety Specialist (OESS), based on an assessment of site history, size of site, expected UXO, terrain features or other such factors that may apply. The following distances shall apply as applicable:

- 200 feet minimum or the K40 factor distance (whichever is greater) from non-UXO trained site personnel, unrelated to the operation.
- 200 feet minimum or the K40 factor distance (whichever is greater) from another heavy equipment operation or other manual intrusive operations.
- All excavations will be conducted offset laterally for the suspected UXO item or anomaly being investigated.
- The heavy equipment will uncover no more than six (6) inches of earth per dig.
- The heavy equipment will not be used to excavate closer than 12 inches from UXO.
- Suspend all operations immediately upon approach of an electrical storm.
- Observe the hazards of electromagnetic radiation (EMR) precautions when working in the vicinity of electrically initiated or susceptible UXO.
- Do not handle any munitions and explosives of concern (MEC) unnecessarily.
- Incorporate appropriate property protective measures for shock and fragmentation when conducting MEC operations.

12.13 HEAVY EQUIPMENT TRAINING

The Team Leader will serve, as the "Competent Person" for all heavy equipment operations. The Project Health and Safety Officer (PHSO) or Certified Industrial Hygienist (CIH) will conduct this training, during the site specific training. This training will be documented and kept on file at the site. Minimum elements of training will include:

- Review of OSHA Regulation for Safety and Health Requirement for Construction/Excavations – OSHA Regulation 29CFR1926, Subpart P, Appendix A and 29CFR1926.652, Subpart P, Appendix F, (Annex A of this SOP)
- Proper Shoring and Sloping Techniques
- Soil classification and evaluation at the excavation site.
- Responsibilities of a Competent Person.

FIGURE 12.1 Heavy Equipment Inspection Report

Date:	**Vehicle Make:**	**Rental/Lease/Private** *(circle one)*

Lic Plate #:	**Veh VIN#:**
Starting Mileage/Hours for Week:	**Ending Mileage/Hours for Week:**

General Vehicle Inspection

Check { } with R for repair needed; X for OK; / for adjustment made

1. Windshield { }	**3. Vehicle Interior** { }
2. Vehicle Exterior { }	**4. Leaks** { }

5. Lights:

a. Headlights { } d. Brake Lights { }

b. Tail lights { } e. Back-up Alarm { }

c. Turn Signals { }

. Brakes { }	**10. Belts** { }
7. Horn { }	**11. Defroster** { }
8. Tires/Tracks (Tread wear/pressure) { }	**12.Radiator/Hoses** (DON'T check when hot) { }
9. Windshield Wipers/Washer { }	**13. Battery** { }

14. Fluid Levels: (Circle approximate level) a. Oil Full 1qt low Added_________ b. Coolant: Full Need coolant Added_________ c. Transmission: Full 1pt low Added_________ d. Fuel: Full ½ ¼ Empty	e. Hydraulic Fluid Full 1qt low Added_________ f. Grease Fittings Full Added_____________ g. ROPS Certificate Yes No

Comments/Repairs/Service(s) Needed: Next Service @_____________hrs

Annex A

Soil Classification for
Heavy Equipment Operations

1.0 SOIL TYPES

The following soil types may be encountered in the course of excavating soil. Knowledge of soil characteristics of the soil types is beneficial to understanding the hazards associated with each.

- **Cemented Soil** – A soil in which a chemical agent, such as calcium carbonate, holds the particles together whereas a hand-size sample cannot be crushed into powder or individual soil particles by finger pressure.

- **Cohesive Soil** – A fine grained soil (clay) or soil with a high clay content, which has cohesive strength. Cohesive soil does not crumble, can be excavated with vertical side-slopes and is “plastic” when moist. Cohesive soil is hard to break up when dry, and exhibits significant cohesion when submerged. Cohesive soils include clayey silt, sandy clay, silty clay, clay and organic clay.

- **Dry Soil** – A soil that does not exhibit visible signs of moisture content.

- **Fissured Soil** – A soil material that has a tendency to break along definite planes of fracture with little resistance or a material that exhibits open cracks, such as “tension cracks,” in an exposed surface.

- **Granular Soil** – Means gravel, sand, or silt (coarse grained soil) with little or no clay content. Granular soil has no cohesive strength. Some moist granular soils exhibit apparent cohesion. Granular soil cannot be molded when moist and crumbles easily when dry.

- **Layered System** – Means two or more distinctly different soil or rock types arranged in layers. Micaceous seams or weakened planes in rock or shale are considered layered.

- **Moist Soil** – Means a condition in which a soil looks and feels damp. Moist cohesive soils can easily be shaped into a ball and rolled into small diameter threads before crumbling. Moist granular soil that contains some cohesive material will exhibit signs of cohesion between particles.

- **Plastic Soil** – means a property of a soil, which allows the soil to be deformed or molded without cracking, or appreciable volume change.

- **Saturated Soil** – Means a soil in which the voids are filled with water. Saturation does not require flow. Saturation, or near saturation, is necessary for the proper use of instruments such as a penetrometer or sheer vane.

2.0 SOIL CLASSIFICATION

If personnel are to enter the excavation, the soils of the excavation must be classified to determine the design of the appropriate protective system. Each soil and rock deposit at an excavation site must be classified by a competent person, as either stable rock, Type A, Type B, or Type C soil.

The soil classification results must be made based on the results of at least one visual test (tension cracks or signs that the soil has been previously disturbed) and one manual test (use of pocket penetrometer or shear-vane to measure unconfined compression strength). The definitions of the various soil classifications are presented below.

- **Stable Rock** is natural solid mineral matter that can be excavated with vertical sides and will remain intact while exposed.
- **Type A Soils** are cohesive soils with an unconfined compressive strength of 1.5 tons per square foot (tsf) (144 kPa) or greater. Examples of Type A cohesive soils are: clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam. A soil cannot be classified as Type A if it is fissured; subject to vibration from traffic, pile driving, or similar effects; has previously been disturbed, is part of a sloped, layered system where the layers dip into the excavation on a slope of 4 horizontal to 1 vertical (4H:1V) or greater; or has seeping water.
- **Type B Soils** are cohesive soils with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa). Examples of other Type B soils are: angular gravel; silt; silt loam; previously disturbed soils unless otherwise classified as Type C; soils that meet the unconfined compressive strength or cementation requirements of Type A soils but are fissured or subject to vibration; dry unstable rock; and layered systems sloping into the trench at a slope less than 4H:1V (only if the material would be classified as a Type B soil).
- **Type C Soils** are cohesive soils with an unconfined compressive strength of 0.5 tsf (48 kPa) or less. Other Type C soils include: granular soils such as gravel, sand and loamy sand, submerged soil, soil from which water is freely seeping, and submerged rock that is not stable. Also included in this classification is material in a sloped, layered system where the layers dip into the excavation or have a slope of four horizontal to one vertical (4H: 1V) or greater.

Table 1-1: Maximum Allowable Slopes

Soil or Rock Type	Maximum Allowable Slopes (H:V) for Excavations less than 20 feet in depth	
Stable Rock	**Vertical**	**(90 deg.)**
Type A	**¾:1**	**(53 deg)**
Type B	**1:1**	**(45 deg)**
Type C	**1 ½:1**	**(34 deg)**

Exception: Simple slope excavations, which are open 24 hours, or less (short term) and 12 feet or less in depth shall have a maximum allowable slope of ½:1.

STANDARD OPERATING PROCEDURE
NUMBER 13

TRENCHING AND EXCAVATION

SOP 13 - SAFETY CONSIDERATIONS DURING TRENCHING AND EXCAVATION

13.1 INTRODUCTION

Parsons will control the hazards posed by open excavation through strict compliance with the procedures outlined in this document. This plan addresses U.S. Army Corps of Engineers excavation requirements contained in EM 385-1-1, Section 25, and OSHA requirements as specified in 29 CFR 1926.651 (Excavation and Trenching). In the event of a conflict between these referenced standards, the more stringent will prevail. Thus, limiting/preventing potential exposures of project personnel must be the FIRST consideration during all intrusive excavations. This will be accomplished by providing protective clothing/respiratory protection, conducting air monitoring during intrusive activities, and decontaminating personnel/equipment.

13.2 GENERAL REQUIREMENTS

13.2.1 Site Reconnaissance

A visual surface reconnaissance and geophysical survey (e.g., magnetometer) will be performed over the excavation area prior to any intrusive work. The objective of this survey is to identify physical hazards, suspected hazards, MEC, CWM, energetic materials, flammables, pyrotechnics, underground utilities, and unknown buried objects. Subsurface contacts are located and marked with a non-metallic identifier and recorded by position.

13.2.2 Underground Installations/Utility Locations

13.2.2.1 The estimated location of utility installations, such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably may be expected to be encountered during excavation work, shall be determined prior to beginning an excavation. Utility companies or a utility locator organization shall be contacted at least seven working days prior to excavation activities and asked to establish the location of underground utilities. Utilities must be located before excavation activities commence.

13.2.2.2 Equipment operators shall maintain a reasonable clearance between any underground utility and the cutting edge or point of powered equipment. When excavating with powered equipment within 18 inches of the markings of underground facilities, personnel should conduct the excavation in a careful and prudent manner by excavating by hand to determine the precise location of the facility/utility to prevent damage. While the excavation is open, underground installations shall be protected, supported or removed as necessary to safeguard employees.

13.3 ACCESS AND EGRESS

If employees are required to enter an excavation that requires shoring, structural ramps or ladders will be used as a means for access or egress. A competent person qualified in structural design must design the ramps. Ramps and runways constructed of two or more structural members shall have the structural members connected together to prevent displacement. If ladders are used, the ladder shall be located every 25 feet of lateral travel distance. Ramps or ladders must be provided when entering an excavation 4' or greater in depth.

13.4 EXPOSURE TO FALLING LOADS

No employee shall be permitted underneath loads handled by lifting or digging equipment. Employees shall be required to stand beyond the swing radius of the backhoe to avoid being struck by any spillage. Employees may ONLY collect samples from the backhoe bucket when the bucket has been lowered to the ground and the operator has removed his hands from the controls. ***Never approach a backhoe unless the operator sees you***.

13.5 WARNING SYSTEM FOR MOBILE EQUIPMENT

When mobile equipment is operated adjacent to an excavation or when such equipment is required to approach the edge of an excavation, and the operator does not have a clear and direct view of the edge of the excavation, a warning system shall be utilized such as barricades, hand or mechanical signals, or stop logs. If possible, the grade should be away from the excavation.

13.6 HAZARDOUS ATMOSPHERES

Refer to the air monitoring Section of the approved Work Plan.

13.7 PROTECTION FROM HAZARDS ASSOCIATED WITH WATER ACCUMULATION

13.7.1 Individuals shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees. These precautions may include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, and/or use of safety harnesses and lifelines. All water removal operations must be monitored by a competent person.

13.7.2 If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering the excavation. Excavations subject to run-off from heavy rains will require an inspection by a competent person before personnel are allowed to enter the excavation.

13.8 PROTECTION OF EMPLOYEES FROM LOOSE ROCK OR SOIL

13.8.1 Adequate protection shall be provided to protect individuals who enter excavations or trenches from loose rock or soil that could pose a hazard by falling or rolling from an excavation face. Such protection shall consist of scaling to remove loose material, installation of protective barricades at intervals as necessary on the excavation face to stop and contain falling material, or other means that provide equivalent protection.

13.8.2 Individuals shall be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. Protection shall be provided by placing and keeping such materials or equipment at least 2 feet from the edge of excavations, or by the use of retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations.

13.9 SELECTION OF PROTECTIVE SYSTEMS

If Parsons personnel or subcontractors are required to enter excavations greater than 5 ft in depth, the sides of the excavation must be protected to prevent cave-in. Sloping and benching precautions to protect against cave-ins will be in accordance with EM 385-1-1, Section 25C.

13.10 INSPECTIONS

13.10.1 Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a “competent person” for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. The competent person for this project will be the SSHO. An inspection shall be conducted by the competent person prior to the start of work and as needed throughout the shift. Additionally, an inspection shall be made after every rainstorm or other hazard increasing occurrence. Inspections are required when employee exposure (i.e., personnel may be required to go into an excavation or trench that is greater than 5 feet deep) can be reasonably anticipated. Inspections must be documented by the “competent person.”

13.10.2 When the competent person finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed employees shall be removed from the hazardous area until the necessary precautions have been taken to ensure their safety.

STANDARD OPERATING PROCEDURE
NUMBER 14

HANDLING, STORAGE AND USE OF PRESSURIZED CYLINDERS

SOP 14 - SAFE PROCEDURES FOR HANDLING, STORAGE AND USE OF PRESSURIZED CYLINDERS

14.1 PURPOSE

The purpose of this procedure is to outline the minimum requirements for safe handling and use of compressed gas and gas cylinders by Parsons' employees. This procedure is an overview of the requirements of 29 CFR 1910.101, .169, and .253. It is anticipated that pressurized cylinders will be used to store and supply standards for air monitoring and Grade D breathing air for Level B activities. This procedure is intended to provide procedures for safely handling these cylinders and any other pressurized gases used on this project.

14.2 USE OF COMPRESSED AIR OR GASES

- Compressed air or other compressed gases are not to be used to blow dirt, chips, or dust from clothing.
- The use of compressed air is to be controlled, and proper personal protective equipment or safeguards utilized, as to protect against the possibility of eye injury to the operator or other persons.
- Compressed gases are not to be used to elevate or otherwise transfer any hazardous substance from one container to another unless the containers are designed to withstand the pressure with a safety factor of at least four.

14.3 COMPRESSED GAS CYLINDERS

- Cylinders must never be dropped, struck, or permitted to strike each other violently. Use carts or racks to move compressed gas cylinders; correct material handling techniques must be exercised when moving cylinders.
- Valve protection caps must always be kept on cylinders when they are being moved, stored, or until ready for use.
- Cylinder valves are to be kept closed except when gas is being used or when connected to a permanent manifold. Valves of empty cylinders must be closed.
- Cylinders must never be used as rollers or supports, or for any purpose other than carrying gas.
- Cylinders of compressed gas shall be stored in areas where they are protected from external heat sources such as flame impingement, intense radiant heat, electric arc, or high temperature steam lines.
- Cylinders are to be stored in an assigned area with full and empty cylinders separated. Stored fuel gases and oxygen cylinders are to be separated by

20 feet, or by a fire wall at least five (5) feet high having a fire-resistance rating of at least one-half (1/2) hour.

- Oxygen, nitrogen, helium, or freon cylinders must be stored upright or transported in a horizontal position with the exception of acetylene cylinders, which must always be kept in an upright position in accordance with EM 385-1-1, Section 20. All horizontally placed cylinders are to be secured by chocks or ties to prevent rolling.
- Cylinders are to be secured to a fixed object by chain or equivalent fastening device whenever they are placed in an upright position. The protective cap is not to be removed or the cylinder valve opened until the cylinder is secured.
- The repair of leaks must never be attempted on a pressurized system. If leaks develop, system pressure should be reduced to atmospheric pressure as rapidly as possible, and the SSHO notified immediately.
- Identification of the gas to be used must always be assured before connecting cylinders for use. All cylinders are to be labeled as to contents in addition to proper color-coding. Color-coding of cylinders should be posted.
- Compressed gas cylinders in portable service are to be conveyed by suitable trucks to which they are securely fastened. All gas cylinders in service must be securely held in substantial racks or secured to other rigid structures so that they will not fall or will not be knocked over.
- Gas cylinders moved by hoist must be handled in suitable cradles or boxes.
- Cylinders must not be placed where they might form part of an electrical circuit.
- Transfer of acetylene from one cylinder to another is prohibited.
- Oxygen cylinders are never to be stored near:
  - ◊ Highly combustible materials, especially oil and grease.
  - ◊ Reserve stocks of acetylene or other fuel gas cylinders.
  - ◊ Any other substance likely to cause or accelerate fire.
- All cylinders used and stored on site must have been hydrostatically tested within the last 5 years and have the date stamped on the cylinder. Any cylinder not having a current hydrostatic test should be rejected.
- Compressed gas cylinders must be legibly marked for identifying the gas content with either the chemical or the trade name of the gas. Such marking is to be by means of stenciling, stamping or labeling, and must not be readily removable. Whenever practical, the marking is to be located on the shoulder of the cylinder.

- Compressed air and oxygen are not interchangeable as gases. Oxygen shall <u>never</u> be used for the following:
    - ◊ As breathing air.
    - ◊ To purge pipelines, tanks, or any confined area.
    - ◊ To supply a head-pressure tank.
    - ◊ To power pneumatic tools.
    - ◊ In oil preheating burners.
    - ◊ To start internal combustion engines.
    - ◊ Ventilation.
    - ◊ Cleaning clothing.
    - ◊ In any other way as a substitute for compressed air.
- Use of a cylinder's contents for purposes other than those intended by the supplier is prohibited.

STANDARD OPERATING PROCEDURE
NUMBER 15

RESPIRATORY PROTECTION

SOP 15 - RESPIRATORY PROTECTION

15.1 REQUIREMENTS, ORGANIZATIONAL RESPONSIBILITIES, AND EVALUATION

15.1.1 Introduction

15.1.1.1 The Occupational Safety and Health Administration (OSHA) has established safe exposure levels for various airborne contaminants that may be encountered at sites during field operations. If worker exposure to these substances exceeds the OSHA permissible exposure limits (PELs), OSHA requires that feasible engineering controls and administrative measures be instituted to reduce worker exposure to within acceptable levels. If these controls are not feasible, employers are required to provide the appropriate, approved respirators for employee protection. Because of the nature of hazardous waste site work, traditional engineering controls are not always feasible. Hence, respirators must be relied upon as a means for protecting workers at hazardous waste sites and CWM sites.

15.1.1.2 No workers will be permitted to wear a respirator without clearance from a physician. This clearance is normally obtained from the examining physician at the time of the worker's normal annual and periodic physical examinations. The Parsons medical monitoring program is described in the Medical Surveillance, Control/Access to Employee Medical Records, and Emergency Care SOP 7. The diagnostic protocol for a fit-to-work classification for workers covered by HAZWOPER (OSHA in 29 CFR 1910.120) includes an assessment of the worker's ability to use air purifying respirators, airline respirators, and self-contained breathing apparatus (SCBAs). The examining physician obtains clinical data, including spirometry, X-ray, and cardiac-function data as well as physical observations on which to base a conclusion. A specific conclusion addressing this requirement must accompany the worker's fit-to-work statement from the examining physician. Some individuals, especially those with marginal respiratory and cardiac functions, may experience a sense of choking (angina) when using respirators. If this is distinct and persistent, the worker shall not be allowed to wear respiratory protective equipment until re-evaluated by a physician.

15.1.2 Objective of the Respiratory Protection Program

The objective of the Respiratory Protection Program is to provide workers with sufficient information and guidance to adequately protect themselves from potential inhalation hazards during hazardous waste operations. The use of respirators to protect personnel from inhalation hazards is permitted by OSHA when other methods of protection (e.g., engineering controls or changes in work practices) are not feasible.

15.1.3 Minimum Requirements of an Acceptable Respirator Program

OSHA has established the requirements for a minimally acceptable program under 29 CFR Part 1910.134. Elements in an OSHA-acceptable program must include the following:

- Use of approved respiratory devices;
- Selection of respirators based on the hazards present;
- An employee training program in which the employee becomes familiar with the respiratory protective devices and is trained in the proper selection and use of respirators and their limitations;
- Provisions for the proper cleaning, disinfection, maintenance, storage, inspection and repair of respirators;
- Testing for the proper fit of the respiratory protective equipment;
- Medical screening of employees to determine if they are physically able to perform their assigned work including the use of respiratory protective equipment;
- Written standard operating procedures for the selection and use of respiratory protective equipment; and
- Regular inspection and evaluation for the respiratory protection program to determine its effectiveness.

15.1.4 Positions and Personnel Responsible for the Program

Personnel with specific responsibilities for the implementation of the program are described in the following:

15.1.4.1 Health and Safety Representative. The Parsons' Project Safety and Health Officer (PSHO) or Site Safety and Health Officer (SSHO) is responsible for the following:

- Administering the respiratory protection program; (SSHO)
- Establishing the training program; (SSHO)
- Selecting and working with a medical contractor;(PSHO)
- Ensuring the project has the necessary respiratory protection equipment; (SSHO)
- Scheduling fit testing; (SSHO)
- Developing written standard operating procedures for the selection of respiratory protection equipment; (PSHO) and
- Scheduling audits of and evaluating the respiratory protection program.(PSHO)

15.1.4.2 Project Safety and Health Officer. The PSHO is responsible for the following:

- Verifying that team members conducting the field investigation have received training in the selection and use of respirators and have the equipment necessary to conduct the investigation safely;
- Determining the degree of respiratory protection required for each field task or operation;
- Ensuring site-specific training is performed prior to on-site activities; and
- Ensuring records of respirator use are maintained.

15.1.4.3 Site Safety and Health Officer. The SSHO is responsible for ensuring the following:

- Maintaining a record of respirator use;
- That respirators are inspected, maintained, and cleaned properly;
- That respirators are stored properly;
- Maintaining copies of fit test and medical records;
- Performing fit-testing as needed;
- Maintaining repair records for respirators;
- That Grade D or better breathing air is provided for atmosphere-supplying respirators; and
- Distribution of respirators to field team member.

15.1.4.4 Project Staff. All project team members are responsible for the following:

- Reading and conforming to the APP;
- Presenting a copy of their fit test results to the SSHO prior to receipt of a respirator;
- Inspecting and cleaning of their assigned respirator before and after each use;
- Storing respirators in a convenient, clean and sanitary location when not in use;
- Reporting any perceived problems or difficulties with respiratory equipment to the SSHO; and
- While using a respirator, workers shall be aware of any perception of odor, resistance in breathing, and/or fatigue and report their existence to the SSHO immediately.

15.1.4.5 Evaluation of the Respiratory Protection Program.

15.1.4.5.1 Auditing of respiratory protection program practices will determine whether the appropriate respirators are being selected and worn properly. Examination of respirators in use and in storage will indicate how well the equipment is being maintained. The results of periodic audits of respirator storage and use consultations with wearers, measurements of hazard levels in work areas, and medical surveillance of wearers will be reviewed and analyzed to determine the effectiveness of the respiratory protection program. Evidence of excessive exposure to a hazard will be followed up to determine why inadequate protection was provided, and action will be taken to prevent a repeat of the problem.

15.1.4.5.2 The respiratory program for the project will be periodically evaluated by the PSHO and modified as appropriate.

15.2 CRITERIA USED TO SELECT RESPIRATORY EQUIPMENT

15.2.1 Introduction

15.2.1.1 The level of respiratory protection will be selected prior to initiating an activity based on characterization of groundwater and soil, knowledge of the area and associated waste, and previous measurements of worker exposure levels for the same or very similar tasks under similar conditions.

15.2.1.2 The investigation of hazardous waste sites presents workers with a number of environmental conditions, some are better defined than others. Each environmental situation is unique and the selection of the appropriate respiratory protection device may involve many steps. The PSHO chooses the respiratory equipment to be used based on considerations which include the following:

- Consideration of all available information pertaining to the hazard including: past activities, suspected materials, historical information, land use, analytical data, and nature of current activities
- Evaluation of the relevancy and timeliness of the data to determine the appropriate protective level needed for the task
- Identification of substances present in the work area
- Evaluation of any known or suspected chemicals on site, using the following characteristics:
  - ◊ short term exposure limits (STEL), permissible exposure limits (PEL), and threshold limit values (TLV);
  - ◊ eye irritation potential for substance;
  - ◊ immediately dangerous to life and health (IDLH) concentration;
  - ◊ possibility of poor sorbent efficiency at and below IDLH concentrations (breakthrough times for anticipated concentrations);

    - ◊ the possibility of severe skin irritation resulting from skin contact;
    - ◊ the vapor pressure of the substance;
    - ◊ anticipated exposure concentrations;
    - ◊ the possibility of high heat of reaction with sorbent material in the cartridge or canister; and
    - ◊ the possibility of shock sensitivity of the chemical being sorbed onto the cartridge or canister.
- Determination of the physical state of the substance as it is likely to be encountered at the site. It will be either: a gas or vapor, a particulate (dust, fume, or mist), or a combination of both.
- Identification of oxygen-deficient atmospheres (ANSI Z88.2). Air-purifying respirators shall not be worn in environments deficient in oxygen (less than 19.5 percent by volume or partial pressure less than 100mm of mercury).
- Skin Absorption and Irritation**.** A Level A ensemble provides skin protection from extremely toxic substances that may be absorbed through the skin or cause severe skin irritation. Most information concerning skin irritation is not quantitative but rather is presented in commonly used descriptive terms, such as "a strong skin irritant, highly irritating to the skin" and "corrosive to the skin." Decisions made concerning skin irritation are judgmental and are often based on this non-quantitative information

15.2.2 Sorbents

There are certain limitations to the use of sorbent cartridge or canister respirators. A sorbent cartridge is not recommended when:

- Evidence exists of short breakthrough times for the chemicals and the concentrations expected to be encountered during operations;
- There is reason to suspect that the sorbent does not provide adequate efficiency against the removal of a specific contaminant that may be encountered at the site;
- There is reason to suspect that a sorbent has a high heat of reaction with a substance;
- There is reason to suspect that a substance sorbed onto the surface of a cartridge or canister is shock sensitive; and
- Concentrations of organic vapors exceed the maximum use concentration for the respirator.

A sorbent, full-facepiece respirator will not be selected if the contaminant(s) are not known or cannot be measured.

15.2.3 Eye Irritation

The decision of whether to use a full-facepiece respirator, a half, or a quarter face piece respirator is often made by considering the chemical’s potential for producing eye irritation or damage. The following guidelines deal with eye protection.

- For routine work activities, any eye irritation is considered unacceptable. Therefore, only full-facepiece respirators are permissible in contaminant concentrations that produce eye irritation.
- For escape, some eye irritation is permissible if it is determined that such irritation would not inhibit escape and such irritation is reversible.
- In instances where quantitative eye irritation data cannot be found in literature references, and theoretical considerations indicate that the substance should not be an eye irritant, half-face-piece respirators are allowed.
- In cases where a review of the literature indicates a substance causes eye irritation but no eye irritation threshold is specified, the full-facepiece respirators are to be used.

  NOTE: Both mustard agent and lewisite are extreme eye irritants and a few minutes of exposure to high concentrations can cause permanent blindness.

15.2.4 Immediately Dangerous to Life or Health

15.2.4.1 The definition of IDLH provided in 30 CFR 11.3(t) is as follows:

> *"Immediately dangerous to life or health means conditions that pose an immediate threat to life or health or conditions that pose an immediate threat of severe exposure to contaminants, such as radioactive materials, which are likely to have adverse cumulative or delayed effects on health."*

15.2.4.2 The purpose of establishing an IDLH exposure concentration is to insure that the worker can escape without injury or irreversible health effects in the event of failure of the respiratory protective equipment. The IDLH is considered the maximum concentration above which only a highly reliable positive-pressure, atmosphere-supplying respirator is permitted. Since IDLH values are conservatively set, any approved respirator may be used up to its maximum-use concentration below the IDLH.

15.2.4.3 In establishing the IDLH concentration, the following factors are considered:

- Escape without loss of life or irreversible health effects. Thirty minutes is considered the maximum permissible exposure time for escape.
- Severe eye or respiratory irritation or other reactions that would prevent escape without injury.

15.2.4.4 The IDLH will be determined from the following sources:

- Specific IDLH concentrations provided in the literature (such as the American Industrial Hygienists Association Hygienic Guides and the National Institute of Occupational Safety and Health Pocket Guide to Chemical Hazards);
- Human exposure data;
- Acute animal exposure data; and
- Acute toxicological data from analogous substances.

15.2.4.5 The following guidelines will be used to interpret toxicological data reported in the literature for animal species:

- Where acute inhalation exposure data (30 minutes to 4 hours) are available for various animal species, the lowest exposure concentration causing death or irreversible health effects in any species is determined to be the IDLH concentration.
- Chronic exposure data may have little relevance to the acute effects and will not be used in determining the IDLH.

  NOTE: Both mustard agents and lewisite have low IDLH concentrations.

15.2.5 Respirator Protection Factors

15.2.5.1 The protection factors of respiratory protection devices are a useful numerical tool to aid in the selection of appropriate respiratory protection. Protection factors measure the overall effectiveness of a respirator.

15.2.5.2 The protection factor of a given respirator for a specific user multiplied by the PEL for a given substance is the maximum allowable concentration of that substance for which the respirator may be used. For example, if the protection factor (PF) for a full-facepiece respirator is 50 and a particular substance has a PEL (or TLV) of 10 ppm, the full-facepiece respirator will provide protection up to 500 ppm (see Table 15.1).

Table 15.1

Example of Assigned Respirator Protection Factors

Type of Respirator	OSHA Cadmium Standard
Air Purifying	
Filtering-face-piece	10
Half-mask	10
Full-face	50
Powered Air Purifying	
Half-mask	50
Full-facepiece	250
Loose-fitting face-piece	25
Hood or helmet	25
Air Line	
Half-mask (demand)	10
Half-mask (continuous)	50
Half-mask (pressure demand)	1000
Full-facepiece (demand)	50
Full-facepiece (continuous flow)	250
Full-facepiece (pressure demand)	1000
Self contained breathing apparatus	
Demand	50
Pressure Demand	>1000

15.2.6 Types of Respirators

There are two main types of respirators, air-purifying and atmosphere-supplying.

15.2.6.1 Air-Purifying Respirators. An air-purifying respirator can be used only if the atmosphere contains greater than 19.5 percent oxygen and the contaminant is present at a concentration below the IDLH level. Two types of air-purifying respirators are described below.

- **Half-Face-piece Respirators**. A half-face-piece respirator fits from under the chin to above the nose. One or two cartridges are used to filter the air and are discarded once the use limits are reached. The half-face-piece has approved cartridges for pesticides, organic vapors, dusts, mists, fumes, acid gases, ammonia, and several combinations of contaminants.
- **Full-face-piece Respirators**. The whole face, including the eyes, is protected by the full-facepiece respirator. It gives 5 times the protection of a half-face-piece (full-facepiece PF-50, half face-piece PF-10).

15.2.6.2 Atmosphere-Supplying Respirators.

15.2.6.2.1 Atmosphere-supplying respirators provide from 5 minutes to several hours of breathing air. The amount of protection provided is based upon the type of face-piece and its mode of operation, continuous, demand, and pressure-demand. The pressure-demand mode provides the best protection.

15.2.6.2.2 Two types of atmosphere-supplying respirators may be used. These are an air line respirator and a self-contained breathing apparatus (SCBA). A description of each is presented below:

- **Air line Respirator**. This respirator uses an air line to transport clean, compressed air to the wearer. The mode of operation may be either continuous, demand, or pressure-demand. This respirator may be worn in an IDLH environment if it is pressure-demand type, and incorporates an escape SCBA into the system. However, no more than 300 feet of air line can be used.
- **Self-Contained Breathing Apparatus**. The wearer of a SCBA carries a cylinder of compressed air and is not restricted by an air line. These devices are open-circuit and are approved for either demand or pressure-demand operation. Greater protection is afforded, however, when these devices are operated in the pressure-demand mode and these devices are used in this mode when worn in IDLH or potentially IDLH conditions.

15.2.7 Use of Air Monitoring Measurements

The protection level will be modified as necessary based on real-time measurements, supplemented with background information, and professional judgment. Modification of the levels or respiratory protection will be made based on the following guidelines.

Level B to Level D

Guideline 1: This modification may be made in the sustained absence of chemical warfare agent, volatiles or particulates, as measured on air monitoring equipment and at the direction of the PSHO.

Level C to Level D

Guideline 1: Same as Level B to Level D

Level B to Level C

Guideline 2: May be made at the direction of the SSHO (after conferring with the PSHO) when the contaminants and their concentrations are known. The concentrations of the contaminants must be below the action levels requiring the utilization of level B protection. This modification should not be used without substantial knowledge of all the chemicals involved and their expected behavior in relation to change in concentration and effect on absorbent cartridges.

Level D to Level C

Guideline 3: Permissible at the direction of the SSHO when total volatiles, particulates, or chemical warfare agent exceeds the preset action level

Level C to Level B

Guideline 4: Permissible at the direction of the SSHO in cases where total volatiles, particulate, or chemical warfare agent measurements exceed the preset action level based on characterization of the expected contaminants.

Level D to Level B

Guideline 5: May be made at the direction of the SSHO Officer based on the magnitude of the measurements and on professional judgment.

15.3 TRAINING AND FITTING

Selecting the respirator appropriate for a given hazard is important, but equally important is using the selected device properly. Proper use can be ensured by careful training of users and by maintenance of respiratory protective devices.

15.3.1 Training

15.3.1.1 Respirator training is required as part of the initial training course conducted for workers who are to perform hazardous waste operations and is also required in the annual refresher training provided to workers performing hazardous waste activities. Both types of training will address the subjects in Table 15.2.

15.3.1.2 Project-specific respirator training will be offered by the Site Safety and Health Officer as part of the initial on-site training.

15.3.2 Respirator Fit Testing

All respirators that rely on a mask-to-face seal need to be checked with either qualitative or quantitative methods to determine whether the mask provides an acceptable fit to the wearer. The qualitative fit test procedures rely on a subjective sensation (taste, irritation, smell) of the respirator wearer to a particular test agent while the quantitative test uses instruments to measure face seal leakage. The relative workplace exposure level determines what constitutes an acceptable fit and which fit test procedure is required. For negative pressure air purifying respirators, users may rely on either a qualitative or a quantitative fit test procedure for exposure levels less than 100 times the occupational exposure limit. Exposure levels greater than 100 times the occupational exposure limit must use a quantitative fit test procedure for these respirators. Fit testing of tight-fitting atmosphere supplying respirators and tight-fitting, powered air-purifying respirators shall be accomplished by performing quantitative or qualitative fit testing in the negative pressure mode. In all instances, the fit test must be made with the same make, model, style, and size of respirator that will be used in the field. Quantitative fit-testing will be performed for all employees and subcontractors that anticipate using a respirator for operations at a CWM site.

15.3.2.1 General Requirements

15.3.2.1.1 The employee shall evaluate respirator fit using the following procedures:

- The worker shall be allowed to choose the most acceptable respirator from a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user.

- Prior to the selection process, the worker shall be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension, and how to determine an acceptable fit. A mirror shall be available to assist the subject in evaluating the fit and positioning of the respirator.

- The worker shall be informed that he or she is being asked to select the respirator that provides the most acceptable fit. Each respirator represents a different size and shape, and if fitted and used properly, will provide adequate protection.

- The worker shall be instructed to hold each chosen face-piece up to the face and eliminate those that obviously do not give an acceptable fit.

- The more acceptable face-pieces are noted in case the one selected proves unacceptable; the most comfortable mask is donned and worn at least five minutes to assess comfort.

15.3.2.1.2 After the worker has determined the respirator of greatest comfort, that person shall conduct a negative and positive pressure fit checks (see below) or other fit checks recommended by the respirator manufacturer. Another face-piece shall be selected and re-tested if the worker fails the fit checks.

15.3.2.1.3 Fit testing shall not be conducted if there is any hair growth between the skin and the face-piece sealing surface, such as stubble beard growth, beard, mustache, or sideburns which cross the respirator sealing surface. Any type of apparel that interferes with a satisfactory fit shall be altered or removed. If the worker exhibits difficulty in breathing, the test shall be discontinued.

15.3.2.1.4 After the successful completion of the fit checks, the respirator fit shall be tested using either the qualitative or quantitative fit test method presented in Attachment A. No matter which test protocol is used, the employee shall be given a description of the fit test protocol and their responsibility during the test procedure. The fit test shall be performed while the worker is wearing any applicable safety equipment that may be worn during actual respirator use, which could interfere with respirator fit. The following test exercises must be performed during fit testing:

- Normal breathing. In a normal standing position, without talking, the subject shall breathe normally.
- Deep breathing, as during heavy exertion.
- Side-to-side and up-and-down head movements. These movements should not be exaggerated, but should approximate those that take place on the job.
- Talking. This is most easily accomplished by reading a prepared text (e.g., Rainbow Passage) loudly enough to be understood by someone standing nearby.
- Grimace. The worker shall grimace by smiling or frowning (this applies only to quantitative testing, it is not performed for qualitative fit testing).
- Bending over. The worker shall bend at the waist as if to touch his or her toes.
- Normal breathing (repeat of first bullet)

15.3.2.1.5 Each test exercise shall be performed for one minute except for the grimace exercise that shall be performed for 15 seconds. The worker shall be questioned by the SSHO regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried. The respirator shall not be adjusted once the fit test exercises begin. Any adjustment voids the test, and the fit test must be repeated. A copy of the fit-test record will be maintained by the SSHO at the site (SSHO can use Forms 1 & 2 or printout from Portacount to document results of fit-testing).

15.3.3 Daily Qualitative Fit Checks

Each employee is responsible for performing daily qualitative fit checks of their assigned air purifying respirator prior to entry into a hazardous atmosphere. The daily determination of fit will consist of a negative and positive pressure fit check as described below.

15.3.3.1 The Negative Pressure Test

In this test, the user closes off the inlet of the canister, cartridge, or filter by covering it with the palm of their hand; inhales gently so that the face-piece collapses slightly; and holds their breath for about 10 seconds. If the face-piece remains slightly collapsed and no inward leakage is detected, the respirator is probably functioning correctly.

15.3.3.2 The Positive Pressure Test

This test is conducted by closing off the exhalation valve and exhaling gently into the face-piece. The fit is considered satisfactory if slight positive pressure can be built up inside the face-piece without any evidence of outward leakage.

Table 15.2
Respirator Training Outline

Lecture and Discussion

- Discussion of classification of respirators
- Discussion of respirator capabilities and limitations
- Instruction on setting "action levels"
- Instruction on OSHA Standard for respiratory protection
- Proper fitting
- Classroom and field training in recognizing and dealing with emergencies

Workshop and Field Exercise

- Field exercise in Levels A, B, and C protective ensembles
- Disassembly and reassembly of respirators emphasizing components, their function, and their relation to the overall function of the respirator
- Inspection of respirators
- Proper donning and field fit testing
- Fit testing with a test atmosphere
- Cleaning, maintenance, and storage

15.4 RESPIRATOR INSPECTION, CLEANING MAINTENANCE, AND STORAGE

Respirator inspection, cleaning, and maintenance is an integral part of the overall respirator program. Wearing a dirty, poorly maintained, or malfunctioning respirator is, in one sense, more dangerous than not wearing a respirator at all. The employee wearing a defective device thinks they are protected when, in reality, they are not.

15.4.1 Inspection

It is imperative that periodic inspections of respirators be done. Inspections for three types of respirators are described in detail below.

15.4.1.1 Air-Purifying Respirators. Each individual must inspect his or her air-purifying respirator before and after each use. Form 3 lists the items to be checked during the inspection of an air-purifying respirator.

15.4.1.2 Self-Contained Breathing Apparatus. Self-contained breathing apparatuses (SCBA) will receive a thorough inspection by the Site Safety and Health Officer prior to beginning work and at regular monthly intervals thereafter (Form 4). Prior to each days use, workers must inspect their individual face-piece assembly as listed on the daily inspection checklist (Form 5).

15.4.1.3 Air line Respirator. Prior to and following each use, the air line system will be inspected. Form 6 contains a list of inspection items.

15.4.2 Cleaning and Storage

Users of respiratory protection are responsible for inspecting and cleaning all respirators following each use. Cleaning is done using a commercial cleaner-sanitizer followed by a thorough rinse and air drying. After cleaning, sanitizing, and inspecting the respirator, the user will repackage and store the respirator in an area protected against dust, sunlight, heat, extreme cold, excessive moisture, and damaging chemicals. Each respirator face-piece usually comes in a plastic bag supplied by the manufacturer. This bag will be retained and used for respirator storage. The respirators must be packed and stored so the exhalation valve rests in a normal position.

15.4.3 Maintenance

Continued usage of respirators will require periodic repair or replacement of component parts of the equipment. Replacement of parts and repair of air-purifying respirators, in most cases, presents few problems. The manufacturer will provide replacement parts. Replacement parts for respiratory protective devices must be those of the manufacturer of the equipment. Substitution of parts from a different brand or type of respirator will invalidate the approval of the respirator. Maintenance of SCBA equipment is more difficult, primarily because of the valve and regulator assembly. Because of this, regulations require that SCBA equipment be returned to the manufacturer for adjustment or repair. Users shall not perform any maintenance on the regulators or valves of SCBA or air line respirators. The SSHO will be notified of needed maintenance/repair and he will ensure required maintenance/repair is performed by manufacturer certified personnel/firms.

FORM 15-1 QUALITATIVE FIT TEST LOG

Personnel:

Employee: ______________________

Fit test
administrator: ___________________________

Respirator:

Manufacturer: _________________________

Model: _______________________________

Size: _________________________________

ID Number: _________________________

Dates:

____
(date of test)

____
(date of last physical)

____
(date of next scheduled fit test)

Comfort:

Very comfortable: ______________________

Comfortable: __________________________

Intolerable: ___________________________

Needs prescription inserts: ______________
(yes/no)

_______ fit _______ no fit

Test Protocol

Pressure fit check:

______ positive

_______ negative

Test atmosphere:

______ isoamyl acetate

______ stannic oxychloride

______ other (specify)

Remarks: ____

____

____

____

FORM 15-2 QUANTITATIVE FIT TEST LOG

Personnel:

Employee: ______________________

Fit test
administrator: __________________________

Dates:

____
(date of test)

____
(date of last physical)

Respirator:

Manufacturer: ________________________

Model: ______________________________

Size: _______________________________

ID Number: ________________________

____
(date of next scheduled fit test)

Comfort:

Very comfortable: _____________________

Comfortable: __________________________

Intolerable: ___________________________

Needs prescription inserts: ______________
(yes/no)

Portacount instrument

______ model and manufacturer

_______ Serial number

Test results (attach strip chart):

-_____ FIT Factor

_______ Pass _______ Did not Pass

Remarks: ____

____

____

FORM 15-3 AIR-PURIFYING RESPIRATOR WEEKLY INSPECTION CHECKLIST

Rubber face piece - check for:

_____ excessive dirt (clean all dirt from face piece);

_____ cracks, tears, or holes (obtain new face piece);

_____ distortion (allow face piece to “sit” free from any constraints and see if distortion disappears; if not, obtain new face piece); and

_____ cracked, scratched, or loose-fitting lenses.

Head harness - check for:

_____ breaks or tears (replace head straps);

_____ loss of elasticity (replace head straps); and

_____ broken or malfunctioning buckles or retaining clips (obtain new buckles).

Inhalation valve, exhalation valve - check for:

_____ detergent residue, dust particles, or dirt on valve or valve seat (clean residue with soap and water);

_____ cracks, tears, or distortion in the valve material or valve seat (clean residue with soap and water); and

_____ missing or defective valve cover (obtain valve cover from program supervisor).

Cartridges and canisters – check for:

_____ proper filter for the hazard (verify with Project Safety and Health Officer);

_____ missing or worn gaskets (contact warehouse manager for replacement);

_____ worn filter and face-piece threads (replace filter or face piece); and

_____ cracks or dents in filter housing (replace filter).

FORM 154 SELF-CONTAINED BREATHING APPARATUS MONTHLY INSPECTION CHECKLIST

Device: ______________________________

Serial #: ______________________________

Date inspected: _________________________

Inspected by: __________________________

Rubber face piece: ______________________

Antifogging Agent Application on lenses: ______________________________________

Exhalaration valve

Rubber head harness: ____________________

Rubber hose: ___________________________

O-rings: _______________________________

Face piece Lens: _______________________

Harness: ______________________________

Backpack: _____________________________

Washing/Sanitizing: _____________________

Operating Instructions: __________________

Hydrostatic test date: ___________________

No visible damage: ______________________

Air Cylinder Pressure: ___________________

Bypass Valve: __________________________

Mainline Valve: _________________________

Alarm: _________________________________

Regulator Diaphragm: ___________________

Regulator Function: _____________________

Demand Valve: _________________________

Pressure Demand: _______________________

Storage Box: ___________________________

Remarks: ____

____

____

____

FORM 15-5 SELF-CONTAINED BREATHING APPARATUS WEEKLY INSPECTION CHECKLIST

Rubber face piece - check for:

_____ Excessive dirt (clean all dirt from face piece);

_____ Cracks, tears, or holed (obtain new face piece);

_____ Distortion (allow face piece to “sit” free from any constraints and see if distortion disappears; if not, obtain new face piece); and

_____ Cracked, scratched, or loose-fitting lenses.

Head harness - check for:

_____ Breaks or tears (replace head straps);

_____ Loss of elasticity (replace head straps); and

_____ Broken or malfunctioning buckles or retaining clips (obtain new buckles).

FORM 15-6 AIR LINE RESPIRATOR WITH EMERGENCY EGRESS SCBA INSPECTION CHECKLIST

Serial #: ____

Date inspected: ____________________________________

Inspected by: ______________________________________

Rubber face piece torn or ripped:	YES	NO
Head harness - torn or ripped:	YES	NO
Is SCBA cylinder fully pressurized:	YES	NO
Are air lines clean and serviceable:	YES	NO
Rotate bypass valve hand wheel while air line is hooked to air source does bypass function?	YES	NO
Check SCBA cylinder for deep scratches or gouges.	YES	NO
Does carrying pouch or harness have signs of excessive wear or damage?	YES	NO
Is face piece lens cracked or scratched?	YES	NO
Has the face piece been washed/sanitized since it was last worn?	YES	NO
Has antifogging solution been applied on lens?	YES	NO
Stow the air lines and face masks.	YES	NO

ATTACHMENT 1
FIT TEST PROTOCOLS

ATTACHMENT 1
FIT TEST PROTOCOLS

QUALITATIVE FIT TEST (QLFT) PROTOCOLS

General

The SSHO must able to prepare test solutions, calibrate equipment, perform the tests properly, recognize invalid tests, and ensure that test equipment is working properly**.** QLFT equipment must be kept clean and well maintained so it operates within the parameters for which it was designed.

Isoamyl Acetate Protocol

This protocol is appropriate for the fit testing of respirators with organic vapor cartridges or canisters.

Odor Threshold Screening

Odor threshold screening, performed without wearing a respirator, is intended to determine if the individual tested can detect the odor of isoamyl acetate at low levels.

1. Three 1-liter glass jars with metal lids are required.
2. Odor-free water (e.g., distilled or spring water) at approximately 25-deg. C (77 deg. F) shall be used for the solutions.
3. The isoamyl acetate (IAA) (also known at isopentyl acetate) stock solution is prepared by adding 1-ml of pure IAA to 800-ml of odor-free water in a 1-liter jar, closing the lid and shaking for 30-seconds. A new solution shall be prepared at least weekly.
4. The screening test shall be conducted in a room separate from the room used for actual fit testing. The 2 rooms shall be well-ventilated to prevent the odor of IAA from becoming evident in the general room air where testing takes place.
5. The odor test solution is prepared in a second jar by placing 0.4-ml of the stock solution into 500-ml of odor-free water using a clean dropper or pipette. The solution shall be shaken for 30-seconds and allowed to stand for 2 to 3 minutes so that the IAA concentration above the liquid may reach equilibrium. This solution shall be used for only 1-day.
6. A test blank shall be prepared in a third jar by adding 500-cc of odor-free water.

7. The odor test and test blank jar lids shall be labeled (e.g., one and two) for jar identification. Labels shall be placed on the lids so that they can be peeled off periodically and switched to maintain the integrity of the test.
8. The following instruction shall be typed on a card and placed on the table in front of the 2 test jars (i.e., one and two): "The purpose of this test is to determine if you can smell banana oil at a low concentration. The two bottles in front of you contain water. One of these bottles also contains a small amount of banana oil. Be sure the covers are on tight, and then shake each bottle for two seconds. Unscrew the lid of each bottle, one at a time, and sniff at the mouth of the bottle. Indicate to the test conductor which bottle contains banana oil."
9. The mixtures used in the IAA odor detection test shall be prepared in an area separate from where the test is performed, in order to prevent olfactory fatigue in the subject.
10. If the test subject is unable to identify the jar containing the odor test solution, the IAA qualitative fit test shall not be performed.
11. If the test subject correctly identifies the jar containing the odor test solution, the test subject may proceed to respirator selection and fit testing.

Isoamyl Acetate Fit Test

1. The fit test chamber shall be a clear 55-gallon drum liner suspended inverted over a 2-foot diameter frame so that the top of the chamber is about 6 inches above the test subject's head. If no drum liner is available, a similar chamber shall be constructed using plastic sheeting. The inside top center of the chamber shall have a small hook attached.
2. Each respirator used for the fitting and fit testing shall be equipped with organic vapor cartridges or offer protection against organic vapors.
3. After selecting, donning, and properly adjusting a respirator, the test subject shall wear it to the fit testing room. This room shall be separate from the room used for odor threshold screening and respirator selection, and shall be well-ventilated, as by an exhaust fan or lab hood, to prevent general room contamination.
4. A copy of the test exercises and any prepared text from which the subject is to read shall be taped to the inside of the test chamber.
5. Upon entering the test chamber, the test subject shall be given a 6-inch by 5-inch piece of paper towel, or other porous, absorbent, single-ply material, folded in half and wetted with 0.75 ml of pure IAA.
6. The test subject shall hang the wet towel on the hook at the top of the chamber. An IAA test swab or ampule may be substituted for the IAA wetted paper towel provided it has been demonstrated that the alternative IAA source will generate an IAA test atmosphere with a concentration equivalent to that generated by the paper towel method.

7. Allow two minutes for the IAA test concentration to stabilize before starting the fit test exercises. This would be an appropriate time to talk with the test subject; to explain the fit test, the importance of his/her cooperation, and the purpose for the test exercises; or to demonstrate some of the exercises.
8. If at any time during the test, the subject detects the banana-like odor of IAA, the test is failed. The subject shall quickly exit from the test chamber and leave the test area to avoid olfactory fatigue.
9. If the test is failed, the subject shall return to the selection room and remove the respirator. The test subject shall repeat the odor sensitivity test, select and put on another respirator, return to the test area and again begin the fit test procedure described above. The process continues until a respirator that fits well has been found. Should the odor sensitivity test be failed, the subject shall wait at least 5 minutes before re-testing. Odor sensitivity will usually have returned by this time.
10. If the subject passes the test, the efficiency of the test procedure shall be demonstrated by having the subject break the respirator face seal and take a breath before exiting the chamber.
11. When the test subject leaves the chamber, the subject shall remove the saturated towel and return it to the person conducting the test, so that there is no significant IAA concentration buildup in the chamber during subsequent tests. The used towels shall be kept in a self-sealing plastic bag to keep the test area from being contaminated.

Irritant Smoke (Stannic Chloride) Protocol

This qualitative fit test uses a person's response to the irritating chemicals released in the "smoke" produced by a stannic chloride ventilation smoke tube to detect leakage into the respirator. The respirator to be tested must be equipped with a P-, R, or N-100 series filter (99.97% efficient filters). An enclosure shall not be used for this test. The smoke can be irritating to the eyes, lungs, and nasal passages. The Facility H&S Representative shall take precautions to minimize the test subject's exposure to irritant smoke and perform the test in a well-ventilated area.

Sensitivity Screening Check

The person to be tested must demonstrate his or her ability to detect a weak concentration of the irritant smoke.

1. The test operator shall break both ends of a ventilation smoke tube containing stannic chloride, and attach one end of the smoke tube to a low flow air pump set to deliver 200 milliliters per minute, or an aspirator squeeze bulb. The test operator shall cover the other end of the smoke tube with a short piece of tubing to prevent potential injury from the jagged end of the smoke tube.

2. The test operator shall advise the test subject that the smoke can be irritating to the eyes, lungs, and nasal passages and instruct the subject to keep his or her eyes closed while the test is performed.
3. The test subject shall be allowed to smell a weak concentration of the irritant smoke before the respirator is donned to become familiar with its irritating properties and to determine if he or she can detect the irritating properties of the smoke. The test operator shall carefully direct a small amount of the irritant smoke in the test subject's direction to determine that he or she can detect it.

Irritant Smoke Fit Test Procedure

1. The person being fit tested shall don the respirator without assistance, and perform the required user seal check(s).
2. The test subject shall be instructed to keep his or her eyes closed.
3. The test operator shall direct the stream of irritant smoke from the smoke tube toward the face seal area of the test subject, using the low flow pump or the squeeze bulb. The test operator shall begin at least 12 inches from the face-piece and move the smoke stream around the whole perimeter of the mask. The operator shall gradually make two more passes around the perimeter of the mask, moving to within six inches of the respirator.
4. If the person being tested has not had an involuntary response and/or detected the irritant smoke, proceed with the test exercises.
5. The exercises identified in this appendix shall be performed by the test subject while the respirator seal is being continually challenged by the smoke, directed around the perimeter of the respirator at a distance of six inches.
6. If the person being fit tested reports detecting the irritant smoke at any time, the test is failed. The person being re-tested must repeat the entire sensitivity check and fit test procedure.
7. Each test subject passing the irritant smoke test without evidence of a response (involuntary cough, irritation) shall be given a second sensitivity screening check. This check involves squeezing a small smoke stream from the tube after the respirator has been removed. If the test subject fails to evoke a response, the fit test is voided.
8. If a response is produced during this second sensitivity check, then the fit test is passed.

QUANTITATIVE FIT TEST (QNFT) PROTOCOL

General

The SSHO administering the QNFT must able to calibrate equipment, perform the tests properly, recognize invalid tests, and ensure that test equipment is working properly**.** QNFT equipment must be kept clean and well maintained so it operates within the parameters for which it was designed.

Ambient aerosol condensation nuclei counter (CNC) quantitative fit testing protocol.

The ambient aerosol condensation nuclei counter (CNC) quantitative fit testing (Portacount) protocol quantitatively fit tests respirators with the use of a probe. The probed respirator is only used for quantitative fit tests. A probed respirator has a special sampling device, installed on the respirator that allows the probe to sample the air from inside the mask. A probed respirator is required for each make, style, model, and size that the employer uses and can be obtained from the respirator manufacturer or distributor. The CNC instrument manufacturer, TSI Inc., also provides probe attachments (TSI sampling adapters) that permit fit testing in an employee's own respirator. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

Portacount Fit Test Requirements

1. Check the respirator to make sure the sampling probe and line are properly attached to the face-piece and that the respirator is fitted with a particulate filter capable of preventing significant penetration by the ambient particles used for the fit test per manufacturer's instruction.
2. Instruct the person to be tested to don the respirator for five minutes before the fit test starts. This purges the ambient particles trapped inside the respirator and permits the wearer to make certain the respirator is comfortable. This individual shall already have been trained on how to wear the respirator properly.
3. Check the following conditions for the adequacy of the respirator fit: Chin properly placed; Adequate trap tension, not overly tightened; Fit across nose bridge; Respirator of proper size to span distance from nose to chin; Tendency of the respirator to slip; Self-observation in a mirror to evaluate fit and respirator position.
4. Have the person wearing the respirator do a user seal check. If leakage is detected, determine the cause. If leakage is from a poorly fitting face-piece, try another size of the same model respirator, or another model of respirator.
5. Follow the manufacturer's instructions for operating the Portacount and proceed with the test.
6. The test subject shall be instructed to perform the exercises
7. After the test exercises, the test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried.

Portacount Test Instrument

The Portacount will automatically stop and calculate the overall fit factor for the entire set of exercises. The overall fit factor is what counts. The pass or fail message will indicate whether the test was successful. If the test was a pass, the fit test is over. Since the pass or fail criterion of the Portacount is user programmable, the SSHO shall ensure that the pass or fail criterion meet the requirements for minimum respirator performance. A record of the test needs to be maintained in accordance with this appendix. The record must contain the test subject's name; overall fit factor; make, model, style, and size of respirator used; the fit test operator's name, and the date of testing.

ATTACHMENT 2
RESPIRATOR CARTRIDGE CHANGEOUT SCHEDULE

ATTACHMENT 2
CARTRIDGE CHANGE-OUT PROGRAM

OSHA Requirement

The Occupational Safety and Health Administration (OSHA) no longer permits the detection of a substance’s odor as the primary basis for determining when the service life of a cartridge or canister is expended. Under the revised respiratory protection standard (29 CFR 1910.134) OSHA requires employers to develop and implement a change schedule for cartridges or canisters based on objective information or data when an end of service life indicator (ESLI) is not available.

In order to comply with the above OSHA requirement, this written program has been established by Parsons for work at the sitet. All Parsons and subcontract personnel are required to comply with this program. A copy of this program will be maintained at the site trailer for inspection by employees

Chemical Hazards

The first step in developing a change out schedule is to determine the chemicals that may be present at this site. The site-specific Work Plan for this site should contain a list of potential contaminants that may have been used. Mustard and lewisite are potentially the most hazardous substances that could be encountered at CWM sites. Other industrial chemicals associated with decontaminants may also be present along with any fuels used.

Respirator and Cartridge Selection

The full face air purifying respirator that has been selected for work at this site is the 3M model # FR-M40B gas mask with a 3M model FR-15-CBRN canister. Both mask and canister are NIOSH CBNR approved. This respirator will be used when:

1) Suspected RCWM has been encountered during modified level D operations. Under this situation workers in the exclusion will don their APR and exit the exclusion zone.
2) Organic vapors are detected at concentrations between 10-100 ppm and RCWM is not present.

Change-Out Schedule

The useful service life of the model FR-15-CBRN canister is dependent upon the breathing rate of the wearer (a function of the task being performed), the volatility and concentration of the contaminant, and environmental conditions such as temperature and humidity. The CBRN certification process involves the testing of cartridges and canisters by NIOSH against a challenge concentration of 50mg/m^3 of HD vapor, 210mg/m^3 of Sarin (GB) vapor, and 0.43mls of liquid HD. Tests are performed at 25ºC; 25 and 80 percent relative humidity; and a flow rate of 64L/min. The results of the test for the 3M FR-M40B mask with the FR-15-CBRN canister indicate that this assembly has a minimum service life of 8 hours against 50mg/m^3 distilled sulfur mustard or 210mg/m^3 Sarin. The mask also has a service life of at least 2 hours when exposed to 0.43 mls of HD liquid. It is important to note that NIOSH has only approved this respirator/ canister assembly for a 15 minute duration in an agent environment. Therefore, the mask may only be used for escape purposes when agent is detected. Both the respirator and canister must be disposed of after exposure to agent. Also note that any canister out of its original factory packaging and exposed to environmental conditions (ie humidity) must be changed every 30 calendar days irrespective of use (ie worker performing modified level D operations must change canisters every 30 days).

In instances where down field personnel use a level C ensemble to protect against elevated organic vapor concentrations (fuel, benzene, and carbon tetrachloride), change-out of the FR-15-CBRN cartridge will be performed daily. The daily change-out schedule is protective for workers[1] and complies with the cartridge replacement schedule required under the OSHA benzene standard (29 CFR 1910.1028[g][2]).

It is important that workers thoroughly decontaminate their respirators after every use. Procedure for the proper storage, maintenance, and cleaning of respirators can be found in Section 13.

Responsibilities

The Project Safety and Health Officer is responsible for the following:

- Verifying that team members conducting the field investigation have received training in the selection and use of respirators;
- Determining the degree of respiratory protection required for each field task or operation;
- Ensuring site-specific training is performed prior to on-site activities; and
- Ensuring records of respirator use are maintained.

The Site Safety and Health Officer is responsible for ensuring the following:

- Maintaining a record of respirator use;
- Verifying that respirators are inspected, maintained, and cleaned properly;
- Verifying that canister are changed out in accordance with SOP
- Maintaining copies of fit test and medical records;
- Performing fit-testing as needed;
- Distribution of respirators to field team member.

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[1] The assumptions of: 32ºC ambient temperature , RH>65%, organic vapor concentration of 100ppm [50ppm carbon tetrachloride & 50ppm benzene], and medium work activity by down field personnel were input into the 3M service life software to calculate change schedule)

All project team members are responsible for the following:

- Reading and conforming to the APP;
- Presenting a copy of their fit test results to the SSHO prior to receipt of a respirator;
- Inspecting and cleaning of their assigned respirator before and after each use;
- Storing respirators in a convenient, clean and sanitary location when not in use;
- Reporting any perceived problems or difficulties with respiratory equipment to the SSHO; and
- Changing cartridges in accordance with this SOP.

ATTACHMENT 3
LIMITATIONS ON CBRN RESPIRATORS

M E M O R A N D U M

February 24, 2006

To: Distribution

From: Edward Grunwald

Subject: Limitations of use for CBRN approved APRs and SCBAs

The purpose of this memo is to outline the uses and limitations of CBRN certified respirators.

Air Purifying Respirator

The full face air purifying respirator that has been selected for work at this site is the 3M model # FR-M40B gas mask with a 3M model FR-15-CBRN canister. Both mask and canister are NIOSH CBNR approved. This respirator can only be used when:

- Suspected RCWM has been encountered during modified level D operations. Under this situation workers in the exclusion will don their APR and exit the exclusion zone.
- Organic vapors are detected at concentrations between 10-100ppm and RCWM is not present.

In instances where the MINICAM detects agent above the action level of 0.4x STEL, the down field team must immediately don their APR and proceed through the PDS. If agent is confirmed, the mask and canister are to be disposed of as 3X scrap. In the absence of agent confirmation the mask and canister may continue to be used. Workers performing modified level D operations must change canisters every 30 days irrespective of respirator use (i.e. once a canister is removed from original packaging and exposed to the environment its useful life is 30 days). Canisters not exposed to agent maybe disposed of as normal waste.

In instances where down field personnel use a level C ensemble to protect against elevated organic vapors (fuel, benzene, and carbon tetrachloride), change-out of the FR-15-CBRN canister must be performed daily. The daily change-out schedule is protective for workers[2] and complies with the cartridge replacement schedule required under the

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[2] The assumptions of: 32ºC ambient temperature , RH>65%, organic vapor concentration of 100ppm [50ppm carbon tetrachloride & 50ppm benzene], and medium work activity by down field personnel were input into the 3M service life software to calculate change schedule)

OSHA benzene standard (29 CFR 1910.1028[g][2]). Spent canisters used for protection from organic vapors can be disposed of with normal waste.

.Self Contained Breathing Apparatus (SCBA)

CBRN certified Interspiro SCBAs could potentially be used during intrusive operations at the site when :

- Suspect RCWM has been encountered,
- When industrial chemicals are detected above criteria for level C (10-100ppm organic vapors) , or
- Air monitoring indicates detection equal to or above 1X STEL for H/HD/HT or L

In situation where the Interspiro SCBA is used to protect against agent, the following conditions must be met

- The respirator cannot be used beyond **6** hours after initial exposure to chemical agent (ie. several entries can be made during that day up to 6hrs)
- If contaminated with liquid agent, the SCBA must be disposed of immediately after decontamination

SCBAs that have been contaminated with liquid agent should be disposed as 3X scrap. If the SCBA is used to protect against exposure to industrial chemicals (above the level C action level 100-1000ppm organic vapor [no agent present]), the SCBA maybe used repeatedly.

Workers assigned to tasks that may involve the use of respiratory protection must be familiar with the requirements of this memo, The Respiratory Protection SOP, and the Cartridge Change-out Procedure. If you have any questions do not hesitate to contact me (678-969-2394).

STANDARD OPERATING PROCEDURE
NUMBER 16

SEVERE WEATHER OPERATIONS

SOP - 16 SEVERE WEATHER OPERATIONS

16.1 PURPOSE

The purpose of this procedure is to provide the minimum requirements and site personnel actions in the event of site evacuation, as a result of severe weather at any Parsons Field operation.

16.2 SCOPE

This SOP applies to all site personnel involved in field operations regardless of affiliation. This SOP is not intended to contain all of the requirements needed to ensure complete compliance, and should be used in conjunction with project plans and applicable Federal, state and local regulations. Consult the documents listed in Section 16.3 of this SOP for additional compliance issues.

16.3 REFERENCES

Applicable sections and paragraphs in the documents listed below will be used as references for the conduct of Severe Weather operations:

- Parsons Corporate Safety and Health Program;
- EM 385-1-97, Explosives Safety and Health Requirements Manual;
- EM 1110-1-4009, Ordnance and Explosive Response; and
- EM 385-1-1, USACE, Safety and Health Requirements Manual

16.4 RESPONSIBILITIES

16.4.1 Site Safety and Health Officer (SSHO)

16.4.1.1 Upon notification that a severe weather situation exists, the SSHO will notify site personnel, by radio, cellular phone or sound a horn for 3 five-second blasts. If operations, that might put site personnel at risk, are on going at the time, either the SSHO or USACE Ordnance and Explosives Safety Specialist (OESS) will cease all operations and have all teams/crews evacuate to either the site office or the closest “Safe Haven.”

16.4.1.2 The SSHO will direct site personnel as to the nature of severe weather and to ready site vehicles for evacuation. During this type of emergency, site personnel should not be concerned with assigned vehicles. Time permitting, a select number of site personnel will attempt to safely secure mission essential equipment (e.g. Geophysical GPS/Radio Relay Systems, RTK GPS Systems, computers, etc.) and prepare to evacuate the area to the recommended “Safe Haven.” The SSHO will maintain radio communications with all site personnel, necessary support elements and record the events in the site Safety Log.

16.4.1.3 Upon arrival at the "Safe Haven," the SSHO will conduct a head count of all site personnel and Site Visitors, using that day's Daily Safety Brief Sign-In Roster and Site Visitors Log.

16.4.2 Individual/Personnel initially reporting Severe Weather

The individual or personnel initially spotting a severe weather situation (lightning, tornado) will immediately report it to either the SSHO or the OESS by the quickest means possible.

16.4.3 Site Personnel

Upon the notification to evacuate the work site for the designated Rally Point, site personnel will do so in an orderly manner. Vehicle operators will not exceed the posted or site enforced speed limit, unless directed by the OESS; however that speed will not exceed the conditions of the roadway.

16.4.4 USACE Ordnance and Explosives Safety Specialist

Severe weather occurring before normal working hours, the OESS will decide whether a work delay is required and notify the SSHO. The SSHO will begin a site recall procedure with all site section supervisors, who will in turn notify their personnel.

16.5 GENERAL INFORMATION

16.5.1 The majority of Parsons field operations are conducted at either heavily wooded sites, or sites that consist of large rolling and sloping pastures and grasslands, consisting of clay or loose sand, and some even contain large areas of ravines and drop-offs. As a result of this, even small amounts of rain could cause vehicle entry/exit problems and personnel slipping hazards that may result in damage or injury to site personnel and equipment.

16.5.2 Almost all of the areas are susceptible to severe thunderstorms, with heavy downpours of rain, lightning, hail, strong microburst winds, flash floods and tornadoes. These storms are known to manifest themselves very quickly and leave very little time to react. In the event of severe weather in the area, the SSHO maintains a portable Severe Weather Alert radio and the Site Manager will have access to the National Weather Advisory system, via the internet or by phone.

16.5.1 Thunderstorms

16.5.1.1 Thunderstorms affect relatively small areas when compared with hurricanes and winter storms. Despite their small size, ALL thunderstorms are dangerous. The typical thunderstorm is 1.5 miles in diameter and lasts an average of 30 minutes. In order for a thunderstorm to form it needs three things; Moisture – to form clouds and rain; Unstable Air – warm air that can rise rapidly; and Lift – cold or warm fronts, sea breezes, mountains, or the sun's heat are capable of lifting air to help form thunderstorms.

16.5.1.2 The life cycle of a thunderstorm constitutes three distinct stages, which are detailed below:

- Developing Stage – Towering cumulus cloud indicates rising air; little if any rain during this stage; and occasional lightning.
- Mature Stage – Most likely time for hail, heavy rain, frequent lightning, strong winds, and tornadoes; storm occasionally has a black or dark green appearance; and lasts an average of 10 – 20 minutes but may last much longer in some cases.
- Dissipating Stage – Rainfall decreases in intensity; can still produce a burst of strong winds; and lightning remains a danger.

16.5.1.3 **How Far Away is the Thunderstorm?**

- Count the number of seconds between a flash of lightning and the next clap of thunder.
- Divide the number of seconds by five (5) to determine the distance to the lightning in miles.

16.5.2 Lightning

16.5.2.1 Lightning poses the greatest potential threat to site personnel and site operations, due to its unpredictable nature. Lightning results from the buildup and discharge of electrical energy between positively and negatively charged areas. Rising and descending air within a thunderstorm separates these positive and negative charges. Water and ice particles also effect distribution.

16.5.2.2 A cloud-to-ground lightning strike begins as an invisible channel of electrically charged air moving from the cloud toward the ground. When one channel nears an object on the ground, a powerful surge of electricity from the ground moves upward to the clouds and produces the visible lightning strike.

16.5.2.3 In accordance with current USACE policies, all operations cease when lightning is observed and the “Flash to Bang Time” is 30 seconds or less (approx 6 miles from site). The safe evacuation of personnel is paramount and equipment is secondary.

16.5.2.4 Those site personnel in and around the site office will seek shelter inside the building. Site personnel working out in the field will seek shelter inside a site vehicle with the windows rolled up and the doors closed.

16.5.2.5 Site personnel that are using any electronic equipment with an antenna (i.e. RTK system, G-858 or EM-61, etc.) will cease all operations and seek shelter upon visually seeing lightning at any distance.

16.5.2.6 **30/30 Lightning Safety Rule**

- Go indoors or seek shelter if, after seeing lightning, you cannot count to 30 before hearing thunder.
- Stay indoors or under shelter for 30 minutes after hearing the last clap of thunder.

16.5.2.7 **Lightning Safety Rules**

- Move to a sturdy building or car. Do not take shelter in small sheds, under isolated trees, or in convertible automobiles. Stay away from tall objects such as towers, fences, telephone poles, and power lines.
- If lightning is occurring and a sturdy shelter is not available, get inside a hard top automobile and keep the windows up. Avoid touching any metal.
- Utility lines and metal pipes can conduct electricity. Unplug appliances, office machines etc. not necessary for obtaining weather information. Avoid using the telephone or any electrical item. Use phones ONLY in an emergency.

16.5.2.8 **If Caught Outdoors and No Shelter is Available**

- Find a low spot away from trees, fences, and poles. Make sure the place you pick is not subject to flooding.
- If you are in the woods, take shelter under the shorter trees.
- If you feel your skin tingle or your hair stand on end, squat low to the ground on the balls of your feet. Place your hands over your ears and your head between your legs. Make yourself the smallest target possible and minimize your contact with the ground. DO NOT lay down.

16.5.3 Tornadoes

16.5.3.1 Tornadoes produce extreme high destructive winds and devastation. Tornadoes are generally produced along the leading edges of thunderstorms that form, with little or no warning. Before thunderstorms develop, a change in wind direction and an increase in wind speed with increasing height create an invisible, horizontal spinning effect in the lower atmosphere. Rising air within the thunderstorm updraft tilts the rotating air from horizontal to vertical. An area of rotation, 2 to 6 miles wide, now extends through much of the storm. Most tornadoes form within this area of strong rotation.

16.5.3.2 Most project sites do not afford adequate tornado “Safe Havens,” or adequate “Safe Havens” are so far away that they afford little or no help to those site personnel working in remote site locations.

16.5.3.3 The SSHO and Site Manager will attempt to locate those “Safe Havens” and brief site personnel of their locations, during the Daily Tailgate Safety Briefing.

16.5.3.4 **When and Where Tornadoes Occur**

- Tornadoes can occur any time of the year.
- Tornadoes have occurred in every state, but they are most frequent east of the Rocky Mountains during the spring and summer months.
- In the southern states, peak tornado occurrence is March – May, while peak months in the northern states are during the late spring and summer.
- Tornadoes are most likely to occur between 3 and 9 p.m., but can occur anytime.
- The average tornado moves from southwest to northeast.
- Tornadoes can accompany tropical storms and hurricanes as they move onto land.

16.5.3.5 **Tornado Safety Rules**

- In a building, move to a pre-designated shelter, such as a basement.
- If a below ground shelter is not available, move to a small interior room or hallway on the lowest floor and get under a sturdy piece of furniture. Put as many walls as possible between you and the outside.
- Stay away from windows.
- Get out of automobiles.
- Do not try to outrun a tornado in your car; instead, leave it immediately for safe shelter.
- If caught outside or in a vehicle, lie flat in a nearby ditch or depression and cover your head with your hands.
- Be aware of flying debris. Flying debris from tornadoes causes most fatalities and injuries.
- Office trailers, even if tied down, offer little protection from tornadoes. You should leave an office trailer and go to the lowest floor of a sturdy nearby building, or follow the procedures detailed in the 6th bullet above.

16.5.4 Flash Floods/Floods

16.5.4.1 Due to the massive amounts of rain that can be dropped from thunderstorms, the site may be susceptible to flash floods. Some of the existing roads may be unimproved dirt and are easily turned into mud, creating an unsafe driving environment. Those roadways that are paved also place the vehicle in low-lying areas that may be washed out. Do not attempt to cross any roadway that has become submerged by water.

16.5.4.2 **Flash Flood/Flood Safety Rules**

- If you are in a low lying area, at the first sign of rain evacuate to high ground.

- Designate an evacuation route in the event of flooding.
- Avoid walking or driving in flood waters.
- Stay away from high water, storm drains, ditches, ravines, or culverts. If the water is moving swiftly, even water only six (6) inches deep can knock you off your feet.
- If you come upon flood waters, stop, turn around, and go another way.

16.5.5 Straight-line/High Winds

16.5.5.1 When this is associated with a passing front generating potential severe weather, the winds can increase in speed rather rapidly. Dust and debris pose an eye hazard. High winds can rip vehicle doors and rear hatches from site personnel's grasp causing damage and injury. Site personnel in the field should select an area or park the vehicle in such a matter that provides a windbreak. If this can not be accomplished, open doors and hatches with care. Vehicles should not be left with doors, hoods or hatches open.

16.5.5.2 Straight-line/High Winds Safety Rules

- In a building, move to a pre-designated shelter, such as a basement.
- If a below ground shelter is not available, move to a small interior room or hallway on the lowest floor and get under a sturdy piece of furniture. Put as many walls as possible between you and the outside.
- Stay away from windows.
- If caught outside, lie flat in a nearby ditch or depression and cover your head with your hands.
- Be aware of flying debris. Flying debris from tornadoes causes most fatalities and injuries.
- Office trailers, even if tied down, offer little protection from straight-line/high winds. You should leave an office trailer and go to the lowest floor of a sturdy nearby building, or follow the procedures detailed in the 4th bullet above.
- Move to a sturdy building or car. Do not take shelter in small sheds, under isolated trees, or in convertible automobiles.
- If high winds are occurring and a sturdy shelter is not available, get inside a hard top automobile and keep the windows up.

16.5.6 Hail

16.5.6.1 Hail can occur in conjunction with a thunderstorm and can cause damage to equipment and injuries to personnel. Hail occurs when strong rising currents of air within a storm, called updrafts, carry water droplets to a height where freezing occurs. These water droplets become frozen and the ice particles grow in size, becoming too heavy to be supported by the updraft, and fall to the ground. Speeds of the falling ice particles, hail, can exceed 100 miles an hour, with size exceeding that of a softball.

16.5.6.2 **Hail safety Rules**

- Seek shelter, preferably in a building, or hard-top automobile.
- If in the open seek shelter in a culvert if there is no flooding under a rock outcrop or under trees if there is no lightning associated with the hail storm.
- Exercise caution when driving on hail, it is very slippery, so avoid it if at all possible.
- If driving when a hail storm starts pull under an overpass if possible, if not pull well off the road with your lights on in order that advancing motorists can see you.

STANDARD OPERATING PROCEDURE
NUMBER 19

SECURITY OFFICER OPERATIONS

SOP 19 - SECURITY OFFICER OPERATIONS

19.1 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum procedures and safety and health requirements applicable to subcontracted Security Officer Operations.

19.2 SCOPE

This SOP applies to all contracted and subcontracted Security Officer personnel involved in the conduct of their assigned duties at Parsons sites. This SOP is not intended to contain all of the requirements needed to ensure complete compliance, and should be used in conjunction with project plans and applicable Federal, state and local regulations. Consult the documents listed in Section 19.3 of this SOP for additional compliance issues.

19.3 REGULATORY REFERENCES

Applicable sections and paragraphs in the documents listed below will be used as references for the conduct of site operations:

- Army Regulation 190-11;
- Army Regulation 190-13;
- Local and State Regulations;
- Parsons Corporate Safety and Health Program;
- USACE EM 385-1-1, Safety and Health Requirements Manual; and
- Approved Project Work Plans.

19.4 RESPONSIBILITIES

19.4.1 Project Manager - The Project Manager (PM) shall be responsible for ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated in plans, procedures, and training for sites where this SOP is to be implemented.

19.4.2 Site Manager - The Site Manager (SM) will be responsible for assuring that adequate safety measures are completed in an efficient and economical manner. The SM or his designee will conduct daily briefings to all on-coming and off-going Security Officers pertaining to daily security requirements or security changes to this SOP.

19.4.3 Site Safety and Health Officer - The Site Safety and Health Officer (SSHO) for this site is responsible for ensuring that all operations are being conducted in a safe and compliant manner. The SSHO will conduct all project required Safety Training to all Security Officers and coordinate these actions with the Security Officer Supervisor, as to not detract from the duties of the SSHO. The SSHO will ensure that the Security Officers are provided any site specific safety equipment needed to perform their duties. The SSHO will also update the Security Officer Notification/Recall Roster with current project information.

19.4.4 Security Officer Supervisor - The Security Officer Supervisor will be trained and qualified to perform their duties and ensure that the Security Officer personnel are also qualified. The Supervisor will:

- Manage all the necessary maintenance on the project or company provided equipment;
- Ensure that security personnel are completing all required reports and log entries in accordance with the security company's integral policies and this SOP;
- Notify the SM or SSHO of any newly arrived Security Officer personnel;
- Coordinate scheduling of the new personnel project training, prior to their arrival on the site; and
- Ensure that all newly assigned personnel have reviewed and signed the "Instructions for the Security Force" prior to assuming any duties.

19.4.5 Security Officer Personnel - Security Officer personnel will comply with their company's internal policies as well as the policies and guidance listed in this SOP. Security Officers will – at a minimum – complete the following during their shift (see attachment: *Instructions for the Security Force*). On duty Security Officers will:

- Keep a concise log of all activities that occur during their shift;
- Provide an adequate briefing to their replacements and finally to the Site Manager at the end of that day's shift;
- Aarrive on site prepared for assumption of duties, as requested by the Site Manager or as directed by their Security Officer Supervisor;
- Rreview the Security Guard Book, to ensure that any changes to security protocols are in place and enforced; and
- Notify the appropriate personnel of any violation, incident or accident concerning this site or any project equipment immediately.

If someone is inquiring as to what activities are going on at this site give the person a US Army Corp of Engineers Corp Fact sheet which pertains to this site. Any questions they may have after reviewing the fact sheet should be directed to the USACE.

19.5 TRAINING REQUIREMENTS

All site personnel – including contractors and subcontractors – must attend a Site Hazardous Communication Brief before they can work onsite. The SSHO will provide a copy of the brief to the Security Officer Supervisor, who will assist in the training of any Security Officer personnel performing a single shift replacement. Any new Security personnel identified as part of the permanent force will also attend the training provided by the SSHO. These briefings will be scheduled as not to detract from their duties to the project.

ATTACHMENT 1
INSTRUCTIONS FOR THE SECURITY FORCE

Attachment 1

Instructions for the Security Force

Security officers will visually check the site at least once every four hours.

When there is more than one officer required, both officers will make radio communication on a periodic basis between posts.

In the event an intruder is detected, the security officers will take appropriate action to stop the intruder and maintain the security of the site. If necessary, the officer will call for appropriate additional support from the local Police Department. Response times would be in accordance with standard police protocols (e.g. 5 to 10 minutes).

If anything unusual is detected, the officer should attempt to contact the individuals listed below, in order. If voicemail is reached, the officer should leave a message and continue down the list until an individual on the list is contacted.

- (USACE Ordnance and Explosive Safety Specialist) at (To be Updated Prior to Work Start)
- (Parsons Site Manager) at (To be Updated Prior to Work Start)
- (Parsons SSHO) at (To be Updated Prior to Work Start)
- (Parsons UXOQCS) at (To be Updated Prior to Work Start)

Questions concerning these instructions should be directed to the Parsons Site Manager. All safety incidents and near misses will be reported to the Parsons Site Safety and Health Officer.

I have read and understand the above instructions.

Signature ________________________________ Date ___________

Name (Printed) ______________________________

STANDARD OPERATING PROCEDURE
NUMBER 20

SOIL SAMPLING

SOP 20 - SOIL SAMPLING

20.1 PURPOSE

The purpose of these procedures is to describe the requirements needed to collect required soil samples.

20.2 PPE

The PPE Level will be determined based on the requirements set forth in the approved Site Safety and Health Plan. At a minimum the following PPE are required while sampling:

- Inner gloves: For use during any field activity which requires that personnel come into contact with soil or water;
- Outer gloves – such as nitrile or neoprene (optional): For use during any field activity which requires that personnel come into contact with contaminated soil and water;
- Safety glasses: For use during all sampling activities involving drilling; and
- A hard hat if the sampling activity includes drilling.

20.3 EQUIPMENT NEEDED FOR SAMPLING:

- Plastic sheeting
- Stainless steel or plastic trowels or equivalent, and stainless steel or plastic bowls or equivilent
- Sample jars
- Bubble wrap
- Plastic baggies
- Watch or some way to tell time accurately
- Chain of custody (COC) forms

20.4 PERSONNEL

20.4.1. One member of the down range team generally conducts the sampling. A second person bags the samples and verifies that procedures are followed.

20.4.2. The Sampling Coordinator is responsible for preparing sample kits, for packaging samples, and for coordinating the transfer of samples for headspacing, if applicable, and for laboratory analysis. The Sampling Coordinator will also provide a summary of each day's sampling efforts to the Site Manager for the Daily Quality Control Report.

20.4.3. The Project Chemist conducts the following:

- Reviews the DQCRs and copies of the COCs.
- Coordinates with the labs regarding the timing of sample shipments and turnaround times.
- Reviews the results of laboratory analyses.

- Any other responsibilities required by the approved Sampling and Analysis Plan (SAP).

20.5 PURPOSE OF SAMPLING METHODS

20.5.1 Composite Sampling

20.5.1.1. Composite samples, regardless of the media, consist of two or more subsamples taken from a specific media and site at a specific point in time. The subsamples are collected and mixed. A single average sample is taken from the mixture.

20.5.1.2. Composite samples are useful in estimating the overall contamination properties of a specific location. They are less expensive than non-composite samples because one sample represents many locations. Composite samples do not provide detailed information of contamination variability as a function of the location.

20.5.2 Grab/Swipe Sampling

Grab/swipe samples are useful in pinpointing a specific location that may contain contamination, based on location (such as inside a drum), or stained or discolored soils. There are no subsamples collected, or mixing in grab samples. The sample is solely comprised of soil or residue from a single location. Also, all samples to be analyzed for VOC or TCLP-VOC will be collected with this technique.

20.6 PROCEDURES

Soil sampling procedures are provided for soil piles, excavations, disposal containers, and soil borings. Separate procedures are provided for composite samples and for grab samples.

20.6.1 Soil Pile Composite Sampling

The following steps must be followed when compositing soil samples from the soil piles already on site.

1. Spread new plastic sheeting on the ground or table at each sampling location to keep sampling equipment clean and prevent cross-contamination.
2. Obtain sample from the soil pile using a dedicated stainless steel trowel or equivalent to scoop the soil from the sample location(s).
3. Transfer the sample from the trowel to a stainless steel bowl for mixing. Homogenize the sample using the cut and quartering technique as follows:
    - i. Mix the sample thoroughly in a stainless steel bowl using the trowel, and divide into quarters.
    - ii. Gather a portion of the soil from two of the quartered sections. This process will be repeated until the amount of soil needed to completely fill the sample containers has been obtained.
    - iii. Confirm that the soil samples are mixed as thoroughly as possible to ensure they are representative of the area of interest.

4. Collect suitable quantities with a stainless steel trowel or equivalent, and transfer into an appropriate sample bottle as listed in SAP. Containers for explosives analysis will be filled before those for metals to allow for sample collection in order of decreasing volatility.
5. Repeat these steps as necessary to obtain sufficient sample volume.
6. Secure the cap tightly.
7. Samples taken for CA will be double-bagged, while other samples do not need to be placed in plastic bags.
8. Place filled sample containers on ice immediately once they have been processed through the PDS.
9. Once the samples have been collected, dispose of any remaining soil in the appropriate container, or soil pile.
10. Decontaminate sampling equipment following decontamination procedures stated in the Work Plan.

20.6.2 Soil Pile Grab Sampling

1. Volatile organic compounds (VOCs) samples of solids (e.g., soils, sludge) must be collected and contained immediately as stand-alone samples and, therefore, <u>cannot</u> be composited.
2. In the immediate vicinity of the sample location for the soil pile composite sample, soils collected for VOCs will be taken directly from the soil pile, and by-pass the composite mixing stage.
3. Spread new plastic sheeting on the ground or table at each sampling location to keep sampling equipment clean and prevent cross-contamination.
4. Obtain sample using a dedicated stainless steel trowel or equivalent to scoop the soil from the sample location. If sample is taken from the excavation bucket, the sides of the bucket will be avoided.
5. Collect suitable quantities with a stainless steel trowel or equivalent, and transfer directly into the sample container. Completely fill the sample container.
6. Repeat these steps as necessary to obtain sufficient sample volume.
7. Secure the cap tightly.
8. Place filled sample containers on ice as soon as possible.
9. Decontaminate sampling equipment following decontamination procedures as stated in the Work Plan.

20.6.3 Excavation Composite Sampling

The following steps must be followed when compositing soil samples from an excavation site:

1. Spread new plastic sheeting on the ground or table at each sampling location to keep sampling equipment decontaminated and prevent cross-contamination.
2. Obtain sample using a dedicated stainless steel trowel or equivalent to scoop the soil from the sample location. If sample is taken from the excavation bucket, the sides of the bucket will be avoided.
3. Transfer the sample from the trowel to a stainless steel bowl for mixing. Homogenize the sample using the cut and quartering technique as follows:

   a. Mix the sample thoroughly in a stainless steel bowl using the trowel, and divide into quarters.
   b. Gather a portion of the soil from two of the quartered sections. This process will be repeated until the amount of soil needed to completely fill the sample containers has been obtained.
   c. Confirm that the soil samples are mixed as thoroughly as possible to ensure they are representative of the area of interest.
4. Collect suitable quantities with a stainless steel trowel or equivalent, and transfer directly into the sample container. Completely fill the sample container. Containers for explosives analysis will be filled before those for metals to allow for sample collection in order of decreasing volatility.
5. Repeat these steps as necessary to obtain sufficient sample volume.
6. Secure the cap tightly.
7. Samples taken for CA will be double-bagged, while other samples do not need to be placed in plastic bags.
8. Place filled sample containers on ice immediately once the sample is processed through the PDS.
9. Once the samples have been collected, dispose of any remaining soil in the appropriate container.
10. Decontaminate sampling equipment following decontamination procedures as stated in the Work Plan.

20.6.4 Excavation Grab Sampling

1. Volatile organic compounds (VOCs) samples of solids (e.g., soils, sludge) must be collected and contained immediately as stand-alone samples and, therefore, cannot be composited.
2. In the immediate vicinity of the sample location for the excavation composite sample, soils collected for VOCs will be taken directly from the soil pile, and by-pass the composite mixing stage.
3. Spread new plastic sheeting on the ground or table at each sampling location to keep sampling equipment decontaminated and prevent cross-contamination.
4. Obtain sample using a dedicated stainless steel trowel or equivalent to scoop the soil from the sample location. If sample is taken from the excavation bucket, the sides of the bucket will be avoided.
5. Collect suitable quantities with a stainless steel trowel or equivalent, and transfer directly into the sample container. Completely fill the sample container.
6. Repeat these steps as necessary to obtain sufficient sample volume.
7. Secure the cap tightly.
8. Place filled sample containers on ice immediately once the sample has processed through the PDS.
9. Decontaminate sampling equipment following decontamination procedures as stated in the Work Plan.

20.6.5 Disposal Container Composite Sampling

The following steps must be followed when compositing soil samples from a drum or roll-off container:

1. Spread new plastic sheeting on the ground or table at each sampling location to keep sampling equipment clean and prevent cross-contamination.
2. Obtain sample using a dedicated stainless steel trowel or equivalent to scoop the soil from the container. The sample must represent the entire contents of the container as well as possible.
3. Transfer the sample from the trowel to a stainless steel bowl for mixing. Homogenize the sample using the cut and quartering technique as follows:
    a. Mix the sample thoroughly in a stainless steel bowl using the trowel, and divide into quarters.
    b. Gather a portion of the soil from two of the quartered sections. This process will be repeated until the amount of soil needed to completely fill the sample containers has been obtained.
    c. Confirm that the soil samples are mixed as thoroughly as possible to ensure they are representative of the area of interest.
4. Collect suitable quantities with a stainless steel trowel or equivalent, and transfer directly into the sample container. Completely fill the sample container. Containers for explosives analysis will be filled before those for metals to allow for sample collection in order of decreasing volatility.
5. Repeat these steps as necessary to obtain sufficient sample volume.
6. Secure the cap tightly.
7. Samples taken for CA will be double-bagged, while other samples do not need to be placed in plastic bags.
8. Place filled sample containers on ice immediately once the sample is processed through the PDS.
9. Once the samples have been collected, dispose of any remaining soil in the appropriate container.
10. Decontaminate sampling equipment following decontamination procedures as stated in the Work Plan.

20.6.6 Disposal Container Grab Sampling

1. Volatile organic compounds (VOCs) samples of solids (e.g., soils, sludge) must be collected and contained immediately as stand-alone samples and, therefore, <u>cannot</u> be composited.
2. In the immediate vicinity of the sample location for the excavation composite sample, soils collected for VOCs will be taken directly from the drum or roll-off container (or the excavator bucket filling the roll-off container).
3. Spread new plastic sheeting on the ground or table at each sampling location to keep sampling equipment decontaminated and prevent cross-contamination.
4. Obtain sample using a dedicated stainless steel trowel or equivalent to scoop the soil from the sample location. If sample is taken from the excavation bucket, the sides of the bucket will be avoided.
5. Collect suitable aliquots with a stainless steel trowel or equivalent, and transfer directly into the sample container. Completely fill the sample container.
6. Repeat these steps as necessary to obtain sufficient sample volume.
7. Secure the cap tightly.

8. Place filled sample containers on ice as soon as possible after the sample has processed through the PDS.
9. Decontaminate sampling equipment following decontamination procedures as stated in the Work Plan.

20.6.7 Soil Boring Composite Sampling

The following steps must be followed when compositing soil samples from the soil borings advanced by hand augering or Geoprobe.

1. Spread new plastic sheeting on the ground or table at each sampling location to keep sampling equipment clean and prevent cross-contamination.
2. Obtain sample using a dedicated stainless steel trowel or equivalent to scoop the soil from the soil boring or acetate liner from the Geoprobe. The soil will be taken starting at representative depth ranges as detailed in the SAP. For hand augering, once the top of the sampling depth is reached, a new auger bucket will be used.
3. Transfer the sample from the trowel to a stainless steel bowl for mixing. Homogenize the sample using the cut and quartering technique as follows:
    a. Mix the sample thoroughly in a stainless steel bowl using the trowel, and divide into quarters.
    b. Gather a portion of the soil from two of the quartered sections. This process will be repeated until the amount of soil needed to completely fill the sample containers has been obtained.
    c. Confirm that the soil samples are mixed as thoroughly as possible to ensure they are representative of the area of interest.
4. Collect suitable quantities with a stainless steel trowel or equivalent, and transfer directly into the sample container. Completely fill the sample container. Containers for explosives analysis will be filled before those for metals to allow for sample collection in order of decreasing volatility.
5. Repeat these steps as necessary to obtain sufficient sample volume.
6. Secure the cap tightly.
7. Samples taken for CA will be double-bagged, while other samples do not need to be placed in plastic bags.
8. Place filled sample containers on ice immediately once the sample has processed through the PDS.
9. Once the samples have been collected, dispose of any remaining soil in the appropriate container.
10. Decontaminate sampling equipment following decontamination procedures as stated in the Work Plan.

STANDARD OPERATING PROCEDURE
NUMBER 21

SOIL HANDLING

SOP 21 - SOIL HANDLING

21.1 INTRODUCTION

Operations for handling potentially contaminated soil must follow a basic set of rules or procedures. This SOP provides the necessary guidelines for placing potentially contaminated soil in drums, roll-offs, or other containers.

21.2 EQUIPMENT

The following equipment will be needed:

- Excavator, to move soil from excavation or soil pile.
- Skid-steer loader or forklift to move pallets and drums.
- Drum funnel.
- Hand tools, for moving soil from excavator bucket to drum, sealing drums, etc.

21.3 GENERAL REQUIREMENTS

- Drums should be staged in one of three locations based on their status:
- Clean, empty drums may be staged where convenient but not with drums that have been used.
- Drums that have been filled but have not been cleared based on headspacing or low-level analysis of samples must remain in a down range holding area
- Drums for which headspacing and low-level results of samples are available, may be moved to the Drum Staging Area to await offsite disposition.
- Drums should be placed on pallets close to the excavation and within reach of the excavator.
- Roll-off containers should be placed within reach of the excavator, or a loader can be filled by the excavator and then used to dump the soil into the roll-off.
- PPE Levels worn will be determined as described in the work plan.
- Drums should remain down range until the following criteria are met:
  1. the drum exteriors are decontaminated, if required
  2. the results of headspacing and/or sampling indicate the disposition of the drum, *i.e.* - whether the contents require decontamination, or that they may be staged for disposal.

21.4 DRUMS

The following steps will be followed when moving soil from the excavation or from a soil pile that requires drumming:

1. The day's operation of pallets and drums will be staged near the area of the excavation or soil pile to be drummed.

2. A pallet will be placed on an elevated platform (such as two 4x4 boards) and the drums placed on the pallet.

3. The drums will be pre-marked IAW the work plan so that proper tracking can be accomplished.

4. Perforated pipes with end caps will be placed within the drums for future decontaminating, if it becomes necessary.

5. A soil funnel will be placed in the first drum to be filled.

6. The excavator will extract a bucket of soil from the excavation or soil pile and hold it over the drum. The soil/drum handlers will pull the soil off of the bucket with hand tools while the operator gently shakes the soil out. If the soil has already been sifted, this step can be skipped and soil may be placed directly in the drum. The handlers will watch for anything unusual such as metal, glass, big limbs, etc. Soil samples may be collected during this process.

7. Once the drum is approximately 1/2 to 2/3 full (may vary depending on weight of soil, not to exceed weight restrictions of disposal contractor), the funnel will be moved to the next drum and the procedure repeated until the drums on the pallet are all 1/2 to 2/3 full, or the specified soil has been drummed.

8. When all the drums are filled, they will be sealed and secured to the pallet. The pallet will then be moved to the Holding Area.

9. Any soil samples collected in association with the pallet being moved to the Holding Area can be given to the loader/forklift operator who will deliver it to the PDS. The pallets with drums will be staged in the Holding Area on the east side of road in a designated area depending on disposition. The drums that require decontamination will be kept separate and will be accumulated until either room is needed or the excavation operation is completed; at that time bleach can be added to decontaminate the soil.

21.5 ROLL-OFFS

Materials from the excavation or soil pile will be placed in a roll-off container with the following considerations.

- Roll-offs will be used for wastes that will be sent to a landfill for disposal.
- The excavator will fill the roll-off directly while the handler and safety observer watch the excavation hole for unusual debris.
- Following completion of the day’s activities, the roll-off must be covered with a lid or tarp to prevent the infiltration of rainwater or other materials.
- Once the roll-off is full it will be staged for further disposition.

21.6 OTHER CONTAINERS

Other containers, such as one to five cubic yard containers, may also be used.

STANDARD OPERATING PROCEDURE
NUMBER 22

DRUM HEADSPACING

SOP 22 – DRUM HEADSPACING

22.1 INTRODUCTION

Operations for conducting headspace monitoring of potential chemical agent (CA) contaminated drums must follow a basic set of rules or procedures. This SOP provides the necessary guidelines for performing the required headspacing. These procedures will be applicable if either headspacing or low-level analyses of a composite sample from the drums are positive for CA. Note that these procedures must be used in combination with the headspacing procedures in the ECBC Air Monitoring Plan, if applicable.

22.2 EQUIPMENT

The following equipment will be needed:

- Skid-steer loader or forklift to move pallets and drums to and from the headspacing station.
- Hot box suitable for enclosing and heating drums.
- A thermometer inside the box used to monitor temperature.
- Hand tools, for opening and sealing drums, etc.
- Air monitoring equipment including MINICAMS and DAAMS.
- Workers opening and sealing the drums must be wearing Level C or higher PPE.

22.3 GENERAL REQUIREMENTS

- The drum or pallet(s) of drums will be moved to the drum headspacing station. Multiple drums may be monitored either at one time or individually.
- MINICAMS lines or DAAMS pumps will be staged for monitoring.
- The lids of the drums will be loosened with the workers standing upwind and the lids removed and placed next to the drums.
- The drums will be covered by the box and allowed to heat up.
- Once the inside of the box has reached 90 degrees Fahrenheit and has maintained that temperature or higher for at least 15 minutes, the monitoring can be conducted.
- Monitoring will be conducted within the box for at least one MINICAMS cycle or the interval required for the DAAMS by the Air Monitoring Plan.
- Once the monitoring has been conducted, the hot box can be removed and the drum lids replaced by workers in the appropriate PPE.
- The air monitoring equipment will be moved out of the way.

- Once the monitoring results are available, the soil in the drums can be decontaminated, if required, and/or staged for disposal. The exterior of the drums must be decontaminated if monitoring is positive for CA. Decontaminating all drums following monitoring is recommended.

STANDARD OPERATING PROCEDURE

NUMBER 23

DECONTAMINATION OF EXCAVATOR BUCKETS

SOP 23 - DECONTAMINATION OF EXCAVATOR BUCKETS

23.1 INTRODUCTION

Operations for decontamination of excavator buckets and other similar equipment should follow an established set of rules in order to be accomplished efficiently and safely. This SOP provides the necessary guidelines for decontaminating and verifying the decontamination of excavator buckets and similar equipment, such as hoppers that have been used to contain CA-contaminated soil and certain chemical agent contaminated media (CACM).

23.2 EQUIPMENT

The following equipment will be needed:

- Items to be decontaminated.
- Sump or containment berm to collect decontamination fluids and water.
- Brushes, scrapers, etc. that can be de-conned or disposed of.
- Hand tools, for disassembling any parts.

23.3 GENERAL REQUIREMENTS

1. Personnel conducting the decontamination shall be wearing at least Level C PPE (see SOP for Personal Protective Equipment).
2. Place the item to be decontaminated over the sump or containment berm to collect any contaminated material that might fall or be washed off the item.
3. Brush or knock off any loose material
4. Disassemble any separate pieces that may be hiding contaminated soil.
5. Wash the items (don't forget the bolts) with a 5% bleach solution.
6. Wash the items with soapy water
7. Rinse the items with clean water.
8. Allow the items to dry.
9. Once dry, place the items in a hotbox or place under plastic sheeting in the sun and monitor with the DAAMS to determine if any CA remains.
10. If the headspace monitoring, detects any CA, the items should be washed with bleach (Return to #5 above).

11. When a non-detect result (or result below the GPL) for CA is returned, the equipment may be reassembled and returned to the owner. If a clean result cannot be obtained, the equipment must be incinerated or must remain in government control.
12. The wash fluids, rinses, and containment materials should all be collected and drummed. This material should be tested in accordance with the IDW plan to determine proper disposal.

STANDARD OPERATING PROCEDURE
NUMBER 26

CRANE OPERATIONS

SOP 26 - CRANE OPERATIONS

26.1 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum procedures and safety and health requirements applicable to subcontracted Crane Operations.

26.2 SCOPE

This SOP applies to all site personnel, including contracted and subcontracted, involved in the conduct of Crane Operations at Parsons' sites. This SOP is not intended to contain all of the requirements needed to ensure complete compliance, and should be used in conjunction with project plans and applicable Federal, state and local regulations. Consult the documents listed in section 26.3 of this SOP for additional compliance issues.

26.3 REGULATORY REFERENCES

Applicable sections and paragraphs in the documents listed below will be used as references for the conduct of demolition/disposal operations:

- 29 CFR 1910.179, 1910.181, 1910.184
- 29 CFR 1926.752(d), 1926.753, 1926.550, 1926.552–1926.554
- EM 385-1-1, Safety and Health Requirements Manual - Section 15, Rigging; Section 16, Machinery and Mechanized Equipment, Section 21, Fall Protection, and Appendix I, Crane Testing Requirements.
- Parsons Corporate Health and Safety Manual- Section 26-00, Cranes, Hoists, Lifts, Section 26-01, Pre-lift Checklist, Section 26-02, and Crane Specifications, Section 26-03, Hoist Specifications.

26.4 RESPONSIBILITIES

26.4.1 Project Manager - The Project Manager (PM) shall be responsible for ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated in plans, procedures and training for sites where this SOP is to be implemented.

26.4.2 Site Manager - The Site Manager (SM) will be responsible for assuring that adequate safety measures are completed in an efficient and economical manner.

26.4.3 Site Safety and Health Officer - The Site Safety and Health Officer (SSHO) is responsible for ensuring that all operations are being conducted in a safe and compliant manner. The SSHO will verify all certifications and qualifications of the contracted operators and equipment brought on site to perform Crane Operations.

26.4.4 Crane Foreman/Supervisor - The Crane Foreman/Supervisor will be trained and qualified to perform their duties and ensure that their personnel are also qualified. The crane Forman/Supervisor will:

- Oversee all the necessary maintenance on the project or company provided equipment;

- Ensure that his personnel are completing all required reports and log entries in accordance with his company's integral policies and this SOP; and

- Provide copies of all certifications, records of inspections and qualifications of operators to the SSHO.

26.4.5 Site Personnel - Site personnel will not attempt to perform any operation or perform maintenance on any part of the Crane system, unless directed and supervised by the crane Forman/Supervisor.

26.5 CRANE OPERATIONS

Most projects do not regularly use cranes in their normal daily operations. When a crane is required, the operation is subcontracted to a company that excels in this field. Project sites requiring cranes will use the procedures outline in Section 26-00 through 26-03 of the Parsons Corporate Safety and Health Manual (CSHM). Any reference within the SOP that calls for a Qualified Operator or Qualified Person will refer to duties which will be handled by the subcontracted crane company.

STANDARD OPERATING PROCEDURE
NUMBER 31

PROCEDURE FOR MONITORING MUSTARD (HD)

SOP 31 - PROCEDURE FOR MONITORING MUSTARD

31.1 INTRODUCTION

This procedure covers the new general requirements for monitoring the workspace for releases of the chemical agent mustard including reference documents, organizational responsibilities, definitions, monitoring requirements, and required actions. This procedure applies only to mustard agent.

31.2 REQUIREMENTS

Revised airborne exposure limits (AELs) for mustard have been adopted by the U.S. Army for chemical workers and the general population and are in effect as of 1 July 2005. The revised exposure limits apply to all chemical agent operations and activities except for tactical military operations and military training.

31.2.1 References

31.2.1.1 Memorandum, Implementation Guidance Policy for New Airborne Exposure Limits for GB, GA, GD, GF, VX, H, HD, and HT, Raymond J. Fatz, Deputy Assistant Secretary of the Army (Environment, Safety and Occupational Health) OASA (I&E), dated June 15, 2004.

31.2.1.2 Implementation Guidance Policy for Revised Airborne Exposure Limits for GB, GA, GD, GF, VX, H, HD, and HT, Department of the Army, Office of the Assistant Secretary of the Army Installations and Environment, 15 June 2004.

31.2.1.3 Interim Recommendations for Airborne Exposure Limits for Chemical Warfare Agents H and HD (Sulfur Mustard). Department of Human Services, Centers for Disease Control and Prevention, *Federal Register*, Vol. 69, No. 85, Monday, May 3, 2004, p. 24164-21168.

31.2.2 Organizational Responsibilities

31.2.2.1 Edgewood Chemical Biological Center (ECBC)

The responsibilities of the U.S. Army Research, Development, and Engineering Command (RDECOM), Edgewood Chemical Biological Center (ECBC) Environmental Monitoring Laboratory include:

- Collect and retain all chemical agent related air monitoring data.
- Conduct on-site analysis and confirmation for air samples and headspace samples collected from soil, scrap, PPE and bulk items samples.

31.2.2.2 Parsons

Parsons is responsible for overall coordination of the field operations. Key personnel related to the air monitoring are the Site Manager and the SSHO.

Besides directing the overall operations, the Site Manager assists the SSHO with reporting the results of monitoring with site workers and forwards monitoring records to the appropriate organizations.

The SSHO briefs the site workers on the results of air monitoring and is responsible for changes to PPE level. The SSHO is responsible for ensuring that health education materials used in worker training programs are readily accessible to all individuals with an exposure potential to mustard agents. The SSHO must also verify that all of the required health-related training has been conducted and has been renewed annually (Section 31.7).

31.3 DEFINITIONS

31.3.1 Airborne Exposure Limits

AELs are the allowable concentrations in the air for workplace and general population exposures. AELs include worker population limits (WPLs), short term exposure limits (STELs), immediately dangerous to life or health values (IDLHs) and general population limits (GPLs).

31.3.2 Excursion

An increase in the concentration of chemical agent present in an environment above a given agent concentration reference point, e.g., the concentration goes above the WPL's 8-hour time-weighted average (TWA) concentration.

31.3.3 General Population Limit (GPL)

The GPL is the maximum concentration to which the general population may be exposed 24 hours per day, 7 days per week, for a 70-year lifetime. The GPL applies to the entire general population including all ages and medical conditions. For mustard, the GPL is 0.00002 mg/m^3.

31.3.4 Immediately Dangerous to Life or Health (IDLH)

An atmosphere that poses an immediate threat to life would cause irreversible adverse health effects or would impair an individual's ability to escape from a dangerous atmosphere, regardless of PPE use. For planning purposes, the respirator wearer shall be unaffected by the environment for up to 30 minutes without any respirator being worn. IDLH also includes atmospheres where oxygen content by volume is less than 19.5 percent. The IDLH for mustard is 0.7 mg/m^3.

31.3.5 Mustard Agent

Mustard, as used in this SOP, refers to Levinstein mustard (H), distilled mustard (HD), or mustard-agent T mixture (HT).

31.3.6 Short Term Exposure Limit (STEL)

The STEL is the maximum concentration to which unprotected chemical workers may be exposed to for up to 15 minutes continuously. The STEL for mustard is 0.003 mg/m^3.

31.3.7 Worker Population Limit (WPL)

The WPL is the maximum allowable 8-hr time-weighted average (TWA) concentration that an unmasked worker can be exposed to for an 8-hour workday and 40-hour week for 30 years without adverse effect. The WPL for mustard is 0.0004 mg/m^3.

31.4 MONITORING REQUIREMENTS

The Implementation Guidance Policy (Reference 31.2.1.2) requires that any workplace associated with, near, or surrounding activities involving the chemical agent mustard will be monitored. Monitoring is required for the Worker Population Limit (WPL) and the Short Term Exposure Limit (STEL).

31.4.1 Worker Population Limit (WPL) Monitoring

WPL monitoring will be performed for identified areas where workers may have an exposure potential to chemical agent (mustard). The monitoring may be either historical, real-time or near-real-time based on the ECBC Air Monitoring Plan for the site.

Historical monitoring is conducted using Depot Area Agent Monitoring System (DAAMS) located at the work site. Near-real-time monitoring is conducted using the Miniature Chemical Agent Monitoring System (MINICAMS).

31.4.2 Short-Term Exposure Limit (STEL) Monitoring

Areas involving operations where a release of chemical agent into the environment, at levels exceeding the STEL can reasonably be expected to occur, will be monitored. At most sites, this will be defined as areas where excavation for suspected RCWM occurs or other locations where a potential release of chemical agent might occur. The monitoring will be conducted using equipment capable of measuring the chemical agent level in real-time or near-real-time ensuring that the duration of 15 minutes associated with the STEL is not exceeded. The monitoring equipment must be set to an alarm or notification level to account for the accuracy and precision of the equipment being used. Records will be maintained of excursions above the STEL including location, time, date, and the names of potentially exposed personnel, at a minimum.

31.5 EXCEEDENCE OF AIRBORNE EXPOSURE LIMITS

31.5.1 Excursion of WPL

When monitoring, regardless of monitoring method, indicates excursions of chemical agent levels above the WPL, the following actions will be completed:

- Restrict the area until the source is identified and corrected and subsequent monitoring indicates chemical agent levels are below the WPL. Demonstration that the chemical agent levels are below the WPL will be provided by two consecutive full-shift (8-hr) monitoring events (using the DAAMS). Restrictions include administrative controls (reducing stay time), increased PPE, and engineering controls (running filtration system), at the discretion of the SSHO.

- Notice of the WPL excursion will be provided to all site workers. At the first opportunity such as the next site safety briefing, the SSHO will notify the site workers on the WPL excursion. Written notice will be posted at the site office, command post, or other convenient location using the WPL Excursion Notice form attached to this SOP. The notice must include the following information:

    - Location of the WPL excursion (e.g., anomaly ID or grid coordinates).

    - Period when the excursion occurred (e.g., between 0900 and 1300 hours).

    - Name of chemical agent detected (e.g., mustard).

    - WPL of chemical agent in mg/m^3 (e.g., 0.0004 mg/m^3 for mustard).

    - Amount of exceedence in mg/m^3.

    - Names of exposed employees (when exposure results are sent to Qualisys, the Social Security Numbers of exposed employees must be included with the monitoring results).

    - Statement of future action to limit future excursions.

- Notice must also be provided to a competent medical authority. The SSHO will send a copy of the WPL Excursion Notice to Work Care (see Emergency Contact Sheet). The information provided to Work Care must include the Social Security Numbers of the potentially exposed workers. This may be done directly or through the PSHO. The same information contained in the WPL Excursion Notice plus the contact information for the SSHO must be provided.

- WPL Excursion Response Plan. The Command Post team (including the Site Manager, SSHO, and USACE OESS) must prepare a plan to investigate, identify, and control the source of the excursion. A separate plan must be developed for each excursion. The plan must include a description of the area of the release, objectives, procedures to be followed, safety measures, and personnel to carry out the plan.

31.5.2 Excursion of STEL

When monitoring indicates excursion of airborne chemical agent in excess of the STEL, the following actions will be completed:

- Reporting of a chemical event must occur for the following circumstances:
  - Chemical agent exceeding the STEL is confirmed outside of the engineering controls designed to protect workers or the environment (VCS).
  - Unprotected personnel have been exposed to a known release of chemical agent exceeding the STEL for 15 minutes or more.
- Decontamination of personnel exposed to an environment with liquid or aerosol chemical agent or where chemical agent exceeded the STEL. Such personnel will require decontamination to below the STEL prior to release from the CRZ.
- Monitoring and, if necessary, decontamination of PPE exposed to an environment where chemical agent exceeded the STEL. Once monitoring shows PPE is below the WPL, the PPE can be reused. PPE exposed to liquid or aerosol chemical agent cannot be reused and must be disposed of.
- Medical examinations must be performed of exposed and potentially exposed workers defined as:
  - Exposed workers exhibit clinical signs or symptoms consistent with vesicant exposure
  - Potentially exposed workers are defined as individuals who were present within an exclusion zone where
    - Mustard agent levels exceed the protective capability of the PPE, or
    - Mustard agent levels exceed the STEL in the presence of unprotected workers or there is a breach in the PPE of a worker.

31.6 MONITORING PROCEDURES

31.6.1 WPL Monitoring using VCS

ECBC will conduct area monitoring to the WPL within the vapor containment structure (VCS). Monitoring is required only once excavation has broken the ground with the VCS set up at its present location. During pre- and post-operation activities, monitoring will be performed when unmasked workers are conducting activities within the VCS. Monitoring will not be required for moving and setting up the VCS prior to conducting excavation within the VCS. Once excavation has been conducted within the VCS, WPL monitoring must be conducted as long as workers are present, or until the VCS has been ventilated. Ventilation may be accomplished by opening the large door and allowing the VCS to aerate for at least 1-hour, or by operating the filtration system for the same time.

Administrative controls must be in place to record the length of stay for each unprotected worker within the VCS at times when monitoring must be conducted. The information will be recorded in the downrange operational log.

WPL monitoring must be conducted continuously during intrusive operation conducted within the VCS. Access to the worksite is restricted except for approved personnel entering and exiting through the personnel decontamination station (PDS).

31.6.2 STEL Monitoring using VCS

STEL monitoring is required while conducting intrusive operations within the VCS. Administrative controls must be in place to record the times, names, and length of stay for individuals working within the VCS. This information will be recorded in the downrange log.

First entry STEL monitoring must be conducted following extended periods of VCS standing unfiltered once excavation has been conducted within the VCS. This will be conducted in the unlikely event that a previously undetected release has occurred and concentrations of chemical agent have built up within the structure while the filters have been idle.

Monitoring will not be required when moving the VCS or setting up the VCS over an area that has not been excavated; an exception would be in the case of a known or suspected release.

31.6.3 WPL Monitoring for Open Air Operations

ECBC will conduct area monitoring to the WPL at open air worksites. Monitoring will be conducted as described in the Air Monitoring Plan. Open air monitoring for the WPL will typically involve placing a dedicated DAAMS pump at the excavation site. Additional monitoring support is typically provided by the MINICAMS; however, the MINICAMS cannot be relied upon to detect concentrations of mustard agent at the WPL.

31.6.4 STEL Monitoring Procedures for Open Air Operations

ECBC will also conduct monitoring to the STEL at open air worksites. Monitoring will be conducted as described in the Air Monitoring Plan. Open air monitoring for the STEL involves the use of the MINICAMS at the excavation site. Confirmation of MINICAMS detections is provided by a second DAAMS pump at the excavation site (separate from the DAAMS used to monitor for the WPL).

31.6.5 STEL Monitoring at Other Locations

Monitoring for the STEL is required to confirm the decontamination of personnel exposed or potentially exposed to chemical agent. Monitoring for the STEL is also used to determine whether soil samples or equipment has been contaminated. In these instances, the MINICAMS is typically used although the DAAMS can be used to monitor the headspace for samples and equipment.

31.7 TRAINING REQUIREMENTS

The following mustard agent specific training items will be included in worker hazard communication training:

- An explanation of the types of activities at the site that have a mustard agent exposure potential
- Methods used to recognize and evaluate work areas with a mustard agent exposure potential.
- An explanation of the potential acute and chronic health effects associated with mustard agent exposure and the purpose and description of the mustard agent medical surveillance program.
- Protective measures including administrative controls, engineering controls, PPE, and safe work practices.
- Emergency procedures including self-aid, buddy-aid, first aid, and decontamination.
- An explanation of mustard agent MSDS and applicable SOPs regarding the handling and disposal of materials contaminated with mustard agent.
- Emergency evacuation and notification procedures.

Site workers must have direct access to mustard agent MSDS and must be readily accessible during and emergency.

STANDARD OPERATING PROCEDURE
NUMBER 32

CORRECTIVE AND PREVENTIVE ACTION

SOP 32 - CORRECTIVE AND PREVENTIVE ACTION

32.1 PURPOSE

This Standard Operating Procedure (SOP) describes the method for conducting root cause analysis of severity level 1 nonconformities identified by Non-Compliance Report (NCR) and customer complaints, and evaluating the need for action to ensure that the nonconformities do not recur.

The procedure establishes the methodology to conduct trend analysis of nonconformities identified through NCRs for severity level 2, 3 and 4, corrective actions, quality surveillance reports and internal audit results, to identify the repetitive nonconformities and determine preventive action to eliminate the cause of potential repetitive nonconformities.

32.2 RESPONSIBILITIES

32.2.1 Project Manager (PM)

The PM will establish an operations project team to investigate the root cause of a severity level 1 nonconformance and recommend action to prevent the recurrence.

The PM is responsible to review the results of the root cause analysis and trend analysis, assign corrective and preventive actions and monitor process performance as a part of the PM’s management review.

32.2.2 Programmatic Quality Control Manager (PQCM)

The QCM will provide support to the PM’s team to effectively implement this SOP. Additionally, all root cause analysis, trend analysis and preventive action reports will be reviewed and recommendations provided if applicable.

32.2.3 QCS/UXOQCS

The QCS/UXOQCS, as applicable, will periodically conduct trend analysis of nonconformities from the sources described herein, and report the results to the PM and PQCM.

32.3 PROCEDURES

32.3.1 Root Cause Analysis

The operations project team appointed by the PM shall determine root cause of a severity level 1 nonconformance. The root cause determination will depend upon project specific factors impacting the product development, product conformity or process performance. The nonconformity may be classified using an event and causal factors (Attachment 1) following the root cause analysis. The root cause analysis shall identify corrective actions to prevent recurrence. The record of the root cause analysis and corrective action taken shall be maintained on file with the PQCM as a part of the project record.

32.3.2 Trend Analysis

The operations project team review results from the following sources and perform a trend analysis, when sufficient information and data is available to ensure that the analysis is meaningful. Typically, a trend analysis should be conducted once at least every 6 months for projects of 1 year or longer duration. For short duration projects, the trend analysis should be done at about the halfway point.

(1) Corrective Actions (severity level 1 NCRs, customer complaints).
(2) Internal and External (including customer) audit results, quality surveillance/audit reports.
(3) NCRs (severity level 2, 3 or 4).

32.3.3 Preventive Action

For the period under review, the project operations team shall determine the root cause(s) of potential repetitive nonconformities and evaluate the need for action to prevent their recurrence. The project team shall prepare a report identifying the nonconformities for each area of the project processes/procedures, a consolidated summary of root causes of the nonconformities, and a statement of trends that are developing or have developed, and submit the report to the PM. The PM shall provide appropriate actions to prevent recurrence of the adverse trends. The team and the PQCM shall verify implementation of the preventive actions and report the results to the PM. The record of trend analysis and preventive action taken shall be maintained on file by the PQCM as a part of the project record.

Attachment 1

Event and Causal Factor Codes

	EVENT		CASUAL FACTOR
CODE	DESCRIPTION	CODE	DESCRIPTION
A	Noncompliance with standards, policies, procedures, or other administrative controls	1	Incorrect or inadequate procedures
B	Human error/inattention to detail	2	Insufficient, inadequate, or lack of training
C	Failure to meet contractual requirements	3	Inadequate supervision/management skills or practices
D	Errors in design		
E	Improper receipt/storage of material	4	Inadequate staffing/resources
		5	Inadequate job skills
F	Errors in construction or installation	6	Inadequate commitment
G	Other	7	Inadequate communication
		8	Inadequate organization/program interfaces
		9	Inadequate organization structure
		10	Inadequate work planning/schedule
		11	Inadequate work conditions
		12	Other

STANDARD OPERATING PROCEDURE
NUMBER 34

CONVENTIONAL ORDNANCE

SOP 34 - CONVENTIONAL ORDNANCE

34.1 PURPOSE

This Standard Operating Procedure (SOP) provides the procedures and safety and health requirements applicable for the handling and disposal of recovered conventional MEC.

34.2 SCOPE

This SOP applies to all site personnel, including subcontractor personnel, involved in the conduct of all field activities associated with MEC location, removal and destruction. This SOP is not intended to contain all of the requirements needed to ensure complete compliance, and should be used in conjunction with project plans and applicable Federal, State, and local regulations. Consult the documents listed in Section 34.3 of this SOP for additional compliance issues.

34.3 REGULATORY REFERENCES

Applicable sections and paragraphs in the documents listed below will be used as references for the conduct of demolition/disposal operations:

- Site Specific Work Plan and SSHP;
- Parsons Corporate Safety and Health Program;
- EM 385-1-97, Explosives Safety and Health Requirements Manual;
- EP 1110-1-17, Establishing a Temporary OB/OD Site for Conventional Ordnance and Explosives Projects;
- EP 1110-1-18, Ordnance and Explosives Response;
- EM 1110-1-4009, Ordnance and Explosives Response;
- EM 385-1-1, Safety and Health Requirements Manual; and
- OE Sector Demolition SOP.

34.4 RESPONSIBILITIES

34.4.1 The Site Manager (SM) will be responsible for assuring that adequate safety measures and coordination between project staff and outside agencies are completed during Evacuation of Non-UXO Personnel and the Handling and Disposal of Recovered Conventional MEC items.

34.4.2 The Site Safety and health Officer (SSHO) is responsible for ensuring that all site activities, to include intrusive operations and handling and disposal of MEC items, are being conducted in a safe and compliant manner.

34.4.3 The Senior UXO Supervisor (SUXOS) will be responsible for assuring that adequate safety measures and housekeeping are taken during all intrusive operations, to include handling and disposal of MEC items, and shall visit demolition locations to ensure that demolition operations are carried out in a safe, clean, efficient, and economical manner.

34.4.4 The UXO Quality Control Specialist (UXOQCS) is responsible for inspecting the Daily Operational Log, the Demolition Shot Record, and the inventory of MEC and demolition material.

34.4.5 All site personnel will strictly adhere to the procedures stipulated in this SOP.

34.5 GENERAL SAFETY REQUIREMENTS

Maximum safety in any MEC operation can be achieved through adherence to applicable safety precautions, a preplanned approach, and intensive supervision. Only those personnel absolutely necessary to the operation shall be allowed in the exclusion zone (EZ) during UXO activities (DOD 6055.09-M). The following precautions must be observed in searching for, probing for, excavating, moving, and handling MEC:

- MEC, which has been exposed to fire and detonation, must be considered extremely hazardous.
- MEC shall not be destroyed until it is positively identified. Carefully examine the item for markings and other identifying features such as shape, size, and external fittings. Do not move the item to inspect it.
- Do not depress plungers; turn vanes; rotate spindles; levers; setting rings; or external fittings on any suspect UXO. These actions may arm; actuate or function the item.
- Assume that “practice” UXO contain live charges until determined otherwise.
- Do not dismantle, strip or subject any MEC to unnecessary movement.
- Do not wear outer or undergarments made of wool, silk, or synthetic textiles such as rayon and nylon while working on MEC. These materials can generate sufficient static charge to ignite fuels or initiate explosives. Any person coming in contact with a MEC item shall ground himself prior to touching it.
- Before any movement of UXO item, the fuze condition must be ascertained. If the condition is questionable, consider the fuze armed. The fuze is considered the most hazardous component of a UXO, regardless of type or condition.
- Do not allow unauthorized or unnecessary personnel to be present in the vicinity of UXO. Limit personnel exposure time. Operations shall always be based upon minimum exposure consistent with efficient operations.

34.6 MUNITION WITH THE GREATEST FRAGMENTATION DISTANCE (MGFD)

A listing of all MEC items reported to be at the site will be listed in the approved project Work Plan, along with the selected Munition(s) with the Greatest Fragmentation Distance (MGFD) and their associated minimum separation distances (MSD). In the event that there are no MEC anticipated or identified at the site, no MGFD will be established.

34.7 EVACUATION OF NON-ESSENTIAL PERSONNEL

34.7.1 Once a MEC item is discovered, the SM and USACE Ordnance and Explosives Safety Specialist (OESS) will conduct the necessary notification to all outside agencies required to affect an orderly evacuation of non-essential personnel. Once complete, the evacuation will be enforced until the item has been mitigated, transported to another location, or disposed of properly and the residents are no longer impacted.

34.7.2 In the event of a MEC item recovery that is not listed in the approved Work Plan, the item will be positively identified and the site will establish a new MFGD, based on DDESB Technical Paper 16 and/or the appropriate Fragmentation Data Sheet. If the item cannot be positively identified, as to type by function, fuzing and filler, the site will assume the item to be suspect RCWM and request OESS assistance in contacting the local U.S. Army EOD unit, IAW the approved Work Plan.

34.7.3 A suspect RCWM item that has been identified by EOD to be conventional UXO will be returned to the project for disposal. If the EOD unit cannot identify the item, a request for support from the 22d Chemical Battalion (TE) will be made by the OESS. Evacuation for non-essential personnel will be maintained until the hazard is eliminated.

34.8 INTRUSIVE ACTIVITIES

The serious problem exists with the handling and disposal of a recovered MEC item contained in toxic contaminated soils. The Downrange Team will need to be extremely aware of the potential of locating an intact MEC item while conducting soil removal and treatment procedures.

34.8.1 **Procedures**

In the event that MEC is uncovered during soil removal and treatment procedures, the Downrange Team Leader will:

- Cease operations.
- Notify the Command Post.
- Positively identify the item encountered (ordnance type, fuzing, and filler).
- If any explosive items are recovered during contaminated soil removal operation the following steps will be followed:
  - If the item is determined to be “Acceptable to Move”, then under direction of the SSHO, prepare the item for movement, by placing the item inside a double wrap of 6-mil plastic, sealed with tape and outside bag lightly wiped down with decontamination solution.
  - Transfer the item directly over to the SUXOS or UXOQCS at the Hot Line, who will place the item inside a larger 6-mil plastic bag for transport.

- Once the item has been positively identified as “Acceptable to Move” to another location for disposal, the SSHO will request permission from the OESS to be allowed to establish a Temporary Open Burn/Open Detonation Area, IAW EP 1110-1-17.
- If the item cannot be moved, the disposal area will be protected with additional safeguards to stop the spread of contamination and erected IAW HNC-ED-CS-S-98-7, and Amendment 1, Use of Sandbags for Mitigation of Fragment and Blast Effects due to Intentional Detonation of Munitions.
- The SM will notify and coordinate with the local authorities to obtain a suitable disposal area.
- The SUXOS will either draw from established on site explosives or notify the established “On-Call” explosives provider and request the adequate amounts of demolition material needed to dispose of the item(s).
- All demolition operations will be conducted IAW Parsons Demolition SOP.

STANDARD OPERATING PROCEDURE
NUMBER 37

MATERIAL POTENTIALLY PRESENTING AN EXPLOSIVE HAZARD INSPECTION, CERTIFICATION, AND FINAL DISPOSITION

SOP 37 – MPPEH INSPECTION, CERTIFICATION, AND FINAL DISPOSITION

37.1 PURPOSE

The purpose of this SOP is to standardize the procedures used in the handling, inspection, certification, and final disposition of all: “other debris” (i.e., debris unrelated to munitions or range operations), munitions debris (MD), range-related debris (RRD), and material potentially presenting an explosive hazard (MPPEH), which includes material documented as being safe (MDAS) and material documented as an explosive hazard (MDEH).

37.2 SCOPE

This SOP is applicable to all operations, which are related to the collection, processing and disposition or might involve encountering: other debris, MD, RRD, and MPPEH.

37.3 REGULATORY REFERENCES

The following references were used in total or in part to develop this SOP:

- DoD Instruction 4140.62, Material Potentially Presenting an Explosive Hazard;
- DoD Directive 4160.21-M, Defense Material Disposition Manual;
- DoD 6055.09-M, DoD Ammunition and Explosives Safety Standards;
- EM 1110-1-4009, Military Munitions Response Actions, and Errata Sheets 1-4;
- EM 385-1-97, Explosives Safety and Health Requirements Manual (including errata sheets);
- 40 CFR 261.6, RCRA Exclusion for Recyclable Scrap Metal; and

37.4 RESPONSIBILITIES

37.4.1 Project Manager

The Parsons Project Manager (PM) is responsible for ensuring that this plan is implemented as written and that all the requisite equipment and material are available to the site manager.

37.4.2 Site Manager

The site manager is responsible for the enforcement of this plan to include the requisition of lockable containers, sorting trays, and other associated equipment necessary to conduct sorting, inspection, classification, certification, and processing. In conjunction with the USACE Ordnance and Explosives Safety Specialist (OESS), he will select an appropriate location for the sorting/processing yard, ensuring the area is secure and safe from break-in, in as much as possible. In addition the SUXOS will periodically inspect the munitions debris and RRD are free of exploves hazards, and ensure that inspected debris is secured in a closed, labeled, and sealed container. In some instances, the Parsons site manager is a qualified Senior UXO Supervisor (SUXOS) and as such, will sign the DD Form 1348-1A as the “certifier”. If the site manager is not UXO-qualified, the UXO subcontractor's onsite SUXOS will sign the DD Form 1348-1A as the certifier.

37.4.3 UXO Safety Officer

The UXOSO is responsible for the safe handling and processing of all classifications of debris. He must ensure that personnel handling debris, with the exception of other debris, are qualified UXO technicians. In all cases, he checks to ensure that they are wearing the appropriate PPE while processing debris. The UXOSO will conduct periodic safety audits of the process and report the findings to the Parsons PM, Parsons Safety and Health Manager, and the senior UXO subcontractor onsite representative. He must ensure that this SOP and applicable approved work plans are being followed.

37.4.4 UXO Quality Control Specialist

The UXOQCS is responsible for the proper separation/segregation of the various types of debris. He will conduct periodic audits of the process and inspected debris to ensure that there is no reactive material mixed in with any of the various wastes. He will inspect a minimum of 10% of the processed MPPEH to ensure it has been properly classified as either MDAS or MDEH. If he encounters an item containing a reactive substance, the entire bin in which it was discovered will be re-checked, and corrective steps taken in an attempt to eliminate a recurrence. In addition, he must ensure that the DD Form 1348-1A is properly executed and must conduct daily inspections of the lockable containers. In the event that a OESS is not on site the UXOQCS may be delegated to sign.

37.4.5 UXO Technician III

The UXO Tech III must perform a 100% re-inspection of all recovered items to determine if free of explosive hazards of other dangerous fillers and engine fluids, illuminating dials and other visible liquid HTRW materials. He also supervises the demolition of of items containing explosive hazards to include venting/demil procedures. The Tech III must supervise the consolidation of MPPEH for containerization and sealing, and the segregation of MD and RRD.

37.4.6 UXO Processing Personnel

All personnel handling and processing debris, with the exception of other debris, will be UXO-qualified and adhere to the procedures included in this plan. They will wear the appropriate PPE when handling/processing debris and segregate any item containing a reactive component, therefore classified as MDEH to a pre-determined location in the sorting yard. Each item will be inspected to determine if it is MPPEH or a component thereof, contains any explosive or dangerous article, and/or requires demilitarization.

37.5 MPPEH PROCESSING

37.5.1 Initial Inspection/Processing

Upon discovery of MPPEH, the UXO technician making the discovery will inspect the item to determine its identity and associated hazards. Once he is satisfied that he has positively identified the item, he will give it one of three classifications: MDEH (hazardous); MDAS and munitions debris (non-hazardous); or RRD and other debris, which can be either hazardous or non-hazardous depending on its classification. At this point the item will be shown to the UXO Tech III, who will verify the classification. If an item cannot be positively identified it will be assumed to be MDEH. Items classified as MDEH will be handled in accordance with the approved Work Plan and SOP 34, Conventional Ordnance, and may be processed for demolition, venting, or demilitarization in accordance with the approved Work Plan and SOP 1, Demolition Operations.

37.5.2 Confirmation and Secondary Inspection/Processing

When items are loaded onto a vehicle for transport to the debris processing/storage area, the senior UXO technician present, a minimum of a UXO Tech III, will re-inspect each item as it is placed on the vehicle, maintaining segregation between the three material classification types, to ensure that no items were improperly identified or co-mingled with another material type. Those items that are either considered hazardous or undetermined will be processed for demolition, venting, or demilitarization (see above). Those items considered non-hazardous will be transported to the debris processing/storage area.

37.5.3 Segregation and Tertiary Inspection/Processing

Upon arrival at the debris processing/storage area, the items will be inspected for a third time for hazardous components and then separated by debris type: MDAS and MD in one container and RRD and other debris in another. In the event that regulated items such as: tires, batteries, asbestos, and lead paint, just to name a few, are encountered, they will be segregated by type and disposed of IAW federal and state regulations.

Items may be further separated by metal type if there is a large volume of material. The most common metal types are: steel, aluminum, copper, brass, and mixed metals. In some instances, the volume of recovered items does not support segregation; therefore, all the recovered items would be placed in the same container. If a hazardous item is encountered, it will be placed in a predetermined, secure location within the processing/storage area awaiting pickup and transport to a suitable demolition site.

37.6 DEBRIS CONTAINERIZATION

37.6.1 Type and Size of Container

As the items are being inspected for the third time, they will be placed in either segregated metal lockable containers or all-metals lockable containers. Lockable containers come in a variety of sizes and shapes from 30-gallon drums to 40 cubic foot roll-offs. Container choice is predicated on the volume and variety of metals and the handling capabilities of the site and end recipient. The only constant is the requirement to be able to lock and/or seal the container to ensure chain-of-custody from initial inspection to final disposition.

37.6.2 Locking, and/or Sealing

Regardless of the type of container selected, the container will be closed and locked and/or sealed when not in use. If the container is not capable of being locked, a seal can be used as long as it will be broken in the act of opening the container. If a lock is used, the UXOQCS will be responsible for securing the key(s) and ensuring the container(s) are properly locked and/or sealed prior to departing the site at the conclusion of the day's activities. In addition, he will inspect the container(s) each workday morning to ensure their integrity. If a seal is used either in conjunction with a lock or separately, the number on the seal, or other form of identification, of the container(s), will be recorded or checked as above. If one of the containers has been tampered with, the seal numbers don't match the log, it will be immediately reported to the site manager/SUXOS. The UXOQCS, in conjunction with the OESS, will determine whether or not it will be necessary to re-inspect the entire contents of the container(s).

37.6.3 Labeling

The container will be clearly labeled outside with a unique identification number and the following information:

- USACE district;
- Installation or site name;
- Parsons;
- Unique identification number commencing with 0001; and
- Seal identification number.

37.7 DOCUMENTATION

37.7.1 DD Form 1348-1A

All shipments of debris, other than other debris, will have a DD Form 1348-1A completed as the certification/verification document. It must clearly show the typed or printed names of the certifier (Site manager/SUXOS) and verifier (OESS), organization, signature, and the home office phone number and field office phone number, if applicable, of the individuals certifying and verifying the contents. In the event an OESS is not present then IAW Errata sheet No. 2, the verification can be delegated to the UXOQCS or a similarly trained individual. In addition, the DD Form 1348-1A must indicate the following:

- Basic material content (Brass, copper, steel etc.);
- Estimated weight;
- Unique identification of the containers;
- Location where contents was recovered; and
- Seal identification number relating to the container identification.

To be consistent with EM 1110-1-4009 Chapter 14, the following certification/verification will be entered on each 1348-1A for turn- over of munitions debris and will be signed by the Senior UXO Supervisor if only munitions debris is being processed:

"*This certifies and verifies that the material listed has been 100 percent inspected and to the best of our knowledge and belief, are inert and/or free of explosives or related materials.*"

37.7.2 Miscellaneous

Local directives may require additional documentation to be prepared. It is the responsibility of the UXOQCS to check with local authorities for these directives and respond accordingly.

37.8 CHAIN-OF-CUSTODY

Throughout the debris handling process, a chain-of-custody procedure will be used to ensure that there is no accidental or deliberate cross contamination of the containers. While the material remains onsite, it is the responsibility of the site manager/SUXOS and the UXOQCS to maintain control of the containers. When the containers are being shipped to a receiving facility, the driver, regardless of his affiliation, will sign for the containers and will likewise obtain the signature of the receiving individual at each delivery location. Signed copies of the DD Form 1348-1A and the Chain-of-Custody form must be included in the final report.

37.9 TRANSPORTATION

The transport of the certified/verified containers does not require any special permits, placards, or precautions since the contents are classified as scrap metal. Likewise, the transport of the debris to the processing yard does not require any special transport requirements since it has been inspected twice prior to being loaded onto a vehicle. In the event MDEH is to be transported on or off-site, it will be accomplished IAW DoD 6055.09-M, Volume 7 and Parsons SOP 2, Explosives Storage and Transportation.

37.10 FINAL DISPOSITION

Upon receipt of the containers by the recipient(s), they will prepare a statement on company letterhead stating that: “the contents of the containers will not be sold, traded, or otherwise given to another party until such time as the contents have been smelted, crushed, or processed in such a manner as to render them unrecognizable as an item of ordnance”. This statement will also become part of the final report.

ATTACHMENT D-5
LOW PROBABILITY CONTINGENCY PLAN

The following is Subchapter 16.13 of the Site-Wide SSHP, which is Attachment 1 to the APP in Appendix D of the Site-Wide WP. It has been included here for ease of reference.

Low Probability Contingency Plan

This low probability contingency plan was included as Attachment 1 to the APP in Appendix D of the Spring Valley Site-Wide Work Plan (USACE 2007) under the previous contact (Contract No. W912DY-04-D-0005 Delivery Order 0007). It is still applicable to the new contact (Contract No. W912DY-09-D-0062 Delivery Order 0006).

USACE 2007 *Site-Wide Work Plan for the Spring Valley Formerly Used Defense Site, Spring Valley, Washington D.C., March 2007.*

16.13 MEC/RCWM CONTINGENCY PLAN FOR LOW PROBABILITY SITES

16.13.1 Introduction

16.13.1.1 The purpose of this contingency plan is to define the procedures that will be followed in the unlikely event that items potentially related to the American University Experiment Station (AUES) are encountered during non-intrusive activities at the SVFUDS, or during intrusive activities at low probability sites. For purposes of differentiation between this plan and the contingency plan used for higher probability sites, this plan will be referred to as the Low Probability Contingency Plan.

16.13.2 Definitions

16.13.2.1 Items that are potentially related to AUES will be defined as “potential AUES items” for the purposes of this Low Probability Contingency Plan. These items include but are not limited to:

- Any item identified as potential MEC/RCWM or as being related to MEC/RCWM; or
- Any sealed container that cannot be positively identified to be unrelated to AUES (e.g., paint cans, etc. are known to be unrelated to AUES activities); or
- Any unsealed container or identifiable fragment thereof that cannot be positively identified to be unrelated to AUES (e.g., beer bottles, etc. are known to be unrelated to AUES activities); or
- Any other item that is potentially agent-related material or that potentially contains agent-related material; or
- Any other item that cannot be positively identified as an obvious cultural feature or a post-1918 feature (obvious cultural features or post 1918 features include such items as root ball baskets, poly vinyl chlorinated [PVC] piping, wiring, etc.).

16.13.3 Low Probability Contingency Plan Initiation

16.13.3.1 The Low Probability Contingency Plan will be initiated if any potential AUES items (as defined above) are encountered during site activities, or if personnel at a low probability site exhibit symptoms that may be attributable to a chemical exposure (i.e., respiratory irritation and/or irritation of the eyes or skin).

16.13.3.2 In the event that the Low Probability Contingency Plan is initiated for any reason, intrusive activities will be halted immediately. EXCEPTION: see Paragraphs 16.13.8.2 through 16.13.8.4.

16.13.4 Initiation Procedures for Potential AUES Items

16.13.4.1 In the event that the Low Probability Contingency Plan is initiated because potential AUES items are encountered during site activities, subsequent actions taken will be determined according to the nature of the potential item. This procedure is summarized in Figure D1-16-1 and in Sections 16.13.5 through 16.13.8.

16.13.4.2 After initiation of the Low Probability Contingency Plan and the cessation of intrusive activities, the Site Manager or designate will contact the USAESCH Safety Specialist and CENAB Site Operations Officer and inform them that the Low Probability Contingency Plan has been initiated. The USAESCH Safety Specialist will coordinate further response with USAESCH, TE, and the Air Monitoring Team, as necessary. The CENAB Site Operations Officer will notify other outside agencies, as required. EXCEPTION: see Paragraphs 16.13.8.2 through 16.13.8.4.

16.13.5 Initiation Procedures for MEC/RCWM-Related Items

16.13.5.1 If the potential item is potentially related to MEC/RCWM, the following step-by-step procedure will be followed:

- If the potential item requires closed cavity assessment or is not certifiable as munitions debris in accordance with DoD Regulation 4160-21.M*, the USAESCH Safety Specialist will contact TE so that the item can be assessed, photographed, packaged, and transported, as appropriate, in accordance with TE SOPs. After TE has been contacted, the USAESCH Safety Specialist and the CENAB Site Operations Officer will contact their respective PDTs to apprise them of the situation.

*MPPEH certification will be conducted in accordance with the current procedures in Chapter 14 of EM 1110-1-4009 Engineering and Design - Military Munitions Response Actions. The Site Wide SSHP will be revised at a later date.

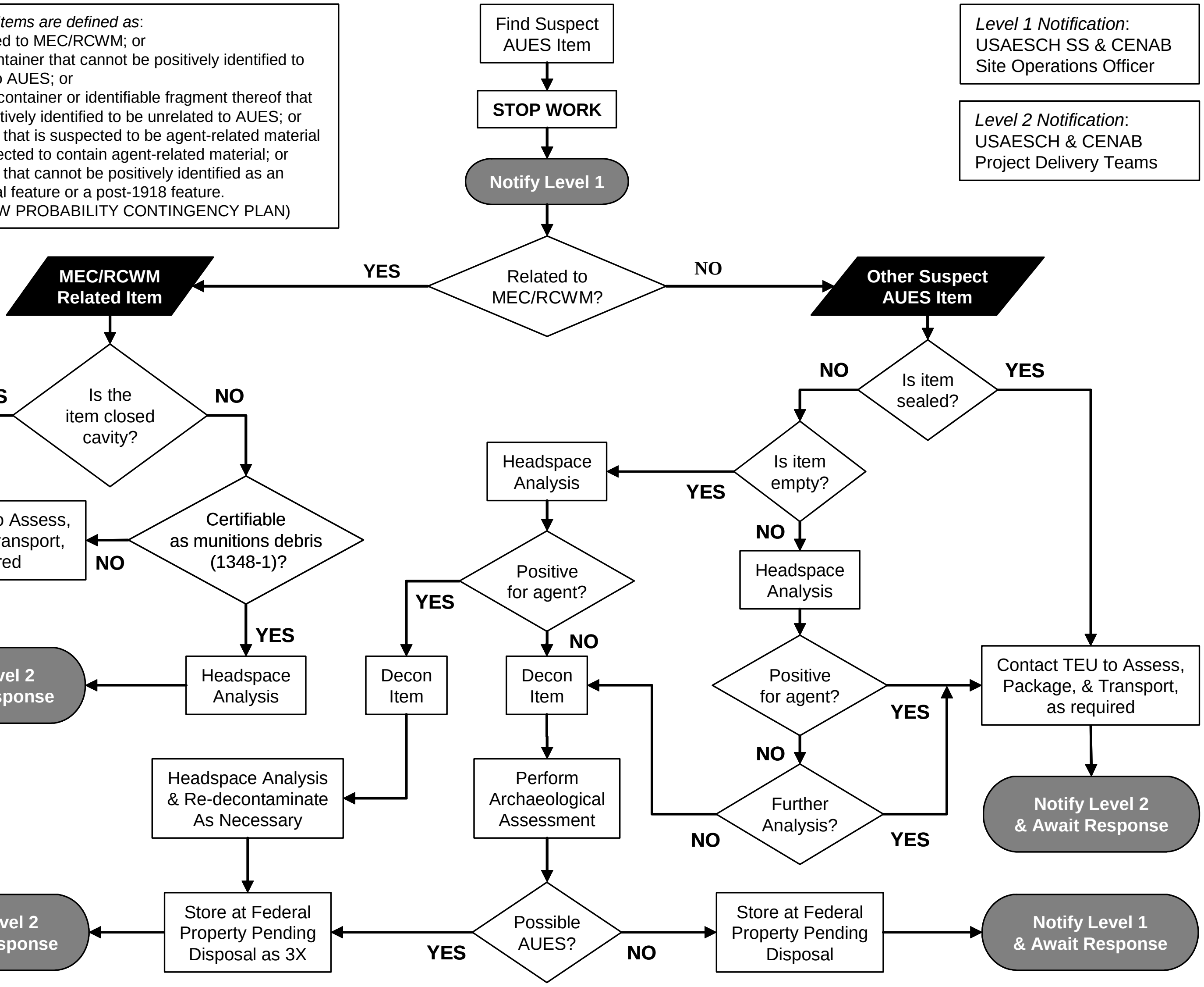
Figure D1-16-1
Low Probability Contingency Plan Decision Flowchart

Suspect AUES Items are defined as:
- Any item related to MEC/RCWM; or
- Any sealed container that cannot be positively identified to be unrelated to AUES; or
- Any unsealed container or identifiable fragment thereof that cannot be positively identified to be unrelated to AUES; or
- Any other item that is suspected to be agent-related material or that is suspected to contain agent-related material; or
- Any other item that cannot be positively identified as an obvious cultural feature or a post-1918 feature.

(ALSO SEE LOW PROBABILITY CONTINGENCY PLAN)

Level 1 Notification:
USAESCH SS & CENAB
Site Operations Officer

Level 2 Notification:
USAESCH & CENAB
Project Delivery Teams



- If the potential item is certifiable as munitions debris in accordance with DoD Regulation 4160-21.M, then the item will be double-bagged in plastic lock bags by personnel wearing Nitrile gloves. The item will be given a tracking number in accordance with Section 16.13.10, and also be photographed unless it is considered unsafe to do so. The item will then be transferred to the Air Monitoring Team for headspace analysis for mustard and lewisite in accordance with their SOPs, and the excavation area will be covered with polyethylene sheeting and anchored at the edges with sandbags pending the analysis results. Once the item has been packaged for transfer, the USAESCH Safety Specialist and the CENAB Site Operations Officer will contact their respective PDTs to apprise them of the situation.
- Intrusive activities will not resume at the site until authorization to continue is received from the USAESCH and CENAB PDTs, via the USAESCH Safety Specialist.

16.13.6 Initiation Procedures for Potential Sealed Items

16.13.6.1 If the potential item is sealed, the USAESCH Safety Specialist will contact TE so that the item can be assessed, photographed, packaged, and transported, as appropriate, in accordance with TE SOPs. After TE has been contacted, the USAESCH Safety Specialist and the CENAB Site Operations Officer will contact their respective PDTs to apprise them of the situation.

16.13.6.2 Intrusive activities will not resume at the site until authorization to continue is received from the USAESCH and CENAB PDTs, via the USAESCH Safety Specialist.

16.13.7 Initiation Procedures for Potential Unsealed Items Containing Liquids or Solids

16.13.7.1 If the potential item is unsealed and contains a liquid or a solid substance, the following step-by-step procedure will be followed:

- The item will not be moved and the excavation area will be secured and covered with polyethylene sheeting, and anchored at the edges with sandbags.
- The USAESCH Safety Specialist will then contact the Air Monitoring Team to request that they come to the site to perform headspace analysis of the potential item for mustard and lewisite in accordance with their SOPs.
- If the item is positive for agent, the USAESCH Safety Specialist will contact TE so that the item can be assessed, photographed, packaged and transported, as appropriate, in accordance with TE SOPs. After TE has been contacted, the USAESCH Safety Specialist and the CENAB Site Operations Officer will contact their respective PDTs to apprise them of the situation.
- If the item is not positive for agent, the SSHO will perform a visual assessment of the item to evaluate whether the contents should be recommended for further

analysis. Agent-related material may be viscous (oil-like) liquid that is clear, yellow, brown, black, or milky in appearance, or unidentifiable solid that is white, yellow, green, brown, or black in appearance.

- If the SSHO deems that there is any reason for the contents to undergo further analysis, the USAESCH Safety Specialist will contact TE so that the item can be assessed, photographed, packaged, and transported, as appropriate, in accordance with TE SOPs. After TE has been contacted, the USAESCH Safety Specialist and the CENAB Site Operations Officer will contact their respective PDTs to apprise them of the situation. Intrusive activities will not resume at the site until authorization to continue is received from the USAESCH and CENAB PDTs, via the USAESCH Safety Specialist.
- If the contents of the item clearly appear to be uncontaminated soil, mud, or groundwater, the SSHO will request the USAESCH Safety Specialist's concurrence with this assessment. If the USAESCH Safety Specialist does not concur with the SSHO's assessment, TE will be contacted as described in the previous step. However, if the USAESCH Safety Specialist does concur with the assessment, the item will be photographed, decontaminated in a container of 5% bleach solution, and then double-bagged, labeled (Section 16.13.10), and transferred to the Project Archaeologist for archaeological assessment. The item will be placed into the decontamination solution using tongs or other method to avoid physical contact with the item during decontamination, and the decontamination solution used will be kept segregated until after the results of the archaeological assessment, to allow analysis of the solution if necessary. Following this archaeological assessment, if the item is determined not to be AUES-related, the USAESCH Safety Specialist and the CENAB Site Operations Officer will be informed and may then give permission for intrusive activities to continue at the site. The decontaminated item will be held in a labeled drum at the Federal Property, pending appropriate disposal, and the segregated decontamination solution will be placed in the decontamination water drum.
- If the item is determined to be potentially AUES-related following this archaeological assessment, the USAESCH Safety Specialist and the CENAB Site Operations Officer will contact their respective PDTs to apprise them of the situation. Intrusive activities will not resume at the site until authorization to continue is received from the USAESCH and CENAB PDTs, via the USAESCH Safety Specialist. The decontaminated item will be held in a labeled drum at the Federal Property, pending disposal as decontaminated scrap, and the segregated decontamination solution will be kept in a labeled container, pending the decision on whether or not it requires analysis.

16.13.8 Initiation Procedures for Other Potential AUES Items

16.13.8.1 If the potential item is neither MEC/RCWM-related nor a sealed item, and it does not contain any liquid or solid substances, the following step-by-step procedure will be followed:

- The item will be photographed and then double-bagged in plastic lock bags by personnel wearing Nitrile gloves. The item will then be transferred to the Air Monitoring Team for headspace analysis for mustard and lewisite in accordance with their SOPs, and the excavation area will be covered with polyethylene sheeting and anchored at the edges with sandbags pending the analysis results.
- If the item is positive for agent, the item will be decontaminated in a container of 5% bleach solution, and then tested again using headspace analysis to confirm decontamination. The item will be placed into the decontamination solution using tongs or other method to avoid physical contact with the item during decontamination. If the item is still positive for agent following this decontamination process, it will be decontaminated again and retested using headspace analysis. This two-step process will be repeated as necessary until decontamination is confirmed. Once the item is decontaminated, it will be double-bagged and labeled in accordance with Section 16.13.10. The USAESCH Safety Specialist and the CENAB Site Operations Officer will contact their respective PDTs to apprise them of the situation and the decontaminated item will be held in a labeled drum at the Federal Property, pending disposal as decontaminated scrap. Intrusive activities will not resume at the site until authorization to continue is received from the USAESCH and CENAB PDTs, via the USAESCH Safety Specialist.
- If the item is not positive for agent, the item will be decontaminated in a container of 5% bleach solution and then double-bagged, labeled (Section 16.13.10), and transferred to the Project Archaeologist for archaeological assessment. The item will be placed into the decontamination solution using tongs or other method to avoid physical contact with the item during decontamination, and the decontamination solution used will be kept segregated until the results of the archaeological assessment are known, to allow subsequent analysis of the solution if necessary. Following this archaeological assessment, if the item is determined not to be AUES-related, the USAESCH Safety Specialist and the CENAB Site Operations Officer will be informed and may then give permission for intrusive activities to continue at the site. The decontaminated item will be held in a labeled drum at the Federal Property, pending appropriate disposal, and the segregated decontamination solution will be placed in the decontamination water drum.
- If the decontaminated item is determined to be potentially AUES-related following this archaeological assessment, the USAESCH Safety Specialist and the CENAB Site Operations Officer will contact their respective PDTs to apprise them of the situation. The decontaminated item will be held in a labeled drum at

the Federal Property, pending disposal as ddecontaminated scrap, and the segregated decontamination solution will be kept in a labeled container, pending the decision on whether or not it requires analysis. Intrusive activities will not resume at the site until authorization to continue is received from the USAESCH and CENAB PDTs, via the USAESCH Safety Specialist.

16.13.8.2 The above procedure may be modified in the event that multiple potential items are recovered that are neither MEC/RCWM-related, nor sealed items, and that do not contain any liquid or solid substances (e.g., the team are digging in an area of trash). Under these circumstances, the field team will not be required to stop work and may continue with excavation activities at the low probability site as long as the following conditions have been met:

- The initial potential item find(s) have been sent for headspace analysis and no agent has been detected.
- The USAESCH and CENAB PDTs have been informed of these finds and have agreed to allow the modification of the procedure.

16.13.8.3 Under these conditions, any potential items recovered that are neither MEC/RCWM-related, nor sealed items, and that do not contain any liquid or solid substances will be containerized (e.g., placed 55-gallon drum) and sent for headspace analysis at the end of each day. Results of these analyses will be reported to the USAESCH and CENAB PDTs the following morning, via the USAESCH Safety Specialist and the CENAB Site Operations Officer, respectively,. Excavation will halt if agent has been detected.

16.13.8.4 Subsequent to this procedure modification, in the event that any items are recovered that are addressed in Sections 16.13.5, 16.13.6, or 16.13.7 of this Low Probability Contingency Plan, or if the Parsons Site Manager, USAESCH Safety Specialist, or CENAB Site Operations Officer otherwise deem it necessary, further intrusive activities will be halted immediately and the appropriate Contingency Plan procedures will be followed.

16.13.9 Initiation Procedures for Possible Agent Exposure

16.13.9.1 In the event that the Low Probability Contingency Plan is initiated because site personnel exhibit symptoms that may be attributable to a chemical exposure, the following step-by-step procedure will be carried out:

- Personnel will move upwind of the excavation or other potential source of exposure.
- The USAESCH Safety Specialist and CENAB Site Operations Officer will be contacted and informed that the Low Probability Contingency Plan has been initiated. The USAESCH Safety Specialist will coordinate further response with USAESCH, TE, and the Air Monitoring Team, as necessary. The CENAB Site

Operations Officer will notify and coordinate with other outside agencies, as required.

- Potentially exposed personnel may be processed through the EPDS, if signs of exposure are observed on their skin or clothing. Areas of the body suspected to be exposed will be flushed with copious quantities of water. Potentially exposed clothing or PPE will be removed and decontaminated in accordance with the procedures described in Chapter 13 of this SSHP.
- George Washington Hospital will be notified (telephone: 202-934-3211) and, if present, the onsite ambulance will be contacted and used to transport any personnel exhibiting chemical exposure symptoms, or other personnel potentially exposed, to that facility. If no ambulance is on-site, George Washington Hospital will be notified and 911 will be called. At this time, George Washington Hospital will be informed whether the potentially exposed personnel have been processed through the EPDS, though they will be advised that the potentially exposed personnel may require additional decontamination upon arrival at the hospital if decontamination has not been confirmed on site using agent monitoring.
- The excavation area will be covered with polyethylene sheeting and anchored at the edges with sandbags and the USAESCH Safety Specialist will contact the Air Monitoring Team to perform headspace analysis at the excavation. Also, the USAESCH Safety Specialist and the CENAB Site Operations Officer will contact their respective PDTs to apprise them of the situation.
- Intrusive activities will not resume until authorization to continue has been received from the USAESCH and CENAB PDTs, via the USAESCH Safety Specialist.

16.13.10 On-Site Tracking for Low Probability Contingency Plan

16.13.10.1 Every potential item uncovered that causes the Low Probability Contingency Plan to be triggered will be tracked using unique alphanumeric tracking numbers. General details of the numbering systems to be used are described below, though specific details will be included in each SSWP.

16.13.10.2 The Site Manager will enter descriptions of all potential items in the Field Log Book (e.g., dimensions, color, material of construction, other notable features). Photographs will be taken of potential items, as specified in Section 16.13.6. All photographs of potential items will include a visual scale in order that the dimensions of the item can be estimated using the photograph.

16.13.10.3 On any day that the Low Probability Contingency Plan is initiated, the Site Manager will complete a Contingency Plan Initiation Summary and include it in the Daily Report (Section 4.9 of the WP). Both the Site Manager and the USAESCH Safety Specialist will sign this Contingency Plan Initiation Summary.

16.13.10.4 Items Removed by TE

16.13.10.4.1 If the item has been removed by TE during a low probability intrusive investigation, Parsons will assign a unique alphanumeric tracking number for internal reference and tracking purposes. The first two characters of this number will be “TE” (to denote an item removed by TE). The next set of characters will denote the overall site location (e.g., “4801GR” for 4801 Glenbrook Road). The next four characters will indicate the specific location at which the item was recovered (AN for anomaly number). The last number will be a unique number assigned to each item recovered at that location which is removed by TE.

16.13.10.5 The following is an example of designations for items removed by TE:

TE-4801GR-AN22-010, TE-4801GR-EX22-011, etc.

16.13.10.6 Munitions Debris

16.13.10.6.1 Each item of munitions debris encountered during a low probability intrusive investigation will be given a unique alphanumeric tracking number. The first three characters of this number will be “SCR” (to denote munitions debris). The next set of characters will denote the overall site location (e.g., “4710WL” for 4710 Woodway Lane). The next four characters will indicate the specific location at which the item was recovered (AN for anomaly number). The last number will be a unique number assigned to each munitions debris item recovered at that location.

16.13.10.6.2 The following is an example of munitions debris item designations:

SCR-4710WL-AN22-010, SCR-4710WL-AN22-011, etc.

16.13.10.7 Other Potential Items

16.13.10.7.1 Other potential items encountered during low probability, intrusive investigations will be given a unique alphanumeric tracking number, which will be marked on the bag in which the item is placed. Additionally, the date of generation will be marked on the bag. The first two characters of this number will be “PI” (potential item). The next set of characters will denote the overall site location (e.g., “5058SegS” for 5058 Sedgwick Street). The next four characters will indicate the specific location at which the item was recovered (AN for anomaly number). The last number will be a unique number assigned to each potential item recovered at that location.

16.13.10.7.2 The following is an example of designations for other potential items:

PI-5058SegS-AN01-001, PI-5058SegS- AN01-002, etc.

16.13.10.7.3 In the event that the procedures detailed in Paragraphs 16.13.8.2 through 16.13.8.4 are followed, other potential items will be containerized and tracked by batch using a unique alphanumeric tracking number, which will be marked on the container in which each batch of items is placed. Additionally, the date of generation will be marked on the container. The first two characters of this number will be "PI" (potential item). The next set of characters will denote the overall site location (e.g., "5058SegS" for 5058 Sedgwick Street). The next four characters will indicate the specific location at which the item was recovered (AN for anomaly number). The next part of the code will be "BATCH" to denote that this tracking number refers to multiple items. The last number will be a unique number assigned to each potential item recovered at that location.

16.13.10.7.4 The following is an example of designations for other potential items using the modified procedures:

PI-5058SegS-AN01-BATCH-001, PI-5058SegS- AN01- BATCH-002, etc.

ATTACHMENT D-6
HIGH PROBABILITY CONTINGENCY PLAN

The following is Subchapter 16.14 of the Site-Wide SSHP, which is Attachment 1 to the APP in Appendix D of the Site-Wide WP. It has been included here for ease of reference.

High Probability Contingency Plan

This high probability contingency plan was included as Attachment 1 to the APP in Appendix D of the Spring Valley Site-Wide Work Plan (USACE 2007) under the previous contact (Contract No. W912DY-04-D-0005 Delivery Order 0007). It is still applicable to the new contact (Contract No. W912DY-09-D-0062 Delivery Order 0006).

USACE 2007 *Site-Wide Work Plan for the Spring Valley Formerly Used Defense Site, Spring Valley, Washington D.C., March 2007.*

16.14 MEC/RCWM CONTINGENCY PLAN FOR HIGH PROBABILITY SITES

16.14.1 Introduction

16.14.1.1 This contingency plan defines the procedures that will be followed in the event that potential MEC/RCWM items are encountered during intrusive activities at high probability sites in order to ensure the safety and the protection of the public and workers, and to ensure the proper disposal of discovered MEC/RCWM items. For purposes of differentiation between this plan and the contingency plan used for low probability sites, this plan will be referred to as the High Probability Contingency Plan.

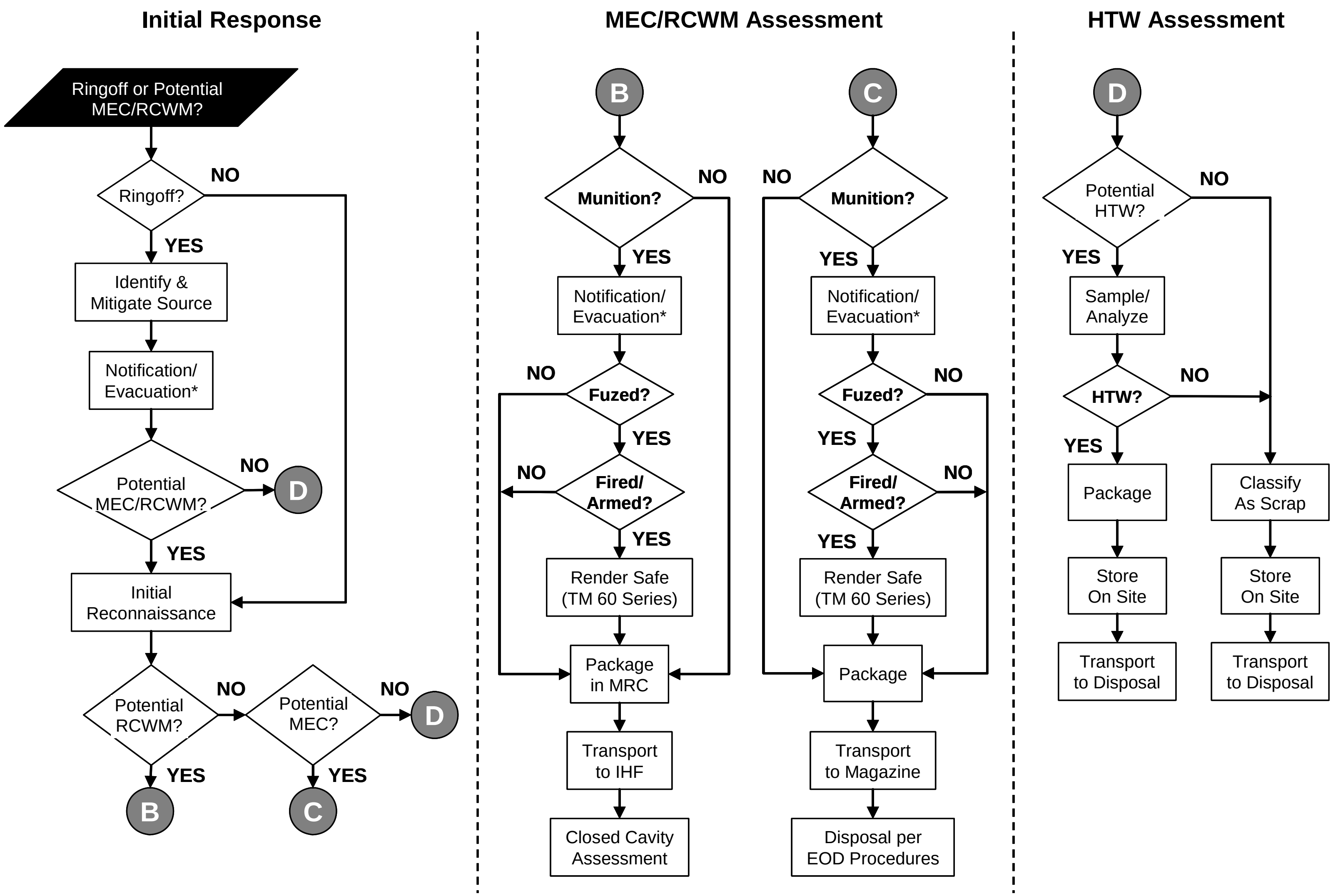
16.14.1.2 Responses to air monitoring alarms/ringoffs are described in Sections 8.3.4 and 8.3.5 of this SSHP.

16.14.2 Initial Response

16.14.2.1 If there is an alarm or a potential RCWM item is encountered, the excavation team will respond according to the procedures described below and illustrated in Figure D1-16-2.

16.14.2.2 If an air monitoring alarm has occurred with no apparent potential RCWM container present and the excavation team is in the proper level of PPE, they will take immediate action to investigate and mitigate the source, as necessary. If they are not in the appropriate level of PPE, the excavation team will exit the EZ, upgrade PPE depending upon the alarm level, and then reenter the EZ and work towards investigating and mitigating the source, as necessary. Mitigation procedures will include identifying the source of the alarm, and containerizing the surrounding soil until there are no additional alarms recorded. If, during source mitigation, a potential RCWM container or MEC item is encountered, the excavation team will perform an initial reconnaissance.

Figure D1-16-2
High Probability Contingency Plan Decision Flowchart



* Notification/evacuation is only applicable if the public is not adequately protected by engineering controls or by prior withdrawal

16.14.2.3 Following investigation of possible source of an air monitoring alarm, if potential chemical agent-related gross liquid contamination is observed, the excavation team will mitigate the source by covering the area with plastic and will then exit the EZ through the PDS. Personnel will then upgrade PPE to an adequate level for dealing with liquid contamination (Chapter 5 of this SSHP) and may then enter the EZ to further mitigate and/or containerize the potential liquid source.

16.14.2.4 Excavation may continue once the alarm/ringoff has been cleared. However, PPE may be upgraded depending upon the alarm level.

16.14.3 Initial Reconnaissance

16.14.3.1 If a potential RCWM container or MEC item is encountered, the excavation team and/or TE will perform an initial reconnaissance. For the purposes of this High Probability Contingency Plan, a potential RCWM container is defined as either (a) a container with markings denoting chemical agent or RCWM, or (b) an unidentifiable intact container that contains liquid. Note that, during an investigation at a high probability site, any discovered unidentifiable intact container that contains liquid will be assumed to be potential RCWM until determined otherwise.

16.14.3.2 If, during the initial reconnaissance, the item is determined to be potential RCWM, the assessment procedures described in Section 16.14.4 will be performed.

16.14.3.3 If an item is identified as potential MEC, the UXO team will assess the potential MEC using their SOPs. Based upon their assessment, established procedures described in Section 16.14.5 will be implemented, if necessary.

16.14.3.4 If it is determined that a potential container is neither a RCWM container nor a MEC item, it will be categorized as potential HTW and assessed according to the procedures described in Section 16.14.6.

16.14.4 RCWM Assessment

16.14.4.1 If the item is categorized as potential RCWM, TE will perform an assessment in accordance with their assessment SOPs. This assessment will be performed at the Federal Property under the supervision of the USAESCH Safety Specialist and the SSHO.

NOTE: IN THE EVENT THAT A RCWM ITEM RECOVERED DURING AN INVESTIGATION IS DETERMINED TO BE INCONSISTENT WITH THE MCE STATED IN THE SSWP, WORK WILL CEASE AND THE SITE-SPECIFIC MCE WILL BE REEVALUATED. IF THE MCE IS REVISED TO A GREATER HAZARD, THE AEGL-2 DISTANCE WILL BE RECALCULATED AND THE NEW AEGL-2 DISTANCE WILL BE IN EFFECT FOR THE REMAINDER OF THE INVESTIGATION. THE REVISED MCE AND AEGL-2 DISTANCE WILL BE APPROVED BY USAESCH PRIOR TO IMPLEMENTATION. AN AMENDMENT TO THE CSS OR ANNEX WILL BE PREPARED AND SUBMITTED FOR APPROVAL.

16.14.4.2 If an item is assessed to be a munition, the following steps will be taken.

- The CENAB Site Operations Officer, SSHO, USAESCH Safety Specialist, and Site Manager will be notified immediately. If not previously implemented, the CENAB Site Operations Officer may implement public evacuation or shelter-in-place in accordance with the CENAB PPP if the public is not adequately protected by engineering controls or a prior withdrawal.
- If the item is fuzed and fired/armed, it will be rendered acceptable to move by TE EOD personnel in accordance with TM 60 Series, packaged in a MRC, transported to the IHF containers, and subjected to closed cavity item assessment in accordance with TE assessment procedures (Section 3.8.13 of the WP). The transportation route to the IHF containers will be determined on a site-specific basis and will be included in the SSWP.
- If the item is not acceptable to move, work will stop and appropriate TM 60 series actions, in conjunction with engineering controls, will be selected. These measures will be applied only after review and approval by the on-site USAESCH Safety Specialist (reference TM 60A-1-1-22).
- If the item has not been fired/armed, it will be packaged in a MRC, transported to the IHF containers, and subjected to closed cavity item assessment in accordance with TE assessment procedures (Section 3.8.13 of the WP).

16.14.4.3 If the item is not a munition (i.e., it is an intact container), it will be packaged in a MRC, transported to the IHF containers, and subjected to closed cavity item assessment in accordance with TE assessment procedures (Section 3.8.13 of the WP).

16.14.5 MEC Assessment

16.14.5.1 If the item is not potential RCWM but is a potential MEC item, qualified UXO technicians will perform the assessment.

NOTE: IN THE EVENT THAT A MEC ITEM RECOVERED DURING AN INVESTIGATION IS DETERMINED TO BE INCONSISTENT WITH THE MGFD STATED IN THE SSWP, WORK WILL CEASE AND THE SITE-SPECIFIC MGFD WILL BE REEVALUATED. IF THE MGFD IS REVISED TO A GREATER HAZARD, THE RELATED MSD WILL BE RECALCULATED AND THE NEW MSD WILL BE IN EFFECT FOR THE REMAINDER OF THE INVESTIGATION. THE REVISED MGFD AND MSD WILL BE APPROVED BY USAESCH PRIOR TO IMPLEMENTATION. AN AMENDMENT TO THE CSS OR ANNEX WILL BE PREPARED AND SUBMITTED FOR APPROVAL.

16.14.5.2 If the MEC item is assessed to be a munition, the following steps will be taken:

- The CENAB Site Operations Officer, SSHO, USAESCH Safety Specialist, and Site Manager will be notified immediately. If not previously implemented, the CENAB Site Operations Officer may implement public evacuation or shelter-in-place in accordance with the CENAB PPP if the public is not adequately protected by engineering controls or a prior withdrawal.

- If the item is fuzed and fired/armed, EOD support shall be requested for further action.
- If the item is not acceptable to move, work will stop and appropriate safety precautions, in conjunction with engineering controls, will be selected. These measures will be applied only after review and approval by the on-site USAESCH Safety Specialist (reference TM 60A-1-1-22).
- If the item has not been fired/armed, it will be packaged by UXO personnel, transported to the magazine at the Federal Property, and disposed of in accordance with applicable guidelines in coordination with USAESCH.

16.14.6 HTW Assessment

16.14.6.1 If the item is not MEC or RCWM but is a potential HTW item, it will undergo HTW assessment at the Federal Property assessment area. The potential HTW item will undergo headspace analysis and liquid or solid samples will be collected from the item by the Sample Team and submitted to the HTW laboratory. If the item itself cannot be sampled, soil samples will be collected from the vicinity in which the item was recovered and these will be analyzed and used to characterize the item.

16.14.6.2 If the item contains HTW components, it will be packaged in a polyethylene drum overpack and stored at the Federal Property with secondary containment until shipped for disposal.

16.14.6.3 All items that are obviously scrap or proven to be scrap will be staged at the Federal Property until shipped for disposal.

ATTACHMENT D-7
LIFT PLAN

LIFT PLAN FOR REMEDIAL ACTION
AT
4825 GLENBROOK ROAD, WASHINGTON, D.C.

Prepared for:

U.S. Army Engineering and Support Center, Huntsville, AL

And

Baltimore District - U.S. Army Corps of Engineers

Prepared by:

PARSONS
100 M Street SE
Washington, D.C. 20003

January 2013

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1.0 INTRODUCTION

1.0.0.1 A lift plan is prepared for the remedial action (RA) at the 4825 Glenbrook Road, NW, Washington D.C. The lift plan will be included as Attachment D-7 of Appendix D of the RA work plan. A crane is required for setting up and removal of Edgewood Chemical Biological Center (ECBC) equipment such as the Chemical Agent Filtration System (CAFS) and Miniature Chemical Agent Monitoring System (MINICAMS) and supporting equipment; and the engineering controlled structure (ECS) tent structure for the high probability intrusive operations.

1.0.0.2 The ECBC equipment and other supporting equipments will be set up in the backyard of the property. Three CAFS Units, one generator, one multiple power distribution system (MPDS), one MINICAMS unit and approximately 20 equipment mats will be lifted from a flat-bed trailer & staged on the equipment setup area in the backyard of 4825 Glenbrook Road. A 120 ton all terrain crane (or similar, larger crane) will be used for the lift operation. The dimensions and weights of the units are:

- MINICAMS:
    - ➢ Weight > 15,000 lbs
    - ➢ Dimensions > 20 feet x 23 feet
- CAFS Unit:
    - ➢ Weight > 8,000 lbs (pounds)
    - ➢ Dimensions > 18 feet x 6.5 feet x 8 feet
- Plastic Equipment Mats:
    - ➢ Weight > 1,000 lbs
    - ➢ Dimensions > 7 feet x 14 feet
- Generator:
    - ➢ Weight > 13,000 lbs
    - ➢ Dimensions > 7 feet x 16 feet
- MPDS:
    - ➢ Weight > 6,000 lbs
    - ➢ Dimensions > 7 feet x 12 feet

1.0.0.3 The ECS tent structure will be set up at the first tent location in the front yard, relocated to the second and later to the third tent locations, and removed when the high probability intrusive operation is completed. Individual pieces from the ECS will be lifted off a flat-bed truck and moved as necessary to assemble the structure. After the structure has been assembled, it will be relocated over the first area to be excavated (see Section 3 for diagram). Once the first area has been excavated, the ECS will be relocated to the second location (see Section 3 for diagram). After the second area has been excavated, the ECS will be relocated to the third location (see Section 3 for diagram). An all-terrain crane (or similar) will be used for these subsequent lift operations. The weights of the units are:

- Assembled Structure
    - ➢ Weight > 17,000 lbs (Provided by manufacturer specifications)
    - ➢ Dimensions > 60 feet x 33 feet x 27 feet (H)

- Leg Truss
  - Weight > 254 lbs (Provided by manufacturer)
- Roof Truss
  - Weight > 409 lbs (Provided by manufacturer)

- Gable Peak Axial Frame
  - Weight > 223 lbs (Provided by manufacturer)
- Leg Bend Axial Frame
  - Weight > 147 lbs (Provided by manufacturer)
- Cover
  - Weight > 3000 lbs (Two sections on the roof - one at 900 lbs and one at 1200 lbs. The gable end panels will weigh 450 lbs each. One panel on each end of the structure.)

1.0.0.4 Safety protocols for these operations are based on the Activity Hazard Analysis (AHA) from SSHP, Appendix D of the RA work plan (USACE 2012). The AHAs for crane operations are also presented in Appendix D of the RA work plan.

1.0.0.5 The approximate schedule for each operation is noted below:

- ECBC Equipment Setup and Removal Activities (January and August 2013)
- ECS Tent Setup, Relocation, and Removal (February through August 2013)

1.0.0.6 This lift plan addresses the following topics:

- Zimmer Environmental Solutions (ZES) Lift Plan checklist (Section 2) – Identifies basic information about the lift plan and operations.
- Lift Plan Diagrams (Section 3) - Site layout, lift radius, no lift areas and approximate center of gravity are provided.
- W.O. Grubb Crane Lift Data (Section 4) - Calculations for the scheduled lift (heaviest item) will be provided when the crane rental is finalized based on availability of equipment. Additional documents required for Attachment 1 will also be provided when rental is finalized with W.O Grubb.
- Grove GMK 5120B Load Chart (Section 5) - Provides calculated crane operating limits for the scheduled load.
- Activity Hazard Analysis (AHA) for Crane Operations (Section 6) - Administrative and Engineering controls for crane operations (including personnel protective equipment (PPE).
- Daily Crane Inspection Form (Section 7) – Crane inspection form will be completed prior to the scheduled lift and submitted to USACE.
- Rigging Equipment Inspection Form (Section 8) - Rigging equipment inspection form will be completed prior to the scheduled lift and submitted to USACE.

2.0 ZIMMER ENVIRONMENTAL SOLUTIONS (ZES) CHECKLIST

3.0 LIFT PLAN DIAGRAMS

4.0 W. O. GRUBB CRANE LIFT DATA

To be provided when the crane rental is finalized based on availability of equipment.

5.0 GROVE GMK 5120B LOAD CHART

6.0 ACTIVITY HAZARD ANALYSIS (AHA) FOR CRANE OPERATIONS

7.0 DAILY CRANE INSPECTION FORMS

To be completed and provided prior to the scheduled lift and submitted to USACE.

8.0 RIGGING EQUIPMENT INSPECTION FORM

To be provided prior to the scheduled lift and submitted to USACE.

ATTACHMENT 1

W.O. GRUBBS ANNUAL INSPECTION, CERTIFICATE OF INSURANCE, AND CRANE OPERATOR AND RIGGER CREDENTIALS

To be provided when rental is finalized with W.O Grubb.

APPENDIX E
SAMPLING AND ANALYSIS PLAN

APPENDIX E OF SITE-SPECIFIC WORK PLAN FOR REMEDIAL DESIGN AND REMEDIAL ACTION AT 4825 GLENBROOK ROAD

SAMPLING AND ANALYSIS PLAN

FIELD SAMPLING PLAN
QUALITY ASSURANCE PROJECT PLAN

SPRING VALLEY FORMERLY USED DEFENSE SITE
SPRING VALLEY, WASHINGTON, D.C.

Prepared for:

U.S. Army Engineering and Support Center,
Huntsville, AL

U.S. Army Corps of Engineers,
Baltimore District

Prepared by:
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December 2015

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LIST OF ACRONYMS

Acronym	Definition
ABP	Agent Breakdown Product
ADR	Automated Data Review
AEL	Army Environmental Center
ASTM	American Society for Testing and Materials
AUES	American University Experiment Station
CA	Chemical Agent
CACM	Chemical Agent Contaminated Material
CARA	CBRNE analytical remediation activity
CBRNE	Chemical Biological Radiological Nuclear and Explosives
CDQAR	Chemical Data Quality Assessment Report
CENAB	U.S. Army Corps of Engineers, Baltimore District
CLP	Contract Laboratory Program
COC	Chain of Custody
CVAA	chlorovinylarsenious acid
CVAO	chlorovinylarsenious oxide
CWM	Chemical Warfare Materiel
DAAMS	Depot Area Air Monitoring System
DL	Detection Limit
DID	Data Item Description
DoD	Department of Defense
DOE	Department of Energy
DOT	Department of Transportation
DQCR	Daily Quality Control Report
DQO	Data Quality Objective
EB	Equipment Blank
ECBC	Edgewood Chemical Biological Center
ECS	Engineering Control Structure
EDD	Electronic Data Deliverable
ELAP	Environmental Laboratory Accreditation Program
EOD	Explosive Ordnance Disposal
EPP	Environmental Protection Plan
ERT	Earth Resources Technology
EZ	Exclusion Zone
FD	Field Duplicate
FSP	Field Sampling Plan
FUDS	Formerly Used Defense Site
HHRA	Human Health Risk Assessment
HI	Hazard Index
HTW	Hazardous and Toxic Waste
IATA	International Air Transport Association
IAW	In Accordance With
IDW	Investigation Derived Waste
IHF	Interim Holding Facility

Acronym	**Definition**
LOD	Limit of Detection
LOQ	Limit of Quantitation
MCE	Maximum Credible Event
MEC	Munitions and Explosives of Concern
MI	Manual Integration
MINICAMS	Miniature Continuous Air Monitoring System
MPPEH	Material Potentially Presenting an Explosive Hazard
MS/MSD	matrix spike/matrix spike duplicate
NIST	National Institute of Standards and Technology
PDT	Project Delivery Team
PM	Project Manager
PMNSCM	Product Manager for Non-Stockpile Chemical Materiel
PSR	Project Status Report
PWS	Performance Work Statement
QA	Quality Assurance
QAM	Quality Assurance Manual
QAPP	Quality Assurance Project Plan
QC	Quality Control
QCM	Quality Control Manager
QCP	Quality Control Plan
QPP	Quality Program Plan
QSM	Quality System Manual
RA	Remedial Action
RACR	Remedial Action Closeout Report
RCRA	Resource Conservation and Recovery Act
RCWM	Recovered Chemical Warfare Materiel
RI/FS	Remedial Investigation/Feasibility Study
SAP	Sampling and Analysis Plan
SEDD	Staged Electronic Data Deliverable
SOP	Standard Operating Procedure
SOW	Scope of Work
SPP	Systematic Planning Process
SSHP	Site Safety and Health Plan
SSHO	Site Safety and Health Officer
SSWP	Site-Specific Work Plan
SUXOS	Senior UXO Supervisor
SVFUDS	Spring Valley Formerly Used Defense Site
SVOCs	Semivolatile Organic Compounds
SWWP	Site-Wide Work Plan
TB	Trip Blank
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TD	Technical Director
TE	U.S. Army 22nd Chemical Battalion (Technical Escort)
TICs	Tentatively Identified Compounds

Acronym	Definition
TPP	Technical Project Planning
UCL	Upper Confidence Level
UFP	Uniform Federal Policy
USACE	U.S. Army Corps of Engineers
USAESCH	U.S. Army Engineering and Support Center, Huntsville
USEPA	U.S. Environmental Protection Agency
UU/UE	Unrestricted Use/Unlimited Exposure
UXO	Unexploded Ordnance
UXOQCS	UXO QC Specialist
UXOSO	UXO Safety Officer
VOCs	Volatile Organic Compounds
WERS	Worldwide Environmental Remediation Services
WP	Work Plan

1 SAMPLING AND ANALYSIS PLAN

1.1 OVERVIEW

1.1.0.1 The Sampling and Analysis Plan (SAP) is the Appendix E of the Site Specific Work Plan (SSWP) for remedial design/remedial action (RA) at 4825 Glenbrook Road. The plan has been developed in accordance with EM 1110-1-4009 (USACE, 2007a), Data Item Description (DID) WERS-009.01 (USACE, 2010), and the Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP) (USEPA, 2005), Department of Defense Quality System Manual (DoD QSM) Version 5.0 (DoD, July 2013), and the scope of work (SOW) in the Performance Work Statement (PWS) for the Remedial Action at 4825 Glenbrook Road.

1.1.0.2 This document outlines all anticipated sampling and analysis procedures that may be used for the RA activities at 4825 Glenbrook Road. The SAP comprises two parts, the Field Sampling Plan (FSP) and the UFP-QAPP. The FSP is presented as Sections 2 through 6. Chemistry Data Quality/Quality Control plans and submittals, including the UFP-QAPP, are addressed in Section 7 and Attachment A. Procedures and protocols documented in the Site-Wide Work Plan (SWWP) (USACE 2007) are incorporated by reference where appropriate.

1.2 OBJECTIVES AND SCOPE

1.2.0.1 The objective of this SAP is to detail the protocol for completion of sampling and analysis activities and related QC plans and procedures to be implemented during the RA at the Spring Valley Formerly Used Defense Site located at 4825 Glenbrook Road, Washington, D.C. The scope of this remedial action includes demolition of the residence, excavation, removal and disposal of on-site soil along with suspected American University Experiment Station (AUES)-related debris in the soil, and site restoration.

1.2.0.2. The scope of required activities addressed under this SAP includes multimedia sampling and analysis, including analyses for chemical agent/agent breakdown products (CA/ABP) and hazardous and toxic waste (HTW). These activities will be conducted during the remedial action and in support of confirmation of the remediation completion, waste analysis and disposal actions.

1.2.0.3 All non-Recovered Chemical Warfare Material (RCWM) areas are referred to as “low probability” areas, while suspect RCWM sites are referred to as “high probability” areas. The low and high probability areas at 4825 Glenbrook Road are delineated in the Decision Document (DD) for 4825 Glenbrook Road (USACE 2012c) and the USACE probability assessment for 4825 Glenbrook Road (USACE 2012a). In many cases, the sampling methods and procedures required are common to both high and low probability areas. In general, higher probability areas require a higher level of activity (more sampling, more parameters, more rigorous safety protocols, etc.). Therefore, unless otherwise specified as a low probability method or procedure, this SAP describes methods and procedures for higher probability activities. Where the required steps for a low probability area differ, those methods and procedures are called out in this SAP.

2 FIELD SAMPLING PLAN (FSP)

2.1 FIELD SAMPLING PLAN (FSP)

The purpose of the FSP is to provide procedures to conduct field sampling at the 4825 Glenbrook Road property during RA activities. Field sampling activities will be performed in accordance with the procedures outlined in this section to ensure that usable data of known quality are generated.

2.2 PROJECT BACKGROUND

The 4825 Glenbrook Road background is presented in this SSWP for Remedial Design/Remedial Action at 4825 Glenbrook Road, Chapter 1.

2.3 PROJECT ORGANIZATION AND RESPONSIBILITIES

The organization and responsibilities for the 4825 Glenbrook Road RA project are described in detail in the SSWP for Remedial Design/Remedial Action at 4825 Glenbrook Road, Chapter 2.

2.4 PROJECT SCOPE AND OBJECTIVES

The 4825 Glenbrook Road RA project scope and project objectives are described in the SSWP for Remedial Design/Remedial Action at 4825 Glenbrook Road, Chapters 1 and 2, respectively (USACE 2012d).

2.5 APPLICABLE REGULATIONS AND STANDARDS

Applicable regulations and standards governing the Remedial Design/Remedial Action at 4825 Glenbrook Road are presented in the Chapter 7 of the SSWP (USACE 2012d).

3 ANALYTICAL PLAN

3.0.0.1 Various types of samples will be collected during RA activities at 4825 Glenbrook Road. These may include: surface and subsurface confirmation soil, soil disposal (excavated soil), aqueous IDW (decontamination water), intact containers, and scrap. These samples will be analyzed for two general types of compounds: Chemical Agent (CA), and Hazardous and Toxic Waste (HTW) constituents.

3.0.0.2 A comprehensive list of analytical parameters was specifically developed by the Spring Valley Partners for the Spring Valley Formerly Used Defense Site (SVFUDS). Over a series of meetings, the Partners reviewed all chemicals documented as having been used at the AUES. The list was refined by considering whether analytical methods were available and by using chemical and physical properties to assess whether the chemical could be present under current site conditions. Table 3.1 presents the general analytical methods that will be used on this project, including those required to address the SVFUDS comprehensive list compounds.

3.1 CA/AGENT BREAKDOWN PRODUCTS ANALYSIS

3.1.0.1 For the 4825 Glenbrook Road property, CA is limited to mustard and lewisite. Agent Breakdown Products (ABPs) also will be monitored during the remedial action. The mustard breakdown products are thiodiglycol, dithiane, and oxathiane. The lewisite breakdown products are chlorovinylarsenious oxide (CVAO) and chlorovinylarsenious acid (CVAA). Although ricin is not categorized as CA/ABP, ricin was a potential contaminant of concern in SVFUDS. Therefore, ricin was included previously with this grouping. However, ricin was not found at 4825 Glenbrook Road or any other SVFUDS site during the previous investigation activities. Therefore, ricin will not be analyzed for this RA.

3.1.0.2 CA/ABP samples will be analyzed via headspace analysis by ECBC at a laboratory staged at the Federal Property. After clearance of the headspace analysis, the samples will be transported off site to ECBC laboratories at Aberdeen Proving Ground, Maryland for low-level agent analysis.

3.1.0.3 Table 3.1 lists the CA/ABP analytical parameters and methods.

3.2 HTW ANALYSIS

3.2.0.1 HTW constituents, which include disposal parameters, are specified in the SSWP. Table 3.1 indicates the analytical parameters required to address the SVFUDS Comprehensive list compounds, as well as the disposal parameters. For 4825 Glenbrook Road, these samples will primarily be solid (soil) samples. If groundwater is encountered during the RA, groundwater will be pumped and collected into a container and transport to the Federal Property. Prior to pumping or containerizing groundwater, the representative disposal characterization groundwater samples (see Section 3.2.0.2) will be collected from the open excavation for groundwater disposal.

3.2.0.2 HTW analyses will be performed by APPL, the HTW laboratory. APPL is a Department of Defense Environmental Laboratory Accreditation Program (DoD ELAP) certified laboratory.

3.2.0.3 All of the parameters listed are discussed in greater detail in the QAPP portion of this SAP.

Table 3.1
Analytical Parameters and Methods

	Analysis	Analytical Parameter	Analytical Method
SVFUDS COMPREHENSIVE LIST PARAMETERS	**CA/ABP**	Lewisite (L) CVAO, CVAA	ECBC IOP-MT-08
		Mustard (H)	ECBC IOP-MT-08
		Oxathiane	ECBC IOP-MT-08
		Dithiane	ECBC IOP-MT-08
		Thiodiglycol \[1]	ECBC IOP-MT-57, Appendix IV
	HTW Parameters	VOCs and TICs \[2]	SW-846 8260B
		SVOCs and TICs	SW-846 8270D
		Pesticides and PCBs	SW-846 8081B and SW-846 8082A
		Metals	SW-846 6010C/6020A/7470A/7471B
		Explosives	SW-846 8330B
		Cyanide	SW-846 9010C/9014
		Fluoride	E300.0
		Iodide	SW-846 9056A
		Perchlorate	SW-846 6850
	Disposal Characterization Parameters	TCLP VOCs	SW-846 1311/8260B
		TCLP SVOCs	SW-846 1311/8270D
		TCLP Metals	SW-846 1311/6010C or 6020A and SW-846 1311/7470A
		Corrosivity	SW-846 9040C and SW-846 9045D
		Ignitability	Modified SW-846 1020A and SW-846 1030

[1] To prevent false positives from plastics and other household products, thiodiglycol analysis will be conducted only after confirmation of oxathiane and dithiane.

[2] For ***confirmation sampling***, VOCs will be sampled with the Terra Core device, prep method SW-5035A.

4 FIELD SAMPLING

The following section describes the field sampling procedures for various types of samples, QC sampling procedures, sample designations, sampling equipment decontamination procedures, and surveying procedures.

4.1 CONFIRMATION SAMPLES

4.1.1 Sample Collection – Confirmation Samples

4.1.1.1 For purposes of confirming that the soil at the excavation boundaries of the low and high probability areas meet with the Spring Valley analytical comparison standards, sidewall samples will be collected at the mid-point of the grid or partial grid along the excavation boundary in a 20-foot linear increment. The proposed sampling locations are illustrated in Figure 4-1. No samples are proposed adjacent to Area C because the area was previously excavated and clean backfill was placed to cover the excavation. The following three vertical samples will be collected at one sidewall sampling location:

- 0-0.5' beneath existing ground surface or clean backfill (where applicable);
- 0.5' above the maximum excavation depth; and
- A mid-point sample will be collected at the mid-point of the maximum excavation depth if the depth is greater than 5 feet. The mid-point sample will not be collected if the excavation depth is less than 5 feet. The excavation depth will be measured from existing ground surface or beneath clean backfill (where applicable) to the bottom of the excavation.

An additional confirmation sample will also be collected after removal of arsenic impacted soil at the curve of the retaining wall next to the driveway.

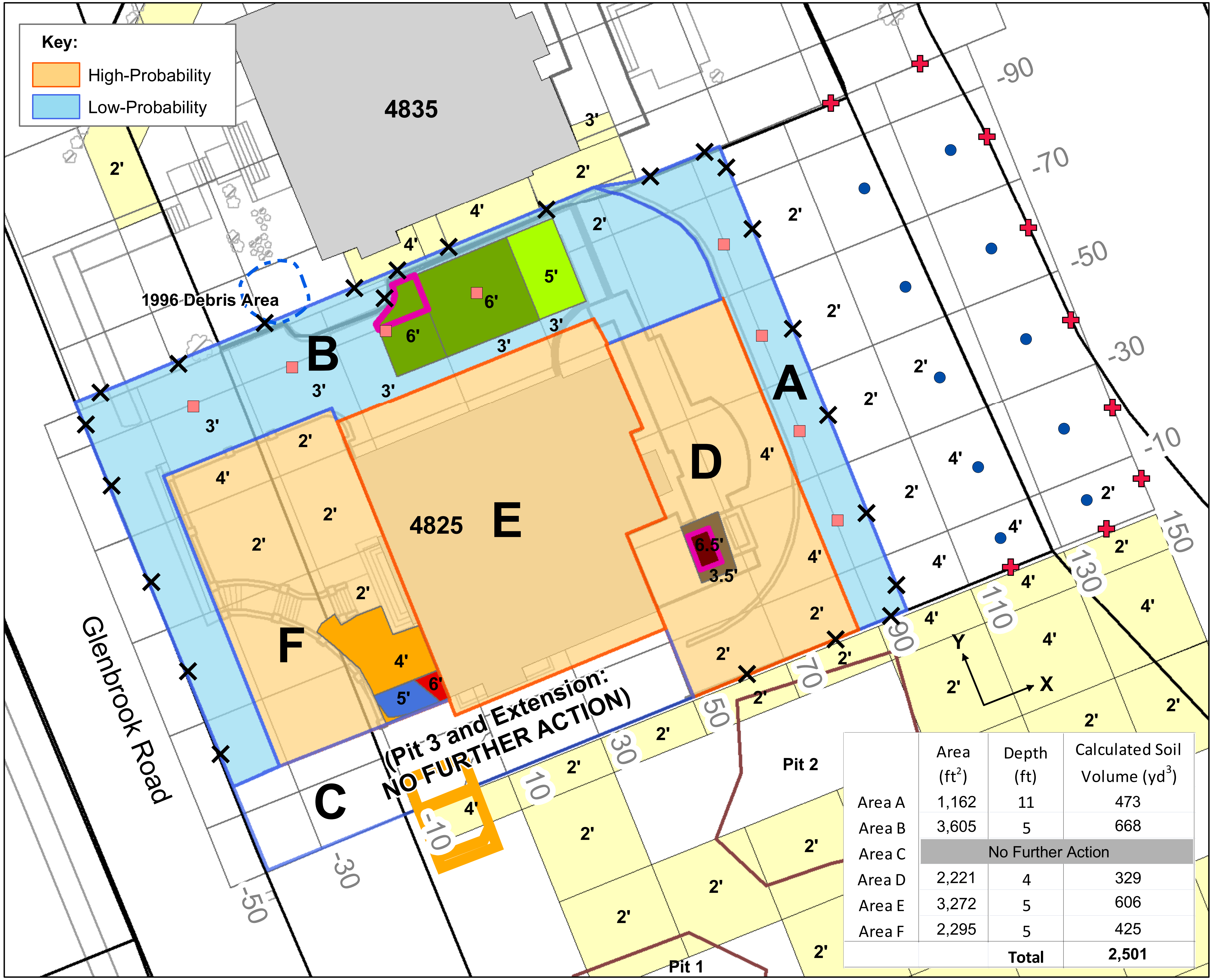
4.1.1.2 Confirmation samples for floor soil clearance will also be collected when the excavation does not reach bedrock. These floor samples will be collected from the center of a 20 foot grid at locations where bedrock is not reached.

4.1.1.3 Soil samples will be collected using clean, disposable sampling equipment from locations in the excavation boundary. All sample locations will have their depth below ground surface (bgs) recorded in feet and inches. The collected soil samples will be analyzed for HTW parameters by an HTW Laboratory following clearance for CA.

4.1.1.4 If the sample collected at any location exceeds the Spring Valley remedial goal of 20 mg/kg for arsenic, the location will be excavated further in 1 foot increments and additional samples will be collected to confirm to ensure that arsenic concentration is below 20 mg/kg. The excavation will be extended to the full depth of the sidewall, and 10 feet in both directions laterally from the sample point. Confirmation sampling procedures are provided in Table 4.1.

Table 4.1
Confirmation Soil Sampling Procedures

PROCEDURE
1. The sampling team will send a bucket liner containing three 4-ounce pre-labeled jars, two 8-ounce pre-labeled jars, three 40-mL VOA vials, a trowel, Terra core sampler and zipper-lock bags to the excavation team. The sample team will inform the excavation team of the location and depth of the samples. 2. The excavation team will record the sample description (depth, time, date and location) in the field log book or relay this information from inside the exclusion zone to the sample team via hand held radio. 3. The excavation team will remove dirt from the outside of the jars with a dry brush, wipe the exterior of the jars with the decontamination fluid (bleach solution), dry, and place in a zipper-lock bag. 4. If more than one location is to be sampled at one time, the jar lids and the jars of each sample will be marked by the excavation team with the proper sample identifier. 5. The excavation team will decontaminate the spoon after each sample is collected or use disposable spoons for each new location. 6. Once the exteriors of the sample jars are decontaminated, they will be passed outside the Exclusion Zone (EZ) to the Sample Team. 7. The Sample Team will fill out Chain of Custody (COC) forms for the HTW samples and for the on-site and off-site CA/ABPs analyses. 8. The samples will be held on ice until cleared for CA/ABPs. The Sample Team will submit the HTW samples to the HTW laboratory after CA clearance. Terra core sampler will be used for VOC samples to meet the holding time requirements.



	Area (ft^2)	Depth (ft)	Calculated Soil Volume (yd^3)
Area A	1,162	11	473
Area B	3,605	5	668
Area C	No Further Action		
Area D	2,221	4	329
Area E	3,272	5	606
Area F	2,295	5	425
		Total	2,501

Figure 4-1
Proposed Confirmation Soil Sample Locations
4825 Glenbrook Road

Spring Valley
Washington, D.C.

Legend

▨	Buildings
☐	Property Boundaries
☐	20' Grid
—	Pits 1 and 2
🟧	Test Pit 23 (Burial Pit 3)
☐	Arsenic Exceedance to be Further Excavated

Arsenic Soil

🟩	Arsenic Grid Previously Removed [5'] (2009)
🟩	Arsenic Grid Previously Removed [6'] (2009)

Soil Excavation

🟫	Excavation Depth [3.5'] (2009)
🟧	Excavation Depth [4'] (2010)
🟦	Excavation Depth [5'] (2010)
🟥	Excavation Depth [6'] (2010)
🟥	Excavation Depth [6.5'] (2009)
⬚	1996 APEX Tree Removal (Debris Area) Perimeter
🟨	Previously Excavated Arsenic: Adjacent Properties
✕	Sidewall Confirmation Sample Location
■	Insitu RCRA Disposal Samples
●	Area Characterization Sample Location
✚	Sidewall Characterization Sample Location

Notes:
1. Sidewall confirmation samples on the east side of Area A will be collected on a 1:1 slope. Therefore, actual locations may vary from those depicted here.

2. Excavation depths shown from previous arsenic removal.

0 10 20 40 Feet

1 inch = 20 feet

Scale: 1:245
Created By: Parsons
File: 20120305 4825 Glenbrook Road Confirmation Sxs.mxd
Date: 3/05/2012
Figure Number: 4-1
Page Number: -

PARSONS

4.1.2 QC Sampling – Confirmation Samples

Several types of field QC samples will be collected for sidewall confirmatory soil sampling. See UFP-QAPP Worksheet 20 for the required frequency of each type of QC sample.

4.1.2.1 **Sample Designation – Confirmation Sample.**

The site-specific plan will describe a sample nomenclature system designed to track each type, location, and container associated with the sample. The collected sidewall confirmation samples will use the following site-specific sample designations:

RA-4825GR-(Area No)(Sidewall Direction)(Grid No.)(Location)(Sample No.)(Depth Taken)

4.1.2.2 The first two letters (RA) denote Remedial Action. The next code identifies the site-specific location. The location for the Confirmation samples will be “EW” for “East Wall,” “SW” for “South Wall,” “NW” for “North Wall,” and “WW” for “West Wall”. Sample Numbers will begin with 01 for each grid. Sample depths will be denoted in feet (e.g., “5”, “2.5”). For example, RA-4825GR-EW-EX22-01-04 would be the east wall confirmation sample for Grid EX22 and RA-4825GR-WW-EX22-03-04 would be the third west wall confirmation sample for Grid EX22 at a depth of four feet (meaning that two other west wall confirmation samples had already been collected from that grid).

4.1.2.3 All QC samples associated with pit characterization samples (except for MS/MSD, TB, and EB samples) will be labeled as normal field samples such that the laboratory does not have the knowledge that they are QC samples. The above sample designation codes will be used for the QC samples (except for MS/MSD samples). The logbook will contain an additional set of characters at the end of the sample name described above to identify the type of QC sample (e.g. DUP01, EB01, etc.). The QC samples will be numbered consecutively for a given type for each sampling event. For the MS/MSD samples, the laboratory will be notified appropriately by adding the MS/MSD characters to the sample code (MS01 or MSD02, for example).

4.2 AREA CHARACTERIZATION SAMPLES

4.2.1 Sample Collection – Area Characterization Samples

4.2.1.1 For purposes of confirming that the soil in areas of ECBC equipment staging meet with the Spring Valley analytical comparison standards, sidewall samples will be collected at the mid-point of the grid or partial grid along the excavation boundaries in a 20-foot linear increment. The proposed sampling locations are illustrated in Figure 4-1.

- 0-0.5' beneath existing ground surface or clean backfill (where applicable);
- 0.5' above the maximum excavation depth; and
- A mid-point sample will be collected at the mid-point of the maximum excavation depth if the depth is greater than 5 feet. The mid-point sample will not be collected if

the excavation depth is less than 5 feet. The excavation depth will be measured from existing ground surface or beneath clean backfill (where applicable) to the bottom of the excavation.

4.2.1.2 Area Characterization samples for floor soil characterization will also be collected when the excavation does not reach bedrock. These floor samples will be collected from the center of a 20-foot grid at locations where bedrock is not reached.

4.2.1.3 Soil samples will be collected using clean, disposable sampling equipment, from locations in the excavation boundary. All sample locations will have their depth below ground surface (bgs) recorded in feet and inches. The collected soil samples will be analyzed for HTW parameters by APPL following clearance for CA.

4.2.1.4 If the sample collected at any location exceeds the Spring Valley remedial goal of 20 mg/kg for arsenic, the location will be excavated further in 1 foot increments and additional samples will be collected to confirm that the arsenic concentration is below 20 mg/kg. The excavation will be extended to the full depth of the sidewall, and 10 feet in both directions laterally from the sample point. For other analyzed compounds where remedial goals were not developed, the characterization sample results will be analyzed in accordance with Section 10.1 of this SSWP. Area Characterization sampling procedures are provided in Table 4.1.

4.2.2 QC Sampling – Area Characterization Sample

Several types of field QC samples will be collected for sidewall characterization soil sampling. See UFP-QAPP Worksheet 20 for the frequency requirement of each type of QC sample.

4.2.3 Sample Designation – Area Characterization Sample

4.2.3.1 The site-specific plan will describe a sample nomenclature system designed to track each type, location, and container associated with the sample. The collected sidewall characterization samples will use the following site-specific sample designations:

RA-4825GR-(Area No)(Sidewall Direction)(Grid No.)(Location)(Sample No.)(Depth Taken)

4.2.3.2 The first two letters (RA) denote Remedial Action. The next code identifies the site-specific location. The location for the characterization samples will be “EW” for “East Wall,” “SW” for “South Wall,” “NW” for “North Wall,” and “WW” for “West Wall”. Sample Numbers will begin with 01 for each grid. Sample depths will be denoted in feet (e.g., “5”, “2.5”). For example, RA-4825GR-EW-EX22-01-04 would be the east wall characterization sample for Grid EX22 and RA-4825GR-WW-EX22-03-04 would be the third west wall characterization sample for Grid EX22 at a depth of four feet (meaning that two other west wall characterization samples had already been collected from that grid).

4.3 BACKFILL

4.3.1 Backfill Sampling

4.3.1.1 Backfill operations will be completed by Parsons using off-site materials. Soil removed during excavation will be replaced by clean fill that has been approved as backfill. USACE Baltimore District (CENAB) will coordinate site restoration.

4.3.1.2 The soil and topsoil to be used for backfill at the 4825 Glenbrook Road property will be sampled and analyzed in general accordance with the U.S. Environmental Protection Agency’s (EPA’s) December 6, 2001 letter to USACE. Four samples will be collected per 1,000 cubic yards of homogenous backfill from random locations at the surface of each pile. One sample will be a six point composite; the remaining samples will be collected as discrete samples.

4.3.1.3 The composite samples will be analyzed for:

- Target compound list (TCL) pesticides (SW-846 Method 8081B);
- TCL polychlorinated biphenyls (PCBs) (SW-846 Method 8082A);
- TCL semivolatile organic compounds (SVOCs) (SW-846 8270D); and
- Target analyte list (TAL) metals, plus boron and tin (SW-846 Method 7471B for mercury, SW-846 Methods 6010C and 6020A for others).

4.3.1.4 The discrete samples will be analyzed for:

- TCL VOCs and TICs (SW-846 Method 8260B);
- TCL pesticides (SW-846 Method 8081B);
- TCL PCBs (SW-846 Method 8082A);
- TCL SVOCs and TICs (SW-846 8270D); and
- TAL metals, plus boron and tin (SW-846 Method 7471B for mercury, SW-846 Methods 6010C and 6020A for others).

4.3.1.5 Backfill material will be purchased and stockpiled at the Federal Property. The backfill soil will be classified in accordance with American Society of Testing and Materials (ASTM) D 2487. Backfill material will be tested for Atterberg limits (ASTM D 4318), grain-size distribution (ASTM D 422), and compaction characteristics (ASTM 698) at a frequency of once per 1,000 cubic yards.

4.3.1.6 Soil will be compacted to 85 percent of maximum dry density for cohesive soils or 85 percent of maximum dry density for cohesionless soils (ASTM 698) unless otherwise specified in the SSWP. Density tests will be performed at a frequency of once per 10,000 square feet per lift. A minimum of one density test will be performed on each lift of backfill placed. Field in-place dry density will be determined IAW ASTM D 1556, ASTM D 2167, or ASTM D 2922. If ASTM D 2922 is used, a minimum of one in ten tests will be checked using ASTM D 1556 or ASTM D 2167. Test results from ASTM D 1556 or ASTM D 2167 will govern if there is a discrepancy with the ASTM D 2922 test results.

4.3.2 Sample Designation

4.3.2.1 All backfill and topsoil samples will have the following alphanumeric sample IDs;

- XX-BF01-0912 or XX-TS01-0912

4.3.2.2 The first two characters represent the project (RA for Remedial Action). The next four characters indicate the type and number of samples collected. The last set of characters indicates the date the samples were collected. For example, the sample name "RA-BF01-1010" would be used for the first discrete backfill sample collected on October 10, or "RA-BF01(c)-1010" for the first composite backfill sample collected on October 10.

4.3.3 Quality Assurance/Quality Control (QC) Sampling – Backfill

4.3.3.1 See UFP-QAPP Worksheet 20 for the frequency requirement of each type of QC sample.

4.3.3.2 FD samples will be numbered using the same system as the backfill samples (see above). The MS/MSD samples will have the following alphanumeric code:

- XX-BF-MSD##

4.3.3.3 The first two characters represent the remedial action project. The next two characters indicate that it is a backfill sample. The last five characters indicate the type of QC sample (e.g. MSD01, MS01, etc.). The QC samples will be numbered consecutively for a given type. As an example, the sample number "RA-BF-MSD01" could be used for the first MSD collected for backfill material for the site-wide operations.

4.4 SCRAP

4.4.1 Sample Collection - Scrap

4.4.1.1 Scrap items (e.g., scrap metal and debris recovered from the excavations) will be assumed to be CA contaminated. All metal scrap and debris will undergo the headspace analytical screening procedure. The scrap will be double-bagged by the excavation team and removed outside of the ECS. The headspace analysis will be conducted in accordance with the air monitoring plan included in Appendix J.

4.4.1.2 If the headspace results exceed the airborne exposure limit (AEL) for mustard or lewisite, the scrap will be decontaminated by the excavation team within the engineering control. Scrap pieces too large for the drums will be cut into manageable pieces after decontamination.

4.4.2 QC Samples – Scrap

No QC sampling is associated with scrap items.

4.4.3 Sample Designation - Scrap

4.4.3.1 The headspace analysis scrap samples will have the following alphanumeric code:

- RA-4825GR-SCR-##

4.4.3.2 The first two characters represent the project, while the next code identifies the site-specific location. The next three characters indicate that it is a scrap sample. The last two characters indicate the number of the scrap container. The scrap samples will be numbered consecutively.

4.5 AQUEOUS IDW DISPOSAL CHARACTERIZATION SAMPLES

4.5.1 Sample Collection – Aqueous IDW

Aqueous investigative derived waste (IDW) includes gross decontamination water and equipment or scrap decontamination water. This water will be accumulated in 55-gallon drums. One composite sample will be collected by the Sampling Team for every fifty drums of accumulated aqueous IDW and analyzed for disposal characterization. The samples will be collected using disposable PVC bailers supplied by the Sample Team. If separate phases of liquid are encountered in the drums (as observed in the bailer), care will be taken to sample each phase to allow for proper disposal characterization. Aqueous IDW sampling procedures are provided in Table 4.2.

Table 4.2
Aqueous IDW Characterization Sampling Procedures

PROCEDURE
1. The sample team will use a disposable PVC bailer to collect a sample from a set of fifty 55-gallon drums of accumulated aqueous IDW. At least one of every five drums will be sampled such that the composite is representative of the IDW. The bailer will be inserted and withdrawn and visually checked for phase separation. If separate phase liquids are evident, each phase will be sampled or the sample will be composited in a new bucket liner.
2. The sample team will fill the six 40-ml glass VOC vials (4 HTW and 2 ABP) first and then fill the remaining bottleware.
3. The sample team will wipe the exterior of the bottleware with the decontamination fluid (bleach solution), and dry.
4. The sample team will affix labels to all the bottleware with the proper sample identifier.
5. The sample team will fill out separate Chain of Custody forms for the CA/ABP sample(s) and the TCLP samples.
6. The sample team will submit the CA/ABP sample to the air monitoring team or contract surety laboratory and hold the TCLP sample on ice, under chain of custody protocols until CA/ABP analyses are complete.
7. If the CA/ABP sample is cleared for the presence of CA/ABP, the TCLP samples will be submitted to the APPL by the sample team. If CA/ABP is detected, then the TCLP samples will be placed into the appropriate drum to be disposed of as CA/ABP contaminated IDW.

4.5.1.1 The aqueous IDW characterization sample will be divided into two samples: one sample will be analyzed for agent by the air monitoring team or contract surety laboratory and the other sample will be analyzed for disposal characterization parameters by APPL. The disposal sample will be kept on site, on ice, under chain-of-custody protocols, until cleared for the presence of CA/ABP by the air monitoring team or contract surety laboratory. The remaining disposal samples associated with an agent-positive CA/ABP sample will not be sent to APPL and will be placed into the appropriate drum to be disposed of as agent contaminated IDW.

4.5.1.2 Disposal characterization data from the agent free samples will be used for the CA/ABP positive IDW samples collected on the same date and closest location. These data will be provided to the disposal facility where the drums containing agent are taken for disposal.

4.5.2 Sample Designation – Aqueous IDW

4.5.2.1 The agent and disposal characterization composite aqueous IDW samples will have the same alphanumeric code that is descriptive of the specific project, using the following format:

- RA-4825GR-IW-(##-##)-####

4.5.2.2 The first two characters represent the project, while the next code identifies the site-specific location. The next two characters indicate that it is an investigative waste sample. The next two characters indicate from which set of five drums the sample was collected. The last set of four characters indicates the month and day of sample collection. As an example, the sample number “RA-IW-(01-05)-0211” could be used for an IDW sample collected on February 11 during site-wide investigations from the first set of (5) drums generated.

4.5.3 QC Sampling – Aqueous IDW

QC samples are not required for aqueous IDW collected during the 4825 Glenbrook Road operations.

4.6 NON-AGENT INTACT CONTAINERS/INTACT CONTAINERS SUSPECTED OF CONTAINING AGENT

4.6.1 Sample Collection – Non-Agent Intact Containers/Intact Containers Suspected of Containing Agent

4.6.1.1 Intact containers determined by the Portable Isotopic Neutron Spectroscopy (PINS) technology to be non-agent, but which cannot otherwise be identified, will be sent to the Chemical Transfer Facility at Edgewood, Maryland for assessment. After the assessment, these items will be returned to the Federal Property to be processed for disposal. This is not expected to be a common occurrence. Characterization of these samples will be for disposal purposes (disposal characterization parameters as listed in Table 3.1). Analyses for unknowns may include site-specific HTW parameters.

4.6.1.2 Intact containers suspected of containing agent will be transported by CARA to ECBC analytical laboratory in Edgewood, Maryland for agent/ABP analysis. Full scan analysis will also be performed for intact containers, which sufficient samples can be collected.

4.6.2 QC Sampling – Non-Agent Intact Containers/Intact Containers Suspected of Containing Agent

No QC sampling is proposed for the non-agent intact container or intact containers suspected of containing agent samples.

4.6.3 Sample Designation – Non-Agent Intact Containers/Intact Containers Suspected of Containing Agent

4.6.3.1 The site-specific plan will describe a sample nomenclature system designed to track non-agent intact container or intact containers suspected of containing agent samples. The samples will have an alphanumeric code that uses the following format:

- RA-4825GR-IC-Sample Number

4.6.3.2 For example, the sample name "RA-4825GR-IC-001" will be assigned to the first non-agent intact container collected from the remedial action at 4825 Glenbrook Road.

4.7 SOIL DISPOSAL CHARACTERIZATION SAMPLES

4.7.1 Sample Collection – Soil Disposal

4.7.1.1 Representative composite samples for disposal characterization will be collected from the soil removed from the excavations as specified in the work plan. The number of samples to be collected for disposal characterization will be based on the type of containers (i.e. drums, roll-off, etc.) that store the excavated soil. The number of samples and collection procedures will be specified by the Sample Team leader. Detailed soil disposal characterization sampling procedures are provided in Table 4.3.

4.7.1.2 All soil disposal characterization samples will be split and one jar will be sent to the ECBC laboratory for CA/ABP analysis before being sent for further analysis by APPL. The split sample for HTW analysis will be kept on site, on ice or in a refrigerator in a secure location, under chain-of-custody protocols, pending the results of the CA/ABP analysis. Soil determined to contain CA/ABPs will not be sent for further HTW analysis and will be disposed of in accordance with the Site-Wide Work Plan, Chapter 3 (USACE 2007).

4.7.1.3 Following CA/ABP clearance, soil disposal characterization ("Resource Conservation and Recovery Act [RCRA] samples") and generator knowledge (or "waste profile") samples will be collected and analyzed to determine the waste profile and meet the disposal facility requirements.

4.7.2 CA Analysis

For intrusive operations, a representative composite soil sample will be collected from every roll-off container (or equivalent) of excavated soil for disposal characterization for each day. Following headspace analysis for CA clearance, this sample will be analyzed for CA/ABPs by ECBC.

4.7.3 RCRA Disposal Samples

4.7.3.1 One RCRA soil sample will be collected for each day of the remedial action during the high probability remediation when roll-off containers are used. One soil sample every three drums will be collected if drums are used. One RCRA soil sample will also be collected for each roll-off from low probability remediation. These samples will be collected as described below.

4.7.3.2 During remedial action excavation, composite soil samples will be collected from each roll-off container (or equivalent) as specified by the Sample Team Leader. The Sample Team Leader will ensure that these composite subsamples are collected to produce a representative sample from each roll-off container. These samples will be kept on site, on ice or in a refrigerator in a secure location, until cleared for the presence of CA/ABPs. When the individual composite samples have been cleared for CA/ABPs, they will be further composited into a single sample representing the day's production, and submitted to APPL (samples for VOC analysis will not be composited). These samples will be analyzed for the RCRA disposal characterization parameters shown in Table 3.1.

4.7.3.3 During excavation activities in locations outside high-probability areas and when dump truck/trailers are the preferred soil transport method, *in-situ* composite and stockpile composite soil samples will be collected for RCRA disposal characterization. The purpose of collecting *in situ* samples is to complete RCRA disposal characterization before the soil is excavated to facilitate the disposal process. The subsamples for each *in-situ* RCRA disposal characterization sample will be collected from at least four full or partial grid center point locations that make up the excavation area (see Figure 4-1 for proposed *in-situ* soil sample locations for low probability Areas A and B). Subsamples will be collected at the bottom and midpoint of the expected excavation depths in accordance with the procedure in Table 4.3 starting with line 5. The subsamples for each stockpile RCRA disposal characterization sample will be collected from four random stockpile locations. Following collection, these individual subsamples will be kept in a secure location on site, on ice or in a refrigerator, until cleared for the presence of CA/ABPs. When the individual subsamples have been cleared for CA/ABPs, they will be composited into a single RCRA disposal characterization sample representative of the applicable low probability area or stockpile, and submitted to APPL (samples for VOC analysis will not be composited). At least one *in-situ* composite or stockpile composite RCRA disposal characterization sample will be collected for every 1,000 cubic yards of soil. These RCRA disposal characterization samples will be analyzed for the RCRA disposal characterization parameters shown in Table 3.1. If AUES-related items or debris are encountered at any point during *in-situ* sampling or excavation activities, the soils will be containerized in drums or roll-offs and sampling will be conducted in accordance with the procedures described in section 4.6.

4.7.4 Waste Profile Samples

4.7.4.1 The purpose of the waste profile samples is to ensure that the disposal facility has sufficient knowledge of potential contaminants not addressed by the RCRA samples discussed above.

4.7.4.2 During remedial action activities, composite soil samples will be collected at locations as specified by the Sample Team Leader. The waste profile samples will be analyzed for the SVFUDS Comprehensive list parameters for soil (not including RCRA/TCLP). Collection of the composite sample will begin when glass or debris is first encountered in the excavation and will continue for 2 days after that. The Sample Team Leader will collect the composite portions from a range of roll-off containers/days to produce a representative sample, while maintaining overall sample holding times. The waste profile samples will be kept on site, on ice or in a refrigerator in a secure location, until the associated soil is cleared for the presence of CA/ABPs. Following CA/ABP the waste profile sample will be shipped to the HTW laboratory for analysis of the SVFUDS Comprehensive list parameters for soil.

4.7.5 QC Sampling – Soil Disposal Characterization

. No quality control samples will be collected for soil disposal characterization.

4.7.6 Sample Designation – Soil Disposal Characterization

4.7.6.1 The CA/ABP composite sample will have an alphanumeric code that is descriptive of the specific project, using the following format:

- RA-4825 GR -XX#-##-####

4.7.6.2 The first two characters represent the project. The next three characters indicate the location. The next two characters indicate from which set of drums the sample was collected. The last four characters indicate the month and day the sample was collected. For example, the sample number “RA-4825 GR- AreaA-01-0211” could be used for a sample collected from the first set of three drums generated on February 11 for excavation work at Area A for the 4825 Glenbrook Road remedial action activities.

4.7.6.3 The disposal characterization composite sample will be labeled on top of the jar lid and on the jar with an alphanumeric code that links it to the associated CA/ABP sample. In the example above, the disposal composite sample could be labeled “Area A-01”. This will allow the disposal characterization composite sample to track with the specific set of drums the CA/ABP composite sample is associated with. This is necessary to ensure that a disposal sample associated with a set of drums which was positive for CA/ABP is not submitted to a non-CA/ABP laboratory.

4.7.6.4 Disposal samples that have been identified as non-CA/ABP will be composited into a single sample for submittal to APPL. The non-CA/ABP samples will be composited daily. This final disposal sample will have the same sample number as the CA/ABP sample, absent the third set of characters that were used to identify the set of drums. In the example used above, the final disposal characterization sample would have the alphanumeric code “RA-Area A-0211”.

Table 4.3
Soil Disposal Characterization Sampling Procedures

SAMPLE COLLECTION PROCEDURE

1. The excavation team will prepare the 5 gallon composite bucket by lining the bucket with a new plastic liner (4 to 6 mil).
2. After a 5 gallon soil removal bucket is filled by the excavation team, a spoonful of soil (approximately 4oz.) will be taken from the soil removal bucket and placed into the lined composite bucket.
3. The excavation team will dump the remaining soil from the soil removal bucket into the 55-gallon drum or roll-off after the spoonful of soil is removed.
4. The excavation team will continue filling the composite bucket in this manner until three 55-gallon drums or a roll-off have been filled.
5. The excavation team will then homogenize the soil in the composite bucket by mixing the soil with the spoon.
6. After mixing, the excavation team will prepare the CA/ABP sample by filling two 4-ounce glass jars with soil from the composite bucket (Note: the number of jars will increase for split or QC samples).
7. After preparing the CA/ABP sample, the excavation team will prepare the disposal characterization sample by filling three 8-ounce jars with soil from the composite bucket.
8. The excavation team will remove dirt from the outside of the jars with a dry brush, wipe the exterior of the jars with the decontamination fluid (bleach solution), and dry.
9. The excavation team will discard the spoon and remove the plastic liner from the composite bucket and replace it with a new one. The used plastic liner will be placed in the same waste container as used PPE.
10. Once the exteriors of the sample jars are decontaminated, they will be passed outside the EZ to the Sample Team.
11. The Sample Team will affix labels to the 4-ounce CA/ABP jars with the proper sample identifier (these samples will be analyzed by the air monitoring team and contract surety laboratory). The Sample Team will label the lids and jars of the 8-ounce disposal characterization sample jars with the proper sample identifier (this sample will be further composited).
12. The Sample Team will fill out separate Chain of Custody forms for the CA/ABP sample(s) and the disposal sample.
13. The Sample Team will submit the CA/ABP sample to the air monitoring team and contract surety laboratory and hold the disposal sample on ice, under chain of custody protocols until CA/ABP analyses are complete.

(Note: These steps will be repeated until the day’s work is complete.)

TCLP COMPOSITE PROCEDURE

1. If the CA/ABP samples are cleared for the presence of CA/ABP, the TCLP samples will be composited by the Sample Team. If CA/ABP is detected in a sample, the associated TCLP sample will be placed into the appropriate drum to be disposed of as CA/ABP contaminated soil. The remaining TCLP samples will be composited as described below. TCLP data from the CA/ABP free samples collected on the same date will be provided to the disposal facility for the CA/ABP contaminated soil.
2. The Sample Team will composite the TCLP samples by pouring the contents of each 8-ounce jar into a stainless steel mixing bowl, mixing, and then filling three 8-ounce jars. The 8-ounce jars will be labeled with the proper TCLP sample identifier. The composite TCLP sample will be submitted to APPL for analysis. It should be noted that TCLP VOCs will not be composited.
3. All used emptied bottleware will be decontaminated in the same manner as sampling equipment.

4.8 SAMPLING EQUIPMENT DECONTAMINATION PROCEDURES

All non-dedicated sampling and measurement equipment will be decontaminated as detailed in Table 4.4. Sampling and measurement equipment will be decontaminated before each use and at the end of the day. At no time will decontaminated equipment be placed directly on the ground.

Table 4.4
Sampling Equipment Decontamination Procedures

PROCEDURE
The following procedures will be followed for decontaminating equipment before work at each new sampling location. All rinsate will be collected in rinsate collection pans/buckets:
1. Sampling equipment will be cleaned of all soil and obvious particles and immersed in 5% decontamination solution in the personnel decontamination station (PDS) by Chemical Biological Radiological Nuclear and Explosives (CBRNE) analytical remediation activity CARA personnel. The cleaned sampling equipment will then be passed on to the sampling team. The sampling team will NOT handle sampling utensils directly from the ECS.
2. The sampling team will place ½-inch baking soda in the bottom of a rinsate collecting bucket.
3. Rinse equipment with laboratory-grade detergent (Alconox) and potable water solution.
4. Rinse equipment with 1 percent (by volume) nitric acid solution.
5. Rinse with isopropyl alcohol.
6. Rinse with HPLC-grade deionized water.
7. Allow to air dry.
8. If equipment is not to be used right away, wrap sample equipment in aluminum foil.

4.9 LOCATION AND SURVEY INFORMATION

Sample locations will be surveyed for horizontal and vertical control. Elevations will be tied to benchmarks on site and referenced to the National Geodetic Vertical Datum. Horizontal locations will be tied to the existing on site benchmarks in the Maryland State Plane feet, North American Datum 1927 coordinate system. Horizontal orientation locations will be accurate to ±0.1 feet and vertical orientation elevations accurate to ±0.01 feet. The excavation team will measure all pit characterization sample locations relative to the stakes when the sample is collected.

5 SAMPLE HANDLING AND SHIPMENT

5.1 BOTTLE TYPES, PRESERVATION, AND HOLDING TIME REQUIREMENTS

5.1.0.1 All samples collected at the site will be placed in an appropriate sample container for preservation and transfer to the designated laboratory. The sample container types, preservatives, and holding time requirements for potential analyses are specified in worksheet 19 of the UFP-QAPP. All sample containers, including CA/ABP bottleware, will be supplied by APPL. APPL has the responsibility to ensure all sample containers are properly cleaned before shipment. No chemical preservatives are required for the soil or water samples to be collected for this project.

5.2 SHIPMENT

5.2.0.1 HTW samples will be delivered APPL by FedEx or UPS. The Parsons Project Chemist will contact APPL daily to inform them of anticipated HTW sample shipments.

5.2.0.2 Hard plastic ice chests will be used for shipping samples. Each container will be lined with a plastic garbage bag. Styrofoam or bubble wrap will be used to absorb shock and prevent breakage. After packing is complete, the plastic bags lining the cooler will be sealed to prevent leakage. Ice will be packed in sealable plastic bags and placed around the bottleware to maintain a temperature at or below 6°C.

5.2.0.3 The COC and any other documentation will be placed in a waterproof plastic bag and taped to the underside of the container lid. The container will then be secured with custody seals affixed across top and bottom joints. Sample shipping containers will be marked in accordance with current U.S. Department of Transportation (DOT) and International Air Transport Association (IATA) dangerous goods regulations, as applicable. In addition to labeling each container with complete mailing addresses, each container will be clearly marked with "this end up" arrows, a label on each side of the container indicating the proper "shipping name" of the samples, and a sticker containing the originator’s address.

6 FIELD PROCEDURES

6.0.0.1 For all sampling activities addressed in this section, samples will be collected using bottleware supplied and labeled by the Sample Team. All HTW samples will be held on site in a refrigerator under full chain of custody protocols until the results of CA/ABP analyses are completed by the air monitoring team or contract surety laboratory.

6.0.0.2 Sample custody procedures will be observed to support the validity of the data. To reduce the chance for error, the number of personnel handling the sample will be minimized. On-site monitoring data will be controlled and entered in permanent log books. Personnel involved in the chain-of-custody and transfer of samples will be trained and indoctrinated on the approved procedures prior to implementation.

6.0.0.3 Sample custody and documentation procedures described in this section will be followed for all project sample collection activities. Proper sample custody procedures include the use of field log books, sample labels, custody seals, and chain-of-custody forms.

6.1 DAILY QUALITY CONTROL REPORTS

6.1.0.1 When sampling activities occur, daily quality control reports (DQCRs) will be prepared daily, dated, and signed by the Site Manager. The DQCR will be included with the Site Manager's Daily Report. These will be sent to the USAESCH PM and the USAESCH Project Chemist. The DQCR will include weather information at the time of sampling, field instrument measurements, calibrations, identification of all field and control samples taken, the status of each sample, departures from the SAP, any problems encountered, and on-site verbal or written instructions authorized from Government personnel. Any deviations that may affect data quality objectives will be conveyed to the USAESCH PM and USAESCH project chemist immediately.

6.2 FIELD LOG BOOKS

6.2.0.1 All parties involved in data collection will be required to document field activities in a log book as described below. Each field log book will receive a serialized number. Field log books will be maintained by the field operations manager and other team members to provide a daily record of significant events, observations, and measurements during the field investigation. All entries will be signed and dated.

6.2.0.2 All information (except formal laboratory chain-of-custody forms) pertinent to field survey and/or sampling activities will be recorded in the log books. The books will be bound with consecutively numbered pages. Entries in the log book will include, at a minimum, the following information:

- Name and title of author, date and time of entry, and physical/environmental conditions during field activity.

- Purpose of sampling activity.
- Location and description of sampling point.
- Name and title of field crew
- Ambient weather conditions.
- Sample media (e.g., pit characterization soil, etc.).
- Sample collection method.
- Number and volume of sample(s) collected.
- Date and time of collection.
- Sample identification number(s).
- Sample distribution (e.g., laboratory).
- Any field measurements made.
- References for all maps and photographs of the sampling site(s). and
- Information pertaining to sample documentation such as:
    - Bottle lot numbers.
    - Dates and method of sample shipments.
    - Chain-of-Custody Forms.
    - Unusual incidents, problems, and accidents experienced.

6.2.0.3 All original data recorded in field log books and sample labels will be written with waterproof ink. The bottom of each page of a daily entry will be dated. The last page of a daily entry will be signed and dated. No controlled serialized documents will be destroyed. If an error is made on a controlled document assigned to an individual, that individual will make all corrections simply by crossing a line through the error, initializing the error, and entering the correct information. The erroneous information will not be erased. Any subsequent error discovered on a controlled document will be corrected by the person who made the entry. All subsequent corrections will be initialed and dated.

6.3 SAMPLE LABELS

6.3.0.1 All samples obtained for the 4825 Glenbrook Road will be placed in the designated sample container for preservation and shipment to the laboratory. Each sample will be identified with a separate identification label which includes the following information:

- Analyses to be performed
- Project: Site Name and Project Code (Project No.)
- Sample description (soil or water, grab or composite)
- Unique sample identification number as specified in Section 5.3 of this SAP
- Preservatives used and any other field preparation of the sample
- Date

- Time (a four-digit number indicating the 24-hour clock time of collection), if not already included in the sample name
- Remarks (such as MINICAMS readings, etc.)
- Sampler's initials

6.4 CUSTODY SEALS

6.4.0.1 When samples are to be shipped to the laboratory they will be placed in shipping containers sealed with custody seals. The shipping container will be secured and a seal provided by the laboratory will be affixed to the latch. Clear tape will be placed over the seals to ensure that seals are not accidentally broken during shipment. A seal broken prior to receipt at the laboratory indicates possible tampering. The laboratory will contact the field operations manager and the sample will not be analyzed if tampering is apparent.

6.5 CHAIN-OF-CUSTODY RECORDS

6.5.0.1 All samples will be accompanied by a COC. A COC accompanies the sample from initial sample container selection and preparation at the laboratory, shipment to the field for sample collection and preservation, and return to the laboratory. If samples are divided and sent to different laboratories, a COC will be sent with each sample. Each COC will be uniquely numbered. The remarks column is used to record specific considerations associated with sample acquisition such as sample type, container type, sample preservation methods, and analyses to be performed. When transferring samples, the individual relinquishing and receiving should sign, date, and note the time on the record.

6.5.0.2 The field operations manager will indicate the sample designation/location number in the space provided on the appropriate COC for each sample collected. Two copies of this record will follow the samples to the laboratory. The laboratory maintains one file copy, and the completed original is returned to the project manager as a part of the final analytical report. This record will be used to document sample custody transfer from the sampler, to another team member, to a shipper, or to the laboratory.

7 CHEMISTRY DATA QUALITY/QUALITY CONTROL

7.1 CHEMISTRY REQUIREMENTS

7.1.0.1 The overall quality assurance (QA) objective for the project is to develop and implement procedures that will provide data that are of known, documented, and defensible quality. Quality is ensured through appropriate sample collection, preservation and transport methods combined with an evaluation of analytical performance through the analysis of quality control (QC) samples. The data generated will be used to:

- determine the extent of excavation for contaminated soils;
- make appropriate soil and/or water disposal determinations; and
- characterize the contents of intact containers.

7.1.0.2 The project will be conducted in accordance with SW-846 methodology and criteria for some analytical parameters and other EPA-approved methods for other parameters (see Attachment A). For the SVFUDS, SW-846 analyses and other EPA-approved method analyses will be analyzed by APPL. For the purposes of this SAP, analytical procedures and lab QC requirements are based on information from APPL, Inc.

7.1.1 Data Quality Objectives (DQOs) and the DQO Process

7.1.1.1 Data quality objectives (DQOs) are qualitative and quantitative statements that define the acceptability of data generated by a study. The data generated by this study must be of sufficient quality to be used to complete the investigation in accordance with USEPA requirements. The DQOs are used for designing the sampling plan and data collection program for the investigation of the site.

7.1.1.2 There are seven steps to the USEPA's DQO process. Application of the DQO Process assists the site manager's plans to collect data of the right type, quality, and quantity to support defensible site decisions. The *Data Quality Objectives Process for Hazardous Waste Site Investigations (QA/G-4HW)* (USEPA, 2000) provides general, non-mandatory guidance on developing DQOs for environmental data collection operations in support of hazardous waste site investigations. The DQOs for this project were developed using this guidance.

7.1.1.3 The DQO Process is a seven-step iterative planning approach used to prepare plans for environmental data collection activities. It provides a systematic approach for defining the criteria that a data collection design should satisfy, including: when, where, and how to collect samples or measurements; determination of tolerable decision error rates; and the number of samples or measurements that should be collected. DQOs, outputs of the DQO Process, are qualitative and quantitative statements that are developed in the first six steps of the DQO Process. DQOs define the purpose of the data collection effort, clarify what the data should represent to satisfy this purpose, and specify the performance requirements for the quality of information to be obtained from the data. These outputs are then used in the seventh and final step of the DQO Process to develop a data collection design that meets all performance criteria and other design requirements and constraints.

7.1.2 Step 1 The Problem

7.1.2.1 The planning team for this project includes the USACE, USEPA (Region III), and the DDOE. Technical execution of the project plan is carried out by USACE and its contractors. Oversight is provided by both DDOE and USEPA.

7.1.2.2 The conceptual site model (CSM) for the SVFUDS was initially developed by the USACE in the previous SVFUDS reports. The original conceptual site model (CSM) developed for this site was based on historical information and photographic interpretation. Based on the historical data, the CSM assumed that a Burial Pit could be located at this property. Previous investigation results show that CWM was found in the vicinity of the back porch, and near the front door of 4825 Glenbrook Road. Burial Pit 3 was also located near the house. Based on all past investigations at the site, there is evidence the developer of the property partially disturbed the original burial pit(s). As such, there is a high potential for CWM to be located throughout the site in areas that have not been investigated/excavated to saprolite/bedrock.

7.1.3 Step 2 Identify the Decision

7.1.3.1 Based on the Decision Document at 4825 Glenbrook Road (USACE 2011), the remedial goals for 4825 Glenbrook Road Remedial Action is: 20 mg/kg for arsenic. The specific remedial action objectives are:

a) Prevent direct contact with soil having non-carcinogenic Hazard Index (HI) exceeding 1

b) Prevent direct contact with soil having a cancer risk in excess of 1 x 10^{-4}

c) Recovered Chemical Warfare Materiel (RCWM) and Discarded Military Munitions (DMM)/Material Documented as an Explosive Hazard (MDEH) will be removed to eliminate unacceptable risk or hazards, which we expect will allow for Unrestricted Use/Unlimited Exposure (UU/UE) use of this property

7.1.3.2 The objectives of the work at 4825 Glenbrook Road are to:

- Remove and dispose of the residence, including the home, foundations, slabs, all utilities (i.e.to include relocation and replacement), driveway, sidewalks, and landscaping adjacent to the house;
- Perform low and high probability intrusive activities to safely remove soil, any RCWM or CACM hazards, and any other AUES-related items and debris that remain within the low and high probability areas;
- Properly dispose of all solid and hazardous waste;
- Maintain a detailed accounting of all CWM and CACM and provide appropriate disposal and disposition of related items or waste;
- Conduct all activities in accordance with health and safety protocols to be protective of workers and the public;
- Collect data to confirm that the remediation goals are met.

- Prepare, submit, and obtain acceptance of a Remedial Action Closeout Report (RACR); and
- Provide technical and community relations support to accomplish these tasks.

7.1.4 Step 3 Identify the Inputs to the Decision

7.1.4.1 For processing of contaminated solids or liquids, the inputs for the decision are the parameters, analytes, and comparison values presented in Worksheet 15 of Attachment A (UFP-QAPP). UFP-QAPP Worksheet 15 includes all parameters and analytical methods involved in this project. The parameters and comparison values shown in Worksheet 15 of the UFP-QAPP, Attachment A, constitute the SVFUDS Comprehensive list. They were specifically developed by the Spring Valley Partners for the Spring Valley site. Over a series of meetings, the Partners reviewed all chemicals documented as having been used at the AUES. The list was refined by considering whether analytical methods were available and by using chemical and physical properties to assess whether the chemical could be present under site conditions. The comparison values for soil were similarly developed through the consensus process, while the comparison values for water were largely a function of the sewer permit under which water encountered will be discharged. Table 3.1 in Section 3 presents the summary of the parameters required to address all the chemicals on the SVFUDS Comprehensive list.

7.1.5 Step 4 Define the Boundaries of the Study

7.1.5.1 The spatial boundaries of the SVFUDS are shown in the SSWP (Chapter 1, Figure 1-1).

7.1.5.2 For proper disposal of the excavated soil and/or water generated, the inputs for the decisions are the concentrations of selected analytes [RCRA Characteristics of Ignitability and Corrosivity; RCRA Toxicity Characteristic Leaching Procedure (TCLP) Metals, VOC and SVOC Analysis]; and the regulatory limits/landfill acceptance criteria. The regulatory limits are shown in Worksheet 15 of the UFP-QAPP, Attachment A.

7.1.6 Step 5 Develop Decision Rule

7.1.6.1 The parameters of interest for the surface and subsurface soil are presented in Worksheet 15 of the UFP-QAPP, Attachment A. The general decision rule for soil excavations is that if the concentration of any of the listed CA or ABPs or arsenic exceeds the comparison value, then further lateral excavation is warranted in that grid. If those comparison values are not exceeded, the excavation is considered complete for CA and ABPs, and may be backfilled.

7.1.6.2 The general decision rule for HTW constituents is that if the concentration of any HTW analyte listed in Worksheet 15 of the UFP-QAPP, Attachment A, exceeds the comparison value, then further lateral excavation and further sampling may be performed until the area is below the comparison value for that compound; or performance of risk assessment calculations to evaluate future risk potential if that soil remains in place. For an intact container, the comparison values will be used to determine appropriate disposal.

7.1.7 Step 6 Limits on Decision Error

The following are the limits on decision errors with respect to the soil analysis. The baseline condition or null hypothesis would be that following excavation, the remaining soil has lower concentrations of analyzed parameters than does background soil. There are two possible decision errors that could be made based on the environmental data: **Type I** - deciding that a grid is not contaminated when, in fact, it is contaminated; or **Type II** - deciding that the grid is contaminated, when in fact, it is not. In the first case, unacceptable contamination would be left on site. In the second case, unnecessary removal would be performed. The acceptable probability of a Type I decision error is a 5% probability of not excavating further when it is contaminated. The acceptable probability of a Type II decision error is a 20% probability of excavating further when the remedial objective has already been met.

7.1.8 Step 7 Optimize the Design

The design of the sampling and analysis plan is being optimized through review by USAESCH, CENAB, USEPA, and DDOE, by limiting the study area to locations identified as most likely to have been impacted, and by sampling for constituents identified as COCs.

7.1.9 Roles and Responsibilities

All data will be received from the laboratories by the Parsons Project Chemist, Ms. Tammy Chang. The Project Chemist will review the data with the Parsons Project Manager, Mr. Sean Buckley. Only final data from the labs can be released to other stakeholders. Should it become necessary to release data that have not been validated by the Parsons chemists, this will be done with the data marked as preliminary.

7.1.10 Environmental and Disposal Analyses Procedures

7.1.10.1 All CA (mustard and lewisite) samples and ABP (CVAA/CVAO, thiodiglycol, dithiane, and oxathiane) samples will be analyzed by ECBC in accordance with their Sample and Analysis Plan presented in Appendix J of the Site-Specific Work Plan.

7.1.10.2 APPL will perform all grab, composite waste profile, and disposal analyses for parameters and methods listed in Table 3.1.

7.2 QUALITY ASSURANCE ELEMENTS

7.2.1 Lab QC Sampling Procedures

7.2.1.1 **Internal Quality Control** - The overall effectiveness of a QC program depends on field and laboratory activities being conducted in accordance with a program that ensures the precision and accuracy of analyses by detecting errors and preventing recurrences or measuring the degree of error inherent in the activities and procedures. The field QC samples to be used during this project are described in this section. The routine laboratory QC samples to be employed during the project are also discussed. Worksheets 19 and 28 of the UFP-QAPP summarize the internal QC requirements including the frequency, acceptance criteria, and corrective action for each type of field or laboratory QC sample.

7.2.1.2 **Field Quality Control Samples** - Field QC samples are used to assess the representativeness of the sampling activities. They are designed to determine what effects activities such as sample container cleaning, sample collection, field decontamination, bottling and shipping have on sample integrity and to ensure that samples sent to the laboratory are representative of site conditions. Field QC samples collected in support of this project are listed in the UFP-QAPP Worksheet 20.

7.2.1.3 **Laboratory Quality Control Checks -** Laboratory analyses will be conducted in accordance with the appropriate analytical methods. Laboratory QC checks will include calibration standards, reagent or method blanks, surrogate and matrix spikes, matrix spike duplicates, laboratory duplicates, and laboratory control samples. The frequency, acceptance criteria, and corrective action requirements for each laboratory QC check are summarized in Worksheet 28 of the UFP-QAPP.

7.2.1.4 **Bottle Types, Preservation, and Holding Time Requirements** - All samples collected at the site will be placed in an appropriate sample container for preservation and transfer to the appropriate laboratories. All sample containers will be supplied by APPL. APPL has the responsibility to ensure that all sample containers are properly cleaned before shipping them to the site. Sample preservation requirements are indicated in Worksheet 19 of the UFP-QAPP.

7.2.1.5 **Sample Numbering -** A sample numbering system will be used to identify each sample. The numbering system will be a tracking mechanism to allow retrieval of information about a particular location and to ensure that each sample is uniquely numbered. A listing of sample numbers will be maintained by the field team leader. Each sample number will assume the format described earlier in Section 4 of the FSP.

7.2.1.6 **Sample Labels -** Each sample will be identified with a separate identification label. The label will document:

- Analyses to be performed;
- Sample identification number;
- Preservatives used;
- Date;
- Time (a four-digit number indicating the 24-hour-clock time of collection; for example, 1430 for 2:30 P.M.); and
- Sampler's initials.

7.2.1.7 **Field Sample Custody** - A sample shall be considered to be in the custody of a person if it is in his or her possession, in his or her sight or secured by that person in an approved location accessible only to authorized personnel. The following procedures will be used to document, establish, and maintain custody of the field samples:

- Sample labels will be completed for each sample using waterproof ink, making sure that the labels are legible and affixed firmly to the sample container.

- All sample-related information will be recorded in the field logbooks.

- The field sample custodian will retain custody of the samples until they are transferred or properly dispatched.

7.2.1.8 **Laboratory Sample Custody** - A chain-of-custody (COC) record accompanies the sample container from the laboratory to the field where the sample is contained, preserved, and then returned to the laboratory. The laboratory's sample custody program meets the criteria listed below.

- The laboratory has designated a sample custodian who is responsible for maintaining sample custody and for maintaining all associated records documenting sample custody.
- Upon receipt of the samples, the custodian checks the original COC documents and compares them with the labeled contents of each sample container for correctness and traceability. The custodian signs the COC record and records the date and time the samples are received. In the event of discrepant documentation, the laboratory immediately contacts the Parsons Project Manager as part of the corrective action process. The sample temperatures will be recorded; if more than 2 degrees Celsius outside of the 4 degree Celsius target, Parsons will be notified.
- A qualitative assessment of each sample container is performed to note any anomalies, such as broken or leaking containers. This assessment will be recorded as part of incoming COC procedures.
- The samples are stored in a secured area at a temperature of approximately 4°C until analyses begin.
- A copy of the COC form accompanies the laboratory report and becomes a permanent part of the project records.

7.2.2 Calibration Procedures and Frequency

7.2.2.1 Instruments and equipment used to gather, generate, or measure environmental data will be calibrated with sufficient frequency and in such a manner that accuracy and reproducibility of results are consistent with the standard operating procedures. Calibration procedures and frequency for the analytical procedures are summarized in Worksheets 22 - 28, of Attachment A. The calibration procedures will meet or exceed the calibration requirements specified in the respective analytical methods. Calibrations can also be performed at the start and completion of each test run. Calibration standards used as reference standards will be traceable to the NIST, USEPA, or AEC when possible. Calibration, repair, or replacement records will be filed and maintained by the laboratory's personnel performing quality control activities. Calibration records of the assigned laboratory will be filed and maintained at the laboratory location where the work is performed.

7.2.2.2 Calibration of field instruments and equipment will be performed at approved intervals as specified in the standard operating procedures or more frequently as conditions dictate.

7.3 DOCUMENTATION

7.3.1 UFP-QAPP

7.3.1.1 The Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP) is a consensus policy developed by EPA, DoD, and Department of Energy (DoE) to implement a standard system for collecting or using environmental data at federal facility hazardous waste sites. The purpose of this consolidated guidance is to assist environmental professionals streamline a systematic planning process (SPP) for quality program planning; reduce review time, revisions and cost; and increase the success rate for quality program plan (QPP) approval. The UFP-QAPP is comprised of a series of 37 worksheets. Each worksheet addresses specific requirements of the UFP-QAPP. A UFP-QAPP is included in Attachment A.

7.3.2 Daily Quality Control Reports for Sampling Activities

7.3.2.1 Field Logbook. The field logbook is the master field investigation document and is a bound book with sequentially numbered pages. Its primary purpose is to contain within one document references to field activities which have occurred at the site on any given day. Any administrative occurrences, conditions, or activities that have affected the field work will also be recorded. All entries into these logbooks will be signed and dated. Entries in the field logbook will include, at a minimum, the following information:

- Sample type and sampling method;
- Location and depth of sample;
- Sample identification number;
- Sample description (e.g., color, odor, clarity);
- Amount of sample; and
- Identification of sampling device and conditions that might affect the representativeness of a sample (e.g., refueling operations).
- Any deviations from established procedures will be documented in the field logbook with the date, time, reason for deviation, and measures to correct the problem identified.
- Decontamination and health and safety procedures shall also be documented in the field logbooks.
- Documentation of field calibration procedures (e.g., field air monitoring equipment).

7.3.2.2 Daily Logs. The site manager will complete a daily log to document the activities that took place each day, including personnel on site, field work completed, samples collected, problems encountered, and significant conversations/decisions that took place.

7.3.2.3 Corrections to Documentation. All documents will be completed in permanent, waterproof ink. None of the field documents are to be destroyed or thrown away, even if they are damaged or contain inaccuracies that require a replacement document. Corrections to the documents (this includes logbooks, sample labels, COCs, etc.) will be made by crossing out mistakes with a single line and then dating and initialing the correction. The use of correction fluid is not permissible.

7.3.2.4 Final Evidence Files. This project will require the administration of a central project file. All field and laboratory generated data will be kept in this file. Hard copies of all data will be kept in project-designated files. The data records management protocols will provide adequate controls and retention of all materials related to the project. Record control will include receipt from external sources, transmittals, transfer to storage and indication of record status. Record retention will be one year and will include receipt at storage areas, indexing, filing, storage, maintenance, and retrieval. Project filing procedures are described below.

7.3.2.5 Record Control. All incoming materials related to the project including sketches, correspondence, authorizations, and logs will be forwarded to the Project Manager or designated assistant. These documents will be placed in the project file as soon as is practical. If correspondence is needed for reference by project personnel, a copy will be made rather than retaining the original. All records shall be legible and easily identifiable. Examples of the types of records that will be maintained in the project file include:

- Field documents;
- Correspondences:
- Photographs;
- Laboratory data:
- Reports; and
- Procurement agreements and contracts.

7.3.2.6 Outgoing project correspondences and reports will be reviewed and signed by the Project Manager prior to mailing. The office copy of all outgoing documents shall bear distribution information.

7.4 DATA VALIDATION

7.4.0.1 Review of all analytical data will focus on the QC criteria set forth in each analytical method, the QC objectives presented in this plan, and standard USEPA Region III data validation guidelines. The validation will be in accordance with an M3 level, i.e., full CLP per the Region III Modifications to the National Functional Guidelines. Automated data review (ADR) will be incorporated into the data validation process. The laboratories will conduct a systematic data review before submitting the analytical report. Post-laboratory data validation will be performed by the Parsons Project Chemist or designee. To resolve any conflicting QC requirements, the following order is specified: the UFP-QAPP, SW-846 Methods, laboratory SOPs, EPA 540-R-99-008, EPA 540-R-01-008 and the National Functional Guidelines for Organic and Inorganic Data Review with Region III Modifications (USEPA). TIC data will be evaluated in accordance with CLP protocols and the Region III Modifications to the National Functional Guidelines.

7.4.0.2 ADR will be used to streamline the data validation process, saving time. The ADR process includes generation of a project library which includes the QC requirements and control limits for the project (based on the QAPP and the data validation requirements). This library will be prepared by Parsons and reviewed and approved by the laboratory. The library will cover QC items including LCS, MS/MSD, laboratory and field duplicates (precision), blanks and surrogates. The library will also include the target analytes and their CAS Nos. as they are to appear in the data reports and data validation tables. The project library is developed in the ADR software and once approved will be used by ADR to validate the laboratory electronic data delivery (EDD). The latest ADR software also includes a Region III validation module which includes Region III modifications to the NFG. Manual validation of the project data will include a Level IV evaluation of those QC items not covered by ADR including calibration, tuning, chromatograms, quantitation reports, etc. It is anticipated that with the time saved by using ADR, 100% manual validation of the remaining data will be achieved.

7.5 DATA MANAGEMENT AND REPORTING

7.5.1 Field Data Management

7.5.1.1 Data generated in the field will be managed by the field team leader who will be responsible for recording and documenting all sampling activities in the field logbook, on sampling records (as appropriate), or on COC forms. These records will be stored in the project files. Additional elements of data management, including sample custody, documentation and recorded control, are contained in Section 2.

7.5.2 Laboratory Data Management

7.5.2.1 A copy of the completed COC records and cooler receipt forms for all shipments of samples will be maintained in the laboratory project file. The laboratory will also archive all logbooks associated with the sample management procedures. These records will be filed accordingly, so they will be easily retrievable in the future, if needed.

7.5.2.2 Sample and QC data will initially be provided as an Excel file in the format used for the SVFUDS and PDF files within the specified turn-around time. The Excel and PDF files will be used to make decisions regarding further excavation requirements and will be sent by the laboratory via electronic mail to the Parsons PM. In general, the Excel and PDF files will include:

- the laboratory's identification of each field sample;
- field sample identifications;
- sample collection and sample analysis dates;
- analytes;
- limit of quantitation, limit of detection, and detection limit;
- results;
- data qualifiers; and

- concentration units.

7.5.2.3 The data will be imported into an ACCESS database for automated validation. The post validation EDD will include text or a database file format of data including all validation qualifiers. Final ADR deliverables will also be generated.

7.5.2.4 Data Reporting. In order to obtain data for all the SVFUDS Comprehensive list compounds (Worksheet 15 of the UFP-QAPP, Attachment), the full list of compounds from a particular analytical suite will be analyzed, e.g., for TCL VOCs it is the CLP list plus selected non-CLP volatile compounds (see Worksheet 15 of the UFP-QAPP for the specific compounds). For reporting purposes, only those compounds that are SVFUDS Comprehensive list compounds (as determined by the Partners, see paragraph 8.4.3.2) plus any detections of the non-SVFUDS Comprehensive list compounds, will be reported.

7.5.2.5 The HTW analyses will be performed by APPL. The CA/ABPs analyses performed by ECBC will follow documentation procedures presented in their Sample Analysis Plan presented in Appendix J of the Site-Wide Work Plan.

7.5.3 Data Reporting Procedures

7.5.3.1 Laboratory Report Requirements

7.5.3.2 For all analyses, at a minimum, the laboratory report will show traceability to the sample analyzed and will contain the following information required for data validation:

- Case narrative (identifies problems and corrective actions);
- Copy of signed COC;
- Cooler receipt forms documenting the date, time of receipt, condition of samples (including preservation) and labels, temperature of the shipping container, and verification of integrity of the custody seals;
- Laboratory name;
- Client name;
- Date of sample collection;
- Date of sample receipt;
- Date of sample extraction or preparation;
- Date of issue;
- Project name and unique identification number;
- Field sample name/number;
- Laboratory sample number;
- Sample matrix description;
- Analytical method description and reference citation for all analyses, preparation, cleanup procedures;

- Preparation, analysis and other batch numbers;
- Individual parameter;
- All confirmation data, when performed;
- Date and time of analysis (first run and subsequent runs);
- Limit of quantitation (LOQ) and limit of detection (LOD) adjusted for sample-specific factors (i.e., aliquot size, dilution/concentration factors, moisture content;
- Detection limits (DLs);
- Concentration units;
- Any data qualifiers assigned;
- Percent moisture or percent solids (all soils reported on dry weight basis);
- Any special conditions;
- Chromatograms, as needed;
- Sample aliquot analyzed;
- Final extract volume;
- Dilution or concentration factors (if dilutions result in non-detect values for all other analytes which showed detected concentrations in previous analyses, the results of both runs will be reported with the appropriate notations in the narrative);
- A cross-reference to identify applicable laboratory QC samples with field samples, such as an analytical batch number; and
- Corresponding QC summary report.
- For samples requiring reanalysis, the laboratory will report complete results and supporting raw and QC data for both the original run and any reanalyses. Reanalyses will be properly identified.

7.5.3.3 QC data will be recorded on Contract Laboratory Program (CLP) or CLP-equivalent QC summary forms for the appropriate tests and correlated to the analysis results by the laboratory lot control numbers. The QC results are used to prepare control charts for each test and matrix type. QC reports will contain the following items as appropriate:

- Narratives describing any non-compliant samples,
- Initial and continuing calibration results,
- Method blank,
- Surrogate results,
- LCS results,
- MS/MSD results, and

- Tuning results.
- Internal standards summary

7.5.3.4 The laboratory is required to indicate the use of Manual Integration (MI) in the case narrative including the reason MI was used and the samples and analytes affected. When MI is used, the lab is also required to submit both the original and manually integrated chromatograms and quantitation reports as part of the data package (with the integrated chromatograms and quantitation reports clearly initialed and dated). During validation the reviewer will evaluate the information provided by the laboratory to determine agreement or disagreement with the reason for the MI or the results of the MI. If there is disagreement, the lab will be contacted to discuss the issue. If the issue cannot be resolved, the reviewer reserves the right to qualify the affected results and offer explanations in the data validation summary report. All MI should be well documented including the following items:

- “Before" and "after" chromatographs of each MI event;
- The reason(s) for the MI;
- Date and the signature of the analyst who performed the MI; and
- Date and the signature of the approver.

7.5.4 Electronic Data Deliverables

7.5.4.1 The laboratories also will submit the analytical data for environmental, field, and laboratory QC samples as a pdf file on a CD-ROM. One pdf file will be submitted for each SDG. The electronic data delivery (EDD) shall be submitted in the Staged Electronic Data Deliverable (SEDD) format, version 5.2 (or most recent version). The SEDD formatted deliverable will require data parsing for use in the ADR software, version 8.0. ADR is a tool developed to aid data users in evaluating the quality of analytical chemistry results. The application was designed to perform routine data quality accuracy and precision checks traditionally performed through a manual data review. ADR uses a project specific library as a reference for EDD non-conformance checks and automated data review. The project specific library will be built and maintained by Parsons and the laboratory and will contain all the methods, target analytes, and quality control and validation requirements specified in this QAPP. Parsons will prepare the initial project library. The library will be submitted to the laboratory for review and comments. The laboratory’s comments will be incorporated and the project library finalized. The final project library will be returned to the laboratory for use in generation of the ADR EDDs. The final project library will also be used by Parsons during data validation and included in the final ADR deliverables.

7.5.4.2 In general, the EDD submittal will include:

- The laboratory’s identification of each field sample,
- Field sample identifications,
- Analytes,
- LOQs, LODs, and DLs

- Results,
- Data qualifiers and validation flags,
- Concentration units, and
- Applicable QC data.
- An error log showing the results of ADR's EDD compliance screening. The error log will also address all errors or warnings.

7.5.4.3 Additionally, the calibration information may be included in the ADR EDD as the laboratory develops the capability to input the data efficiently.

7.5.5 Data Validation Reports

7.5.0.1 During the project, the Parsons Project Chemist will prepare one Data Validation Report (DVR) per data package or sample delivery group (SDG) for confirmation, grab, and backfill sample data to discuss:

- the periodic assessment of measurement data accuracy, precision, and completeness; and
- significant quality assurance problems and corrective actions taken.

7.5.0.2 These reports will be prepared following receipt of the full data packages from the lab. The reports will be provided as attachments to the site-specific reports.

7.5.0.3 In addition, the Project Manager will receive periodic updates concerning QA at the site or the laboratory. The final report prepared upon completion of the project will include a separate data assessment report summarizing data quality information and QC sample results.

7.6 PERFORMANCE AND SYSTEM AUDITS

7.6.0.1 The laboratory QA officer will carry out performance and/or systems audits to ensure that data of known and defensible quality are produced during the program.

7.6.0.2 Field. Field performance audits will include an audit by the Parsons Technical Director or qualified designee to ensure that sampling procedures performed by the sampling team are in accordance with the Site-Specific Work Plan, FSP, and QAPP.

7.6.0.3 Laboratories. Both APPL and ECBC are accredited to perform work for DoD under Quality Systems Manual, Version 5.0. 7.6.0.4 Subcontractor Laboratory. In accordance with the QSM, Version 5.0, section 4.5, any subcontractor laboratories (laboratory contracted by the primary laboratory) will similarly be accredited under NELAP for the tests to be performed or will meet applicable statutory and regulatory requirements for performing the tests and submitting the results of tests performed. The subcontractor laboratory will be indicated in the final report and non-NELAP accredited work will be identified.

7.7 PREVENTIVE MAINTENANCE

7.7.1 Maintenance Procedures

7.7.1.1 Equipment, instruments, tools, gauges, and other items requiring preventive maintenance will be serviced in accordance with the manufacturer's specified recommendation and written procedures developed by the operators. Written procedures will identify the schedule for servicing critical items to minimize the downtime of the measurement system. It will be the operator's responsibility to adhere to this maintenance schedule and to arrange any necessary service promptly. Service to the equipment instruments, tools, etc., shall be performed by qualified personnel. In the absence of any manufacturer's recommended maintenance criteria, a maintenance procedure will be developed by the operator based upon experience and previous use of the equipment.

7.7.2 Maintenance Records

7.7.2.1 Logs shall be established to record and control maintenance and service procedures and schedules. All maintenance records will be documented and traceable to the specific equipment, instruments, tools, and gauges. Records produced shall be reviewed, maintained, and filed by the operators at the laboratories and by the data and sample control personnel. The QC Manager can audit these records to verify complete adherence to these procedures.

7.7.3 Equipment Spare Parts

7.7.3.1 The operator will make a critical spare parts list. These parts will be stored on-site or be immediately available for use in reducing instrument or equipment downtime. In lieu of maintaining an inventory of spare parts, an arrangement for rapid instrument repair or backup instruments shall be made.

7.7.4 Laboratory Maintenance

7.7.4.1 Preventive maintenance procedures for the laboratory will be in accordance with the approved laboratory QA plans.

7.8 PROJECT-SPECIFIC QA OBJECTIVES

7.8.1 Field Measurements

7.8.1.1 Field measurements will include a survey of the grid corners. The survey will meet a horizontal accuracy of 0.1' and a vertical accuracy of 0.01'.

7.8.1.2 Field measurements will also include real time air monitoring for dust using a MIE PDM-3 Miniram. The Miniram is capable of measuring concentrations of the range of 0.01 to 100 mg/m^3 with a precision of ± 0.02 mg/m^3.

7.8.1.3 Field measurements using a photoionization detector (PID) will be made inside the ECS and potentially outside depending on site circumstances. Worksheet 22 provides the standard operating procedures for PID usage. SUMMA canisters may be used to collect air samples for VOC analysis depending on site circumstances; Worksheet 22 provides the standard operating procedures for using SUMMA canisters.

7.8.1.4 Field measurements using an arsine detector may be made depending on site circumstances. Worksheet 22 provides the Standard Operating Procedures for using the arsine detector. Dräger tubes may be used for arsine confirmation depending on site circumstances; Worksheet 22 provides standard operating procedures for using the Dräger tubes.

7.8.1.5 Field determination of bedrock or competent saprolite will be performed by a Parsons/ERT geologist with concurrence by USACE Geologist.

7.8.2 Laboratory Measurements

7.8.2.1 QA objectives for laboratory measurements are expressed in terms of precision, accuracy, completeness, representativeness, comparability, and detection limits. Project-specific objectives are listed in the UFP-QAPP, Attachment A. Evaluation procedures for each of these data quality indicators are discussed throughout this section. These objectives may not be met due to matrix effects unique to the samples; however, for laboratory quality control samples (e.g., method blank, blank spike, laboratory control samples, etc.), these objectives must be met. Matrix effects must be verified through reanalysis of affected samples and reporting both sets of data.

7.8.2.2 Precision is an expression of the agreement between multiple measurements of the same property carried out under similar conditions. Precision thus reflects the reproducibility of the measurement. Precision will be evaluated using the relative percent difference (RPD) of the data for field or laboratory duplicates. RPD control limits for matrix spikes are presented in Worksheet 28 of the UFP-QAPP; the target RPD for field duplicates is 50% for soil samples. The target RPDs are presented in Worksheets 12 and 28 of the UFP-QAPP.

7.8.2.3 Accuracy is a measure of the difference between a measured value and the “true” or accepted reference value. Accuracy will be evaluated as percent recovery from matrix, control, and surrogate spike samples. Accuracy criteria are listed in Worksheet 28 of the UFP-QAPP, Attachment A.

7.8.2.4 Samples collected and analyzed must be representative of the population. Representativeness will be achieved by:

- collecting samples from locations fully representing site conditions;
- using appropriate sampling procedures and equipment;
- collecting sufficient amount of properly preserved samples in the appropriate pre-cleaned containers;
- selecting appropriate analytical methods for the parameters of interest; and
- analyzing samples within the holding time specified for the parameter or method.

7.8.2.5 Completeness of the data set generated will be assessed by comparing the number of parameters required with the number of parameters successfully completed and usable. The completeness objective for this project is 95 percent as shown in Worksheet 37 of the UFP-QAPP, Attachment A.

7.8.2.6 The data collection procedures presented in this section are designed to produce comparable data. Standard recognized field and analytical methods will be followed to ensure generation of comparable data. Any deviations from prescribed procedures will be noted with the reported data. Comparability of the data generated and conclusions drawn from them during this project will be assured by:

- conforming to identified Standard Operating Procedures (SOPs) during all field and laboratory activities;
- using identified standard methods for the analytical phase of this project;
- ensuring traceability of all analytical standards or source materials to the National Institute of Standards and Technology (NIST), USEPA, or Army Environmental Center (AEC) Reference Standards (when available); and
- using standard reporting units and reporting formats including the reporting of QC data.

7.8.2.7 Sensitivity will be monitored using detection limits:

LOQ, LOD, and DL. Definitions for LOQ, LOD, and DL are provided below. All non-detects will be reported at the LOD (with the ‘U’ qualifier). Sample detections above the DL but less than the LOQ will be reported with the ‘J’ qualifier. The sample specific LOQ, LOD, and DL will be adjusted for sample amounts, dilution and percent solids as appropriate. The LOQ, LOD, and DL for the each target analyte, for each matrix, are presented in Worksheet 15 of the UFP-QAPP, Attachment A.

- Detection Limit. The smallest analyte concentration that can be demonstrated to be different from zero or a blank concentration at the 99% level of confidence. At the DL, the false positive rate (Type I error) is 1%. For samples in which an analyte is not detected, the environmental laboratory will report results as not-detected at the DL.
- Limit of Quantitation. The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence.
- Limit of Detection. The smallest amount or concentration of a substance that must be present in a sample in order to be detected at a high level of confidence (99%). At the LOD, the false negative rate (Type II error) is 1%.

7.8.2.8 Project Reporting Limit. The PRL is the project-specific reporting level. For this project, the LOQs will be used as the PRLs.

8 REFERENCES

DoD, 2013. Department of Defense Quality System Manual for Environmental Laboratories Version 5.0

USACE, 2012a, MEC/CWM Probability Assessment, Intrusive Remedial Action at 4825 Glenbrook Road Spring Valley FUDS, Washington, D.C. 15 February.

USACE 2012b. Addendum 1 to Site-Wide Work Plan, Appendix E Sampling and Analysis Plan, Spring Valley Formerly Used Defense Site, Washington D.C. 8 June, 2012.

USACE, 2012c. Decision Document for Spring Valley FUDS, Operable Unit 3, 13 June 2012.

USACE, 2012d. Site-Specific Work Plan for Remedial Design Action at 4825 Glenbrook Road Spring Valley FUDS, Washington, D.C., December 2012.

USACE 2011. Remedial Investigation Report for 4825 Glenbrook Road, Spring Valley FUDS, Washington, D.C. 29 July 2011.

USACE, 2010. Data Item Description (DID), WERS-009.01, Munitions Constituents Chemical Data Quality Deliverables.

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USACE, 2001. Requirements for the Preparation of Sampling and Analysis Plan, (EM 200-1-3).

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USEPA, 2000. Data Quality Objectives Process for Hazardous Waste Site Investigations, (EPA QA/G-4HW, EPA/600/R-00/007).

USEPA, 1999a. Region III Modifications to the National Functional Guidance for Organic Data Review.

USEPA, 1999b and subsequent modifications. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods Integrated Manual (SW 846).

USEPA, 1993. Region III Modifications to the National Functional Guidance for Inorganic Data Review.

ATTACHMENT A

UFP-QAPP

QAPP Worksheet #1 - Title and Approval Page

FINAL
Revision 1

UFP-Quality Assurance Project Plan Worksheets - Attachment A to Sampling and Analysis Plan

Remedial Design/Remedial Action at 4825 Glenbrook Road
Spring Valley Formerly Used Defense Site, Operable Unit 3
Spring Valley, Washington, D.C.

December 2015

Prepared for:
U.S. Army Engineering & Support Center, Huntsville
and
Baltimore District
U.S. Army Corps of Engineers

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Contract Number: W912DY-09-D-0062
Delivery Orders: DO 0006

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Approved by:

Sean Buckley, Parsons Project Manager

QAPP Worksheet #2a - QAPP Identifying Information

Site Name/Number:	**4825 Glenbrook Road- Spring Valley Formerly Used Defense Site**
Operable Unit:	**Operable Unit 3**
Contractor Name:	**Parsons Government Services, Inc. (Parsons)**
Contract Number:	**W912DY-09-D-0062**
Contract Title:	**USACE Huntsville WERS / DO 0006 - RD/RA 4825 Glenbrook Road**

Work Assignment Number (optional): 748271/ 748272

1. This QAPP was prepared in accordance with the requirements of the Uniform Federal Policy for Quality Assurance Plans (UFP-QAPP) (USEPA 2012), DoD Quality System Manual version 5.0 (July 2013), and EPA Guidance for Quality Assurance Project Plans, EPA QA/G-5, QAMS (U.S. EPA 2002)

2. Identify regulatory program:

This project is being implemented under the DERP- FUDS program.

3. This QAPP is a project-specific QAPP

4. Dates of scoping sessions that were held: Ongoing monthly Partner's meetings since December 2011.

5. List dates and titles of any QAPP documents written for previous site work that are relevant to the current investigation.

Title Date

Appendix E, Site-Wide Work Plan Spring Valley Formerly Used Defense Site (USACE 2007). Addendum 1 to Site-Wide Work Plan, Appendix E Sampling and Analysis Plan Spring Valley Formerly Used Defense Site (USACE 2012)

6. List organizational partners (stakeholders) and connection with lead organization:

The stakeholders are the US Army Engineering and Support Center Huntsville (USAESCH), US Army Corp of Engineers- Baltimore District, US Environmental Protection Agency (USEPA) Region III, District of Columbia Department of Environment (DDOE) and property owner - American University. TAPP and RAB are also stakeholders for this remedial activity. Edgewood Chemical Biological Center (ECBC), Project Manager for Non-Stockpile for Chemical Materiel and CBRNE Analytical and Remediation Activity (CARA) are other organizations contracted by USAESCH to support the Remedial Action.

7. Lead Organization:

The US Army Engineering and Support Center Huntsville is the lead organization for this project.

8. If any required QAPP elements or required information are not applicable to the project or are provided elsewhere, then note the omitted SAP elements and provide an explanation for their exclusion below:

Worksheet #9 - TPP Participants Sheet not applicable, therefore ongoing monthly Partner's meetings sheet has been included.

QAPP Worksheet #2b - QAPP Identifying Information

UFP-QAPP Worksheet	Required Information	Crosswalk to Related Information
A. Project Management and Objectives		
Title and Approval Page		
1	Title and Approval Page	Worksheet (WS) 1
Document Format and Table of Contents		
2	Table of Contents	WS 2
	QAPP Identifying Information	
Distribution List and Project Personnel Sign-Off Sheet		
3	Distribution List	WS 3
4	Project Personnel Sign-Off Sheet	WS 4
Project Organization		
5	Project Organizational Chart	WS 5
6	Communication Pathways	WS 6
7	Personnel Responsibilities and Qualifications Table	WS 7
8	Special Personnel Training Requirements Table	WS 8
Project Planning/ Problem Definition		
9	Project Planning Session Documentation (including Data Needs tables)	Appendix J - Placeholder in SSWP. Not applicable to the RA effort
	Project Scoping Session Participants Sheet	WS 9
10	Problem Definition, Site History, and Background	WS 10
	Site Maps (historical and present)	Contained within the main text of the WP
Project Quality Objectives and Measurement Performance Criteria		
11	Site-Specific Project Quality Objectives	WS 11
12	Measurement Performance Criteria Table	WS 12
13	Sources of Secondary Data and Information	WS 13
	Secondary Data Criteria and Limitations Table	
Project Overview and Schedule		
14	Summary of Project Tasks	WS 14
15	Reference Limits and Evaluation Table	WS 15
16	Project Schedule/Timeline Table	WS 16

QAPP Worksheet #2b - QAPP Identifying Information (*continued*)

UFP-QAPP Worksheet	**Required Information**	**Crosswalk to Related Information**
B. Measurement/Data Acquisition		
Sampling Tasks		
17	Sampling Design and Rationale	WS 17
18	Sampling Locations and Methods/SOP Requirements Table	WS 18
	Sample Location Map(s)	Contained within the main text of the WP
19	Analytical Methods/SOP Requirements Table	WS 19
20	Field Quality Control Sample Summary Table	WS 20
21	Project Sampling SOP References Table	WS 21
22	Field Equipment Calibration, Maintenance, Testing, and Inspection Table	WS 22
Analytical Tasks		
23	Analytical SOPs	WS 23
	Analytical SOP Reference Table	
24	Analytical Instrument Calibration Table	WS 24
25	Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table	WS 25
Sample Collection Documentation, Handling, Tracking, and Custody Procedures		
26	Sample Handling System, Documentation Collection, Tracking, Archiving and Disposal Sample Handling Flow Diagram	WS 26
27	Sample Custody Requirements, Procedures/SOPs Sample Container Identification Example Chain-of-Custody Form and Seal	WS 27
Quality Control Samples		
28	Lab QC Samples Table	WS 28
Data Management Tasks		
29	Project Documents and Records Table	WS 29
30	Analytical Services Table Analytical and Data Management SOPs	WS 30

QAPP Worksheet #2b - QAPP Identifying Information (*continued*)

UFP-QAPP Worksheet	**Required Information**	**Crosswalk to Related Information**
C. Assessment/Oversight		
Assessments and Response Actions		
31	Planned Project Assessments Table and Audit Checklists	WS 31
32	Assessment Findings and Corrective Action Responses	WS 32
QA Management Reports		
33	QA Management Reports Table	WS 33
D. Data Review		
34	Verification (Step I) Process Table	WS 34
35	Validation (Steps IIa and IIb) Process Table	WS 35
36	Validation (Steps IIa and IIb) Summary Table	WS 36
37	Usability Assessment	WS 37

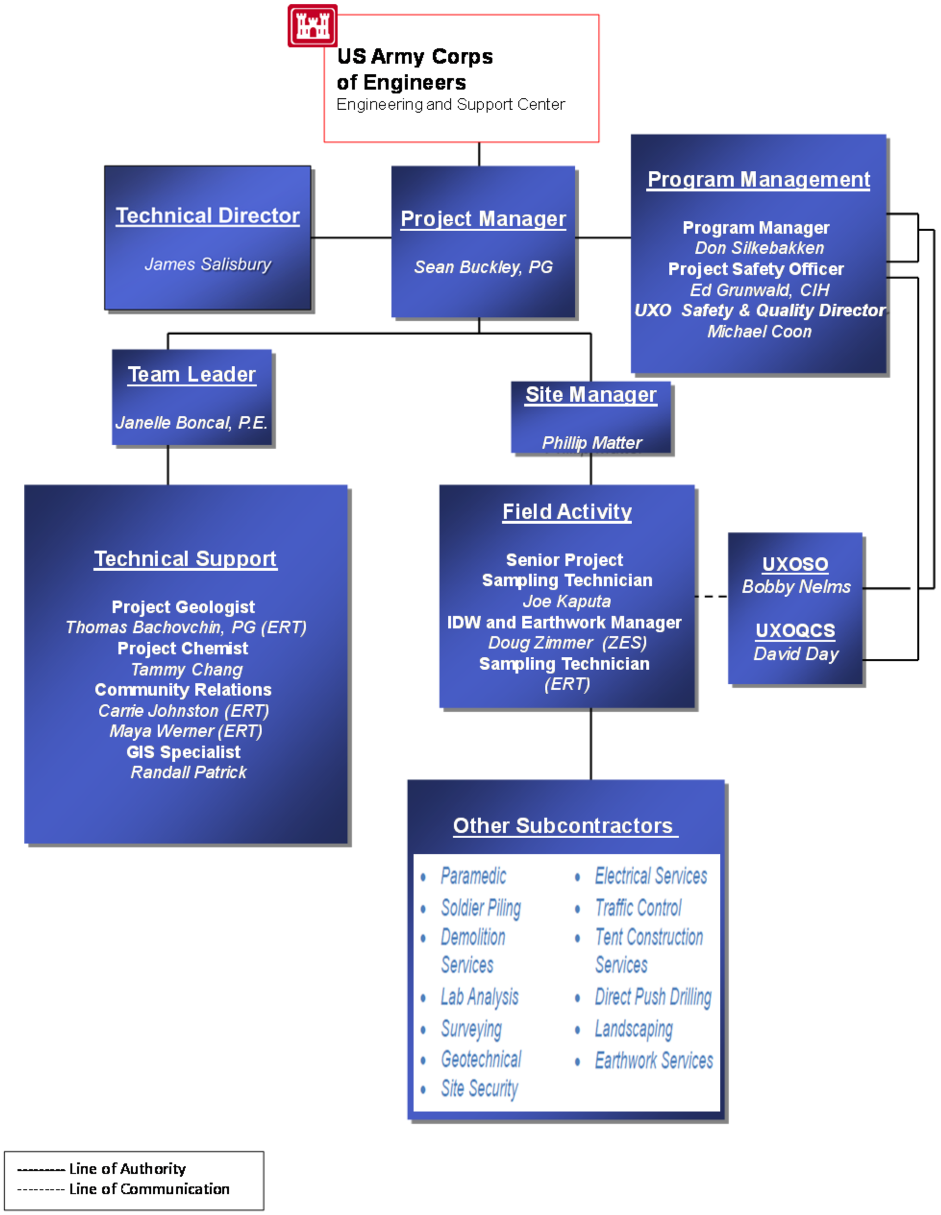
QAPP Worksheet #3 - Distribution List

QAPP Recipients	Title	Organization	Telephone Number	E-mail Address	Document Review	Document Control #
Sherri Anderson-Hudgins	USAESCH Project Manager	USAESCH	(256)895-1522	sherri.anderson-hudgins@usace.army.mil	draft/draft final	1
Bruce Whisenant	Technical Manager	USAESCH	(256)895-1633	Bruce.K.Whisenant@usace.army.mil	draft/draft final	2
Brenda Barber	CENAB -Project Manager	CENAB	(410) 962-0030	Brenda.M.Barber@usace.army.mil	draft/draft final	3
Steve Hirsh	Region 3 Project Manager	USEPA	(215) 814-3352	hirsh.steven@epa.gov	draft final	4
James Sweeney	DDOE Project Manager	DDOE	(202) 535-2289	james.sweeney@dc.gov	draft final	5
Dr. Peter L. deFur	Technical Assistance for Public Participation (TAPP) Representative	Environmental Stewardship Concepts	804-741-2922	pdefur@estewards.com	draft final	6
Bethany Bridgham	Property Owner - AU Representative	AU	(202) 885-3252	bjbesq@american.edu	draft final	7

QAPP Worksheet #4 - Project Personnel Sign-Off Sheet

Project Personnel	Organization	Title	Telephone Number	Signature	Date QAPP Read
Sherri Anderson- Hudgins	USAESCH	USAESCH Project Manager	(256) 895-1522		
Bruce Whisenant	USAESCH	Technical Manager	(256) 895-1633		
Brenda Barber	CENAB	CENAB - Project Manager	(410) 962-0030		
Steve Hirsh	USEPA	Region 3 Project Manager	(215) 814-3352		
James Sweeney	DDOE	DDOE Project Manager	(202) 535-2289		
Bethany Bridgham	AU	Property Owner - AU representative	(202) 885-3252		
Dr. Peter L. deFur	TAPP Representative	Environmental Stewardship Concepts	(804) 741-2922		
Michael Coon	Parsons	UXO Safety and Quality Director	(425) 457-1734		
Sean Buckley	Parsons	Project Manager/QC Manager	(202) 469-6385		
James Salisbury	Parsons	Technical Manager	(512)719-6028		
Janelle Boncal	Parsons	Technical Team Leader	(804)327-7453		
Tammy Chang	Parsons	Project Chemist	(512) 719-6092		
Phillip Matter	Parsons	Site Manager	(202) 412-6174		
Joe Kaputa	Parsons	Sampling Technician	(703) 899-4206		

QAPP Worksheet #5 - Project Organizational Chart



QAPP Worksheet #6 - Communication Pathways

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure (Timing, Pathways, etc.)
QAPP Approvals	USAESCH Project Manager Parsons Project Chemist	Sherri Anderson-Hudgins Tammy Chang	(256) 895-1522 (512) 719-6092	Parsons Project Chemist will review the UFP-QAPP on behalf of Parsons. Parsons will submit to Sherri-Anderson Hudgins for USACE approval.
Field Corrective Actions	Parsons Site Manager and Parsons Field Team Leader	Phillip Matter and Joseph E. Kaputa	(703) 899-4206	Parsons Field Team Leader will contact Parsons Project Manager (by phone first or email second) immediately if a field problem occurs and resolution/ corrective action will be determined.
Laboratory Corrective Actions	APPL PM ECBC Lab Manager	Diane Anderson (APPL) John Schwarz (ECBC)	APPL: (559)275-2175 ECBC: (410)436-2150	APPL's PM, Diane Anderson or ECBC Lab Manager, John Schwarz, will contact Parsons Project Chemist by phone or email if a QA/QC problem has been identified and resolution/ corrective action will be determined.
Stop Work Issues	Parsons Site Manager	Phillip Matter	(202) 412-6174	Parsons Field Team Leader will call Parsons Project Manager immediately to determine course of action.
Field Deviation from Work Plan	Parsons Field Team Leader	Joseph E. Kaputa	(703) 899-4206	Parsons Field Team Leader will call Parsons QA Manager immediately once problem is identified. Parsons QA Manager will immediately discuss resolution with the PM and the USACE.
Amendment to Work Plan	Parsons Technical Lead	James Salisbury	(512)719-6028	Parsons Technical Lead will contact USACE to discuss potential amendment to the Work Plan. With USACE concurrence, Parsons Technical Lead will prepare and approve amendment and submit for USACE approval.
Amendment to QAPP	Parsons Project Chemist	Tammy Chang	(512) 719-6092 (512) 590-1126	Parsons Project Chemist will contact the USACE to discuss potential amendment to the UFP-QAPP. With concurrence from the USACE, Parsons Project Chemist will prepare amendment and submit for USACE approval.

QAPP Worksheet #7 - Personnel Responsibilities and Qualifications Table

Name	Title	Organizational Affiliation	Responsibilities	Education and Experience Qualifications
Sean Buckley, P.G, PMP	Project Manager	Parsons	• Serves as single point of contact on this project • Monitors project deliverable quality, budget, and milestones and prepares related progress reports • Approves deliverables and ensures technical, cost, and schedule performance	• MBA, Management; B.S., Civil Engineering • 23 years of program/project management experience on design, construction and environmental projects
James Salisbury	Technical Director	Parsons	• Advises project team on project planning, execution, and reporting • Performs independent reviews of all deliverables	• M.S., Environmental Science; B.S., Biochemistry • Over 21 years experience on federal environmental projects • Over 12 years experience with munitions projects, including projects involving RCWM
Janelle Boncal, P.E.	Project Engineer	Parsons	• Serves as a technical point of contact on project plans, assessments, and submittals • Supports Project Manager in monitoring deliverable quality, budget, and milestones and prepares related progress reports • Manages day-to-day Parsons work activities, including subcontractor services	• M.S. and B.S. Civil Engineering • 7 years of experience and 5 years of direct experience at CWM related projects.
Phillip Matter	Site Manager	Parsons	• Supervises field staff and conducts inspections of field work • Plans, implements, and oversees all site activities ensuring compliance with health, safety, and quality objectives • Schedules field team activities, conducts daily safety meetings, and submits daily progress reports	• Explosive Ordnance Disposal (EOD) Certificate/1991/US Navy EOD School • 8-hour OSHA HAZWOPER Supervisor, 40-hour OSHA HAZWOPER,10 and 30-hour OSHA Construction Safety certifications • Over 12 years experience managing field work and safety and health oversight on military munitions and remediation projects. • Served as SUXOS, UXOQCS, UXOSO, Team Leader and UXO technician on numerous UXO projects over 19 years.

QAPP Worksheet #7 - Personnel Responsibilities and Qualifications Table (*continued*)

Name	Title	Organizational Affiliation	Responsibilities	Education and Experience Qualifications
Bobby Nelms	UXOSO	Parsons	• Develops and implements approved explosives and UXO health and safety program • Conducts, documents, and reports results of safety inspections and provide reports to UXO Safety Manager • Holds the authority to stop work on safety related issues	• Graduate, U.S. Naval EOD School, Indian Head, MD, 1987 • USAESCH UXO Personnel Database, #0144 • 40-hr OSHA HAZWOPERand current 8-hr OSHA Refresher certifications • More than 16 years of government experience, including active duty military and contractor expe-rience and more than 5 years experience with USACE HTRW and munitions projects
David Day	UXOQCS	Parsons	• Develops and implements MEC-specific sections of the Quality Control Plan (QCP) • Conducts audits and project inspections • Identifies, documents, reports and closes out all corrective actions	• Graduate of U.S. Navy School of Explosive Ordnance Disposal,1987 • 8-hour OSHA HAZWOPER Supervisor, 40-hour OSHA HAZWOPER, 30-hour OSHA Construction Safety certifications, and ISO 9001:2008 Internal Auditor • Served as UXO Team Leader on munitions and CWM projects for over 5 years.
Joseph Kaputa	Field Team Leader	Parsons	• Oversees sample collection and submission to labs • Track and catelog all items found • Procurement of equipment and supplies	• 40-hr OSHA HAZWOPERand current 8-hr OSHA Refresher certifications • Over 20 years experience managing field work for remediation projects • More han seven years experience with USACE HTRW and munitions projects
Tammy Chang	Project Chemist	Parsons	• Oversees the development of chemical sampling and analysis plans • Reviews laboratory submittals and tracks and resolves related corrective actions • Ensures chemistry data are collected, managed, reviewed, validated and reported in accordance with approved plans/requirements, e.g., DQOs, UFP-QAPP, and SEDD data submittals • Solve all non-conformance issues related to the analyses of project samples	• M.S. and B.S. Chemistry • Over 25 years experience in performing laboratory audits, chemical analyses, overseeing laboratory QA programs, developing QA/QC plans including UFP-QAPP for sampling and analysis, and conducting data validation

QAPP Worksheet #7 - Personnel Responsibilities and Qualifications Table (*continued*)

Name	Title	Organizational Affiliation	Responsibilities	Education and Experience Qualifications
Diane Anderson Project Manager	Laboratory Project Manager	APPL, Inc.	• Responsible for conduct of laboratory analyses in accordance with the approved UFP-QAPP and applicable analytical methods.	• B.S., Chemistry • 30 years experience in project management and customer service in the environmental testing field
John Schwarz	Laboratory Manager	ECBC	• Responsible for conducting laboratory analyses in accordance with the approved UFP-QAPP and applicable analytical methods.	•B.S. Chemistry •15 years experience with chemical agents related analyses.

QAPP Worksheet #8 - Special Personnel Training Requirements Table

Project Function	Specialized Training - Title or Description of Course	Training Provider	Training Date	Personnel/Groups Receiving Training	Personnel Titles/Organizational Affiliation	Location of Training Records/Certificates
UXO Tech – Unexploded Ordnance (UXO) recognition and avoidance	Graduate of a military Explosive Ordnance Disposal (EOD) School of the United States, or equivalent	U.S. Military or other approved training facility	All relevant personnel will be trained before starting work onsite	UXO Technician III and UXO Technician II	UXO Technician III and UXO Technician II/ Parsons	Field Office Files
Field Personnel	OSHA 40-hour; 8 hr refresher; Supervisor Training ; CPR; First Aid (as appropriate)	Parsons or external vendor	All relevant personnel will be trained before starting work onsite	All Field Personnel	Field Technician; UXO Technician; Field Team Leader, Parsons	Field Office Files

QAPP Worksheet #9 - Project Planning Session Participants Sheet

Project Name:	Remedial Action at Spring Valley FUDS Operable Unit 3, 4825 Glenbrook Road, Washington, D.C.		**Site Name:**	Spring Valley FUDS, Operable Unit 3	
Projected Date(s) of Sampling:	April 2012 – June 2017		**Site Location:**	4825 Glenbrook Rd, Washington, D.C.	
Project Manager:	Sean Buckley				
Date of TPP Meeting:	Ongoing Monthly				
TPP Meeting Purpose:	Discuss plans and progress on remedial action				
Name	**Title**	**Affiliation**	**Telephone Number**	**E-mail Address**	**Project Role**
Sherri Anderson- Hudgins	USAESCH Project Manager	USAESCH	(256) 895-1522	sherri.anderson-hudgins@usace.army.mil	Government Oversight
Bruce Whisenant	Technical Manager	USAESCH	(256) 895-1633	Bruce.K.Whisenant@usace.army.mil	Government Oversight
Brenda Barber	CENAB -Project Manager	CENAB	(410) 962-0030	Brenda.M.Barber@usace.army.mil	Government Oversight
Steve Hirsh	Region 3 Project Manager	USEPA	(215) 814-3352	hirsh.steven@epa.gov	Regulator
James Sweeney	DDOE Project Manager	DDOE	(202) 535-2289	james.sweeney@dc.gov	Regulator
Dr. Peter L. deFur	Technical Assistance for Public Participation (TAPP) Representative	Environmental Stewardship Concepts	(804) 741-2922	pdefur@estewards.com	Stakeholder
Bethany Bridgham	Property Owner - AU Representative	American University (AU)	(202) 885-3252	bjbesq@american.edu	Property Owner
Sean Buckley	Project Manager	Parsons	(202) 469-6385	sean.buckley@parsons.com	Contractor
Note: The Partnering Meetings for this remedial action have been ongoing since January 2012.					
Comments/Decisions:					
Action Items:					
Consensus Decisions:					

QAPP Worksheet #10 - Problem Definition

The problem to be addressed by the project:

The remedial action objective for 4825 Glenbrook Road is to achieved unrestricted future use by -

- Safely demolishing the 4825 Glenbrook Road house;
- Excavating the soil to the depth of bedrock or competent saprolite in the excavation boundaries of the low and high probability areas identified in the Decision Document (USACE 2011), which will result in an over-excavation of the soil to safely remove the impacted soil and clean up to residential standards to allow for unrestricted future use of the property;
- Accomplish the goals of safely removing any potential RCWM including industrial chemical hazards and chemical warfare materiel, laboratory waste, potential munitions and explosives of concern (MEC), material potentially presenting an explosive hazard (MPPEH), and other AUES-related debris at 4825 Glenbrook Road; and
- Perform mobilization and demobilization efforts for these tasks

The environmental questions being asked:

The overall objective of the remedial action is to achieve unrestricted residential use at 4825 Glenbrook Road in accordance with the Decision Document for 4825 Glenbrook Road.

A synopsis of secondary data or information from site reports:

Previous investigations were performed between 1992 and 2010 at 4825 Glenbrook Road. The investigation activities and results were discussed in details in the Remedial Investigation report (USACE 2011). Data and information collected from previous investigations are discussed in Chapter 1 of the Work Plan to which this QAPP is appended.

The possible classes of contaminants and the affected matrices:

During the RI, known MEC contaminated areas were investigated and all known MEC were removed. The remaining contamination at the site is CWM-impacted areas and areas with HTW-contamination. Affected media include surface and subsurface soils. The chemicals of potential concern at this site include explosives, metals, VOCs, SVOCs, pesticides, PCBs, perchlorate, iodide, fluoride, cyanide, toxic industrial chemicals as well as chemical agents and agent breakdown products. The possibility of encountering MEC at the site is considered remote.

The rationale for inclusion of chemical and nonchemical analyses:

A comprehensive list of analytical parameters was specifically developed by the Spring Valley Partners for the Spring Valley Formerly Used Defense Site (SVFUDS). Over a series of meetings, the Partners reviewed all chemicals documented as having been used at the AUES. The list was refined by considering whether analytical methods were available and by using chemical and physical properties to assess whether the chemical could be present under current site conditions.

Information concerning various environmental indicators:

The nature and extent of CWM and HTW contamination was determined in the RI report which documented previous investigations, geophysical surveys, test pit excavations, and environmental sampling.

Project decision conditions ("if…,then…" statements):

If a significant level of unknown contamination including MEC or CWM is encountered, the Parsons PM in conjunction with the USACESCH PM, will stop the excavation to re-evaluate. The Project Delivery Team will discuss any further actions and obtain concurrence from the Partners on further actions.

QAPP Worksheet #11 - Project Quality Objectives/Systematic Planning Process Statements

Who will use the data?
Parsons, USAESCH, CENAB, USEPA, DDOE, AU, and TAPP.
What will the data be used for?
Used for confirmation that the all known contamination from the site has been removed and the remaining soil meets the comparison criteria. The analytical data will ensure that the site met with the remedial action objective of unrestricted future use as stated in the Decision Document for 4825 Glenbrook Road (CENAB 2011).
What type of data are needed? (target analytes, analytical groups, field screening, on-site analytical or off-site laboratory techniques, sampling techniques)
Soil samples collected for this project will be analyzed at APPL Inc. for explosives (SW-846 8330B), metals (SW-846 6010C and 7471B for mercury), VOCs plus top 20 tentatively identified compounds (TICs*) (SW-846 8260B), SVOCs (SW-846 8270D) plus top 20 TICs*, total cyanide (SW846 9010/9014), perchlorate (SW-846 6850), iodide (SW-846 9056A.), fluoride (USEPA 300.0), pesticides and polychlorinated biphenyls (PCBs) (SW-846 8081B and SW-846 8082A) for backfill soil only, and at ECBC for analysis of chemical agents (L and HD), and agent breakdown products (1,4-thioxane; 1,4-dithiane; TDG; CVAA; CVAO). *TICs will be analyzed in accordance with the TIC Memo dated October 27, 2008. (Attachment B to the SAP)
How "good" do the data need to be in order to support the environmental decisions?
The data quality must fulfill the requirements set forth in this UFP-QAPP for DQOs, which are qualitative and quantitative statements developed to clarify study objectives, define the type of data needed, and specify the tolerable levels of potential decision errors. These DQOs are defined in Section 7.1.1 of the SAP.
How much data are needed? (number of samples for each analytical group, matrix, and concentration)
Grab soil samples will be collected at the excavation boundary at 20 feet intervals to confirm that the excavation sidewalls meet the comparison standards. Approximately 40 samples are anticipated to be required for performing this confirmatory sampling. Composite soil samples will also be collected during soil excavation for disposal characterization. Other media that may require sampling include aqueous IDW for disposal parameters in addition to the soil disposal samples.

QAPP Worksheet #11 - Project Quality Objectives/Systematic Planning Process Statements (*continued*)

Where, when, and how should the data be collected/generated?

Confirmation samples will be collected on the sidewalls of the excavation boundary at 20 foot linear spacing intervals. The following three vertical samples will be collected at one sidewall sampling location:

a) 0-0.5 feet beneath ground surface or clean backfill;
b) 0.5 feet above the maximum excavation depth; and
c) a mid-point sample will be collected at the mid-point of the maximum excavation depth if the maximum depth is greater than 5 feet. The mid-point sample will not be collected if the excavation depth is less than 5 feet.

Soil samples will also be collected from the excavation floor. One floor sample will be collected per 20' grids if the excavation does not reach the bedrock.

Soil samples will be collected using clean, disposable sampling equipment from locations in the excavation boundary. If the sample collected at any location does not meet the remediation goal of 20 mg/kg, the location will be excavated further in 12 inches increments and additional samples will be collected to confirm that arsenic concentration is below 20 mg/kg. The excavation will be extended to the full depth of the sidewall, and 10 feet in both directions laterally from the sample point.

Who will collect and generate the data?

Parsons, APPL, Inc. (subcontract offsite laboratory) and Chemical Agent Capable Laboratory - ECBC (subcontract offsite laboratory)

How will the data be reported?

Offsite commercial laboratory data will be reported as Level IV data packages in PDF format and also electronic data deliverables (EDD/SEDD) will be generated. ECBC will also report Level IV data packages in PDF format, but electronic data deliverables will be generated in MS Excel format.

How will the data be archived?

Validated chemical data for the confirmation samples will be stored in a database in the Washington DC Office server.

QAPP Worksheet #12.1 - Measurement Performance Criteria Table

Matrix:	Soil/Water				
Analytical Group:	Total and TCLP VOCs				
Sampling Procedure	**Analytical Method/SOP**	**Data Quality Indicators (DQIs)**	**Measurement Performance Criteria**	**QC Sample and/or Activity Used to Assess Measurement Performance**	**QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)**
Composite / Grab	8260B / ANA8260	Precision	Parent & Field Duplicate: %RPD ≤ 50% for soil.	Field Duplicate *	S&A
Composite / Grab	8260B / ANA8260	Accuracy/Bias	See Worksheet 28.1a	Matrix Spike *	A
Composite / Grab	8260B / ANA8260	Precision	See Worksheet 28.1a	Matrix Spike Duplicate *	A
Composite / Grab	8260B / ANA8260	Accuracy/Bias	See Worksheets 28.1a	Surrogate Spike (organics)	A

* Field duplicate, matrix spike, and matrix spike duplicate are not required for TCLP VOCs.

QAPP Worksheet #12.2 - Measurement Performance Criteria Table

Matrix:	Soil/Water				
Analytical Group:	Total and TCLP SVOCs				
Sampling Procedure	**Analytical Method/SOP**	**Data Quality Indicators (DQIs)**	**Measurement Performance Criteria**	**QC Sample and/or Activity Used to Assess Measurement Performance**	**QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)**
Composite / Grab	8270D / ANA8270	Precision	Parent & Field Duplicate: %RPD ≤ 50% for soil.	Field Duplicate *	S&A
Composite / Grab	8270D / ANA8270	Accuracy/Bias	See Worksheet 28.2a	Matrix Spike *	A
Composite / Grab	8270D / ANA8270	Precision	See Worksheet 28.2a	Matrix Spike Duplicate *	A
Composite / Grab	8270D / ANA8270	Accuracy/Bias	See Worksheet 28.2a	Surrogate Spike (organics)	A

* Field duplicate, matrix spike, and matrix spike duplicate are not required for TCLP SVOCs.

QAPP Worksheet #12.3 - Measurement Performance Criteria Table

Matrix:	Soil/Water
Analytical Group:	Explosives

Sampling Procedure	**Analytical Method/SOP**	**Data Quality Indicators (DQIs)**	**Measurement Performance Criteria**	**QC Sample and/or Activity Used to Assess Measurement Performance**	**QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)**
Composite / Grab	8330B / HPL8330	Precision	Parent & Field Duplicate: %RPD ≤ 50% for soil.	Field Duplicate	S&A
Composite / Grab	8330B / HPL8330	Accuracy/Bias	See Worksheet 28.5a	Matrix Spike	A
Composite / Grab	8330B / HPL8330	Precision	See Worksheet 28.5a	Matrix Spike Duplicate	A
Composite / Grab	8330B / HPL8330	Accuracy/Bias	See Worksheet 28.5a	Surrogate Spike (organics)	A

QAPP Worksheet #12.4 - Measurement Performance Criteria Table

Matrix:	Soil/Water				
Analytical Group:	Total and TCLP Metals				
Sampling Procedure	**Analytical Method/SOP**	**Data Quality Indicators (DQIs)**	**Measurement Performance Criteria**	**QC Sample and/or Activity Used to Assess Measurement Performance**	**QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)**
Composite / Grab	6010C, 7471B, 7470A / ANA6010, ANA7471, ANA7470A	Precision	Parent & Field Duplicate: %RPD ≤ 50% for soil.	Field Duplicate *	S&A
Composite / Grab	6010C, 7471B, 7470A / ANA6010, ANA7471, ANA7470A	Accuracy/Bias	See Worksheet 28.3b	Matrix Spike *	A
Composite / Grab	6010C, 7471B, 7470A / ANA6010, ANA7471, ANA7470A	Precision	See Worksheet 28.3b	Matrix Spike Duplicate *	A

* Field duplicate, matrix spike, and matrix spike duplicate are not required for TCLP metals.

QAPP Worksheet #12.5 - Measurement Performance Criteria Table

Matrix:	Soil				
Analytical Group:	Total Cyanide				
Sampling Procedure	**Analytical Method/SOP**	**Data Quality Indicators (DQIs)**	**Measurement Performance Criteria**	**QC Sample and/or Activity Used to Assess Measurement Performance**	**QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)**
Composite / Grab	9010C/9014/ANA9010C/9014	Precision	Parent & Field Duplicate: %RPD ≤ 50% for soil.	Field Duplicate	S&A
Composite / Grab	9010C/9014/ANA9010C/9014	Accuracy/Bias	See Worksheet 28.8b	Matrix Spike	A
Composite / Grab	9010C/9014/ANA9010C/9014	Precision	See Worksheet 28.3b	Matrix Spike Duplicate	A

QAPP Worksheet #12.6 - Measurement Performance Criteria Table

Matrix:	Soil/Water				
Analytical Group:	Perchlorate				
Sampling Procedure	**Analytical Method/SOP**	**Data Quality Indicators (DQIs)**	**Measurement Performance Criteria**	**QC Sample and/or Activity Used to Assess Measurement Performance**	**QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)**
Composite / Grab	6850 HPL6850	Precision	Parent & Field Duplicate: %RPD ≤ 50% for soil.	Field Duplicate	S&A
Composite / Grab	6850 / HPL6850	Accuracy/Bias	See Worksheet 28.7b	Matrix Spike	A
Composite / Grab	6850 / HPL6850	Precision	See Worksheet 28.7b	Matrix Spike Duplicate	A

QAPP Worksheet #12.7 - Measurement Performance Criteria Table

Matrix:	Soil				
Analytical Group:	Iodide				
Sampling Procedure	**Analytical Method/SOP**	**Data Quality Indicators (DQIs)**	**Measurement Performance Criteria**	**QC Sample and/or Activity Used to Assess Measurement Performance**	**QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)**
Composite / Grab	9056A / ST-WC-0028	Precision	Parent & Field Duplicate: %RPD ≤ 50% for soil.	Field Duplicate	S&A
Composite / Grab	9056A / ST-WC-0028	Accuracy/Bias	See Worksheet 28.11a	Matrix Spike	A
Composite / Grab	9056A ST-WC-0028	Precision	See Worksheet 28.11a	Matrix Spike Duplicate	A

QAPP Worksheet #12.8 - Measurement Performance Criteria Table

Matrix:	Soil				
Analytical Group:	Fluoride				
Sampling Procedure	**Analytical Method/SOP**	**Data Quality Indicators (DQIs)**	**Measurement Performance Criteria**	**QC Sample and/or Activity Used to Assess Measurement Performance**	**QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)**
Composite / Grab	300.0 / HPL9056	Precision	Parent & Field Duplicate: %RPD ≤ 50% for soil.	Field Duplicate	S&A
Composite / Grab	300.0 / HPL9056	Accuracy/Bias	See Worksheet 28.10b	Matrix Spike	A
Composite / Grab	300.0 / HPL9056	Precision	See Worksheet 28.10b	Matrix Spike Duplicate	A

QAPP Worksheet #12.9 - Measurement Performance Criteria Table

Matrix:	Soil/Water				
Analytical Group:	Pesticides/PCBs				
Sampling Procedure	**Analytical Method/SOP**	**Data Quality Indicators (DQIs)**	**Measurement Performance Criteria**	**QC Sample and/or Activity Used to Assess Measurement Performance**	**QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)**
Composite / Grab	8081B, 8082A / ANA8081, ANA8082	Precision	Parent & Field Duplicate: %RPD ≤ 50% for soil.	Field Duplicate	S&A
Composite / Grab	8081B, 8082A / ANA8081, ANA8082	Accuracy/Bias	See Worksheet 28.6a	Matrix Spike	A
Composite / Grab	8081B, 8082A / ANA8081, ANA8082	Precision	See Worksheet 28.6a	Matrix Spike Duplicate	A
Composite / Grab	8081B, 8082A / ANA8081, ANA8082	Accuracy/Bias	See Worksheet 28.6a	Surrogate Spike (organics)	A

QAPP Worksheet #12.10 - Measurement Performance Criteria Table

Matrix:	Soil/Water				
Analytical Group:	CA/ABPs				
Sampling Procedure	**Analytical Method/SOP**	**Data Quality Indicators (DQIs)**	**Measurement Performance Criteria**	**QC Sample and/or Activity Used to Assess Measurement Performance**	**QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)**
Composite / Grab	CA and ABPs/IOP –MT-08 and IOP-MT-57	Accuracy/Bias	See Worksheet 28.15a	Matrix Spike	A
Composite / Grab	CA and ABPs/IOP –MT-08 and IOP-MT-57	Precision	See Worksheet 28.15a	Matrix Spike Duplicate	A
Composite / Grab	CA and ABPs/IOP –MT-08 and IOP-MT-57	Accuracy/Bias	See Worksheet 28.15a	Surrogate Spike	A

QAPP Worksheet #13 - Secondary Data Criteria and Limitations Table

Secondary Data	Data Source (Originating Organization, Report Title, and Date)	Data Generator(s) (Originating Org., Data Types, Data Generation/Collection Dates)	How Data Will Be Used	Limitations on Data Use
RI at 4825 Glenbrook Road	USACE, (Remedial Investigation at 4825 Glenbrook Road, July 2011)	USACE Pit Confirmation/Characterization samples	• Used to compare that confirmation samples do not exceed standards documented in RI	None

QAPP Worksheet #14 - Summary of Project Tasks

Sampling Tasks:

Following three vertical samples will be collected at one sidewall sampling location:

a) 0-0.5 feet beneath existing ground surface or clean backfill where applicable;
b) 0.5 feet above the maximum excavation depth; and
c) a mid-point sample will be collected at the mid-point of the maximum excavation depth if the maximum depth is greater than 5 feet. The excavation depth will be measured from existing ground surface or beneath clean backfill (where applicable) to the bottom of the excavation. The mid-point sample will not be collected if the excavation depth is less than 5 feet.

An additional confirmation sample will also be collected after removal of arsenic impacted soil at the curve of the retaining wall next to the driveway.

Soil samples will also be collected from the excavation floor. One floor sample will be collected per 20-foot grid if the excavation does not reach the bedrock.

Soil samples will be collected using clean, disposable sampling equipment from locations in the excavation boundary. If the sample collected at any location does not meet the remediation goal of 20 mg/kg, the location will be excavated further in 12 inches increments and additional samples will be collected to confirm that arsenic concentration is below 20 mg/kg. The excavation will be extended to the full depth of the sidewall, and 10 feet in both directions laterally from the sample point.

Analysis Tasks:

Soil samples collected for this project will be analyzed at APPL, Inc. for explosives (SW-846 8330B), metals (SW-846 6010C and 7471B for mercury), VOCs (SW-846 8260B), SVOCs (SW-846 8270D), total cyanide (SW846 9010C/9014), perchlorate (SW-846 6850), iodide and flouride (SW-846 9056A.), pesticides and polychlorinated biphenyls (SW-846 8081B and SW-846 8082A) for backfill soil only, and at ECBC for analysis of chemical agents (L and HD), and agent breakdown products (1,4-thioxane; 1,4-dithiane; TDG; CVAA; CVAO).

Quality Control Tasks:

APPL, Inc. will follow the guidelines of the DoD QSM version 5.0 and this QAPP to ensure the data is usable and of known quality. ECBC will follow the lab SOPs and this QAPP to ensure the data is usable and of known quality.

Secondary Data:

Analytical data from previously conducted investigations will be used to ensure that confirmatory samples collected do not exceed the comparison standards and previously detected concentration.

Data Management Tasks:

The deliverables required for this project are in both hard-copy and electronic format. Hard-copy reporting of analytical results is defined in Worksheet #29 and will include level IV data packages. Staged electronic data deliverables (SEDD) will be generated using the SEDD/ADR.net formats, and validated chemical data will be stored and maintained in the Parsons Washington DC office. ECBC does not have the capability of generating SEDD/ADR.net files, instead, it will provide EDDs in MS Excel format. The validated text files, the laboratory SEDD or EDD files, and any associated error logs will be submitted to the client. Field and laboratory data verification project personnel will verify field data collected during this investigation by reviewing accuracy, precision, comparability, representativeness, completeness, and sensitivity, as summarized in Worksheet #37.

QAPP Worksheet #14 - Summary of Project Tasks (*continued*)

Assessment/Audit Tasks:
Audits will be conducted by a qualified Parsons professional.
Data Review Tasks:
Analytical Data will be reviewed as outlined in the DoD QSM version 5.0 and will be performed by laboratory personnel. Data validation for laboratory hardcopy reports will be performed by the Parsons Project Chemist (or designee) for sample results in accordance with the requirements contained in the FSP, this UFP-QAPP, DoD QSM 5.0, and other applicable SOPs and guidance. Manual validation of the project data will include a Level IV evaluation of those QA/QC items not covered by ADR including calibration, tuning, chromatograms, manual integration, traceability of standard, quantitation reports, etc.

QAPP Worksheet #15.1 - Reference Limits and Evaluation Table

Matrix:	Soil
Analytical Group:	VOCs + TICs (8260B)

Parameter	CAS #	Waste Profile Comparison Value (mg/kg)	Grab/Confirmation Comparison Value (mg/kg)	Comparison Value Source (1)	APPL LOQ (mg/Kg)	APPL LOD (mg/Kg)	APPL DL (mg/Kg)
1,1,1-Trichloroethane	71-55-6	8,100	810	RSL	0.005	0.0020	0.0004
1,1,2,2-Tetrachloroethane	79-34-5	0.60	0.60	RSL	0.005	0.0020	0.0012
1,1,2-Trichloroethane	79-00-5	1.1	0.15	RSL	0.005	0.0020	0.0003
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	76-13-1	40,000	4,000	RSL	0.010	0.0020	0.0008
1,1-Dichloroethane	75-34-3	3.6	3.6	RSL	0.005	0.0020	0.0003
1,1-Dichloroethene	75-35-4	230	23	RSL	0.005	0.0020	0.0008
1,2,4-Trichlorobenzene	120-82-1	24	5.8	RSL	0.005	0.0020	0.0005
1,2-Dibromo-3-chloropropane	96-12-8	0.018	0.018	BG[2]	0.01	0.005	0.002
1,2-Dibromoethane	106-93-4	0.036	0.036	RSL	0.005	0.0020	0.0014
1,2-Dichlorobenzene	95-50-1	1,800	180	RSL	0.005	0.0020	0.0005
1,2-Dichloroethane	107-06-2	0.46	0.46	RSL	0.005	0.0020	0.0001
1,2-Dichloropropane	78-87-5	1.0	1.0	RSL	0.005	0.0020	0.0007
1,3-Dichlorobenzene	541-73-1	NA	NA	NA	0.005	0.0020	0.0007
1,4-Dichlorobenzene	106-46-7	2.6	2.6	RSL	0.005	0.0020	0.0007
2-Butanone	78-93-3	27,000	2,700	RSL	0.01	0.003	0.003
2-Hexanone	591-78-6	200	20	RSL	0.01	0.002	0.001
4-Methyl-2-pentanone	108-10-1	33,000	3,300	RSL	0.01	0.002	0.001
Acetone	67-64-1	61,000	6,100	RSL	0.01	0.005	0.003
Acetonitrile	75-05-8	810	81	RSL	0.1	0.050	0.017
Acrolein	107-02-8	0.14	0.014	RSL	0.20	0.100	0.077

QAPP Worksheet #15.1 - Reference Limits and Evaluation Table (*continued*)

Matrix:	Soil						
Analytical Group:	VOCs + TICs (8260B)						
Parameter	**CAS #**	**Waste Profile Comparison Value (mg/kg)**	**Grab/Confirmation Comparison Value (mg/kg)**	**Comparison Value Source (1)**	**APPL LOQ (mg/Kg)**	**APPL LOD (mg/Kg)**	**APPL DL (mg/Kg)**
Benzene	71-43-2	1.2	1.2	RSL	0.005	0.0020	0.0006
Benzyl chloride	100-44-7	1.1	1.1	RSL	0.20	TBD	0.002
Bromobenzene	108-86-1	290	29	RSL	0.005	0.0020	0.0008
Bromochloromethane	74-97-5	150	15	RSL	0.01	0.002	0.001
Bromodichloromethane	75-27-4	0.29	0.29	RSL	0.005	0.0020	0.0007
Bromoform	75-25-2	19	19	RSL	0.005	0.0020	0.0008
Bromomethane	74-83-9	6.8	0.68	RSL	0.005	0.0020	0.0016
Carbon disulfide	75-15-0	770	77	RSL	0.005	0.0020	0.0011
Carbon tetrachloride	56-23-5	0.65	0.65	RSL	0.005	0.0020	0.0008
Chlorobenzene	108-90-7	280	28	RSL	0.005	0.0020	0.0005
Chloroethane	75-00-3	14,000	1,400	RSL	0.005	0.0020	0.0015
Chloroform	67-66-3	0.32	0.32	RSL	0.005	0.0020	0.0014
Chloromethane	74-87-3	110	11	RSL	0.010	0.005	0.002
cis-1,2-Dichloroethene	156-59-2	160	16	RSL	0.005	0.0020	0.0002
cis-1,3-Dichloropropene	10061-01-5	NA	NA	NA	0.005	0.0020	0.0009
Cyclohexane	110-82-7	6,500	650	RSL	0.005	0.0020	0.00082
Dibromochloromethane	124-48-1	8.3	8.3	RSL	0.005	0.0020	0.0008
Dichlorodifluoromethane	75-71-8	87	8.7	RSL	0.01	0.002	0.001
Ethylbenzene	100-41-4	5.8	5.8	RSL	0.005	0.0020	0.0010
Isopropylbenzene	98-82-8	1,900	190	RSL	0.005	0.0020	0.0011
m,p-Xylene	1330-20-7	580	58	RSL	0.01	0.005	0.002

QAPP Worksheet #15.1 - Reference Limits and Evaluation Table (*continued*)

Matrix:	Soil						
Analytical Group:	VOCs + TICs (8260B)						
Parameter	**CAS #**	**Waste Profile Comparison Value (mg/kg)**	**Grab/Confirmation Comparison Value (mg/kg)**	**Comparison Value Source (1)**	**APPL LOQ (mg/Kg)**	**APPL LOD (mg/Kg)**	**APPL DL (mg/Kg)**
Methyl acetate	79-20-9	78,000	7,800	RSL	0.01	0.0020	0.0010
Methylcyclohexane	108-87-2	NA	NA	NA	0.02	0.005	0.0020
Methyl tert-butyl ether	1634-04-4	47	47	RSL	0.005	0.0020	0.0010
Methylene chloride	75-09-2	57	35	RSL	0.02	0.010	0.001
o-Xylene	95-47-6	650	65	RSL	0.005	0.0020	0.0010
Styrene	100-42-5	6,000	600	RSL	0.005	0.0020	0.0012
Tetrachloroethene	127-18-4	24	8.1	RSL	0.005	0.0020	0.0005
Toluene	108-88-3	4,900	490	RSL	0.005	0.0020	0.0013
trans-1,2-Dichloroethene	156-60-5	1,600	160	RSL	0.005	0.0020	0.0003
trans-1,3-Dichloropropene	10061-02-6	NA	NA	NA	0.005	0.0020	0.0008
Trichloroethene	79-01-6	0.94	0.41	RSL	0.005	0.0020	0.0009
Trichlorofluoromethane	75-69-4	23,000	2,300	RSL	0.005	0.0020	0.0016
Vinyl chloride	75-01-4	0.059	0.059	RSL	0.005	0.0020	0.0015
Notes:							

(1) Comparison values were obtained from the USEPA Regional Screening Levels (RSLs), updated November 2015.
The Waste Profile Comparison Value was the Resident Soil RSL based on a target risk of 1E-06 or hazard quotient of 1.0 as presented in the RSL table located here: http://semspub.epa.gov/work/03/2220581.pdf.
The Grab/Confirmation Comparison Value was the Resident Soil RSL based on a target risk of 1E-06 or hazard quotient of 0.1 as presented in the RSL table located here: http://semspub.epa.gov/work/03/2220579.pdf.
(2) When the comparison value was lower than the background (BG) concentration, the BG value was used as the comparison value. BG concentrations are the 95th percentile concentration presented in the Background Soil Sampling Report - Spring Valley Formerly Used Defense Site (Parsons 2008).
NA = Not available.

QAPP Worksheet #15.2- Reference Limits and Evaluation Table

Matrix:	Soil						
Analytical Group:	Semivolatile Organic Compounds + TICs (8270D)						

Parameter	CAS #	Waste Profile Comparison Value (mg/kg)	Grab/Confirmation Comparison Value (mg/kg)	Comparison Value Source (1)	APPL LOQ (mg/Kg)	APPL LOD (mg/Kg)	APPL DL (mg/Kg)
2,4,5-Trichlorophenol	95-95-4	6,300	630	RSL	0.33	0.167	0.060
2,4,6-Trichlorophenol	88-06-2	49	6.3	RSL	0.33	0.167	0.048
2,4-Dichlorophenol	120-83-2	190	19	RSL	0.33	0.167	0.048
2,4-Dimethylphenol	105-67-9	1,300	130	RSL	0.33	0.167	0.044
2,4-Dinitrophenol	51-28-5	130	13	RSL	0.66	0.167	0.054
2-Chloronaphthalene	91-58-7	4,800	480	RSL	0.33	0.167	0.052
2-Chlorophenol	95-57-8	390	39	RSL	0.33	0.167	0.044
2-Methylnaphthalene	91-57-6	240	24	RSL	0.33	0.167	0.050
2-Methylphenol	95-48-7	3,200	320	RSL	0.33	0.167	0.045
2-Nitroaniline	88-74-4	630	63	RSL	0.66	0.167	0.062
2-Nitrophenol	88-75-5	NA	NA	NA	0.33	0.167	0.048
3,3´-Dichlorobenzidine	91-94-1	1.2	1.2	RSL	0.66	0.167	0.056
3-Nitroaniline	99-09-2	NA	NA	NA	0.66	0.167	0.061
3/4-Methylphenol (m-cresol)	108-39-4	3,200	320	RSL	0.33	0.167	0.046
4,6-Dinitro-2-methylphenol	534-52-1	5.1	1.3 (2)	RSL/BG	0.66	0.167	0.056
4-Bromophenyl phenyl ether	101-55-3	NA	NA	NA	0.33	0.167	0.057
4-Chloro-3-methylphenol	59-50-7	6,300	630	RSL	0.33	0.167	0.059
4-Chloroaniline	106-47-8	2.7	2.7	RSL	0.33	0.167	0.017

QAPP Worksheet #15.2- Reference Limits and Evaluation Table (*continued*)

Matrix:	Soil						
Analytical Group:	Semvolatile Organic Compounds + TICs (8270D)						
Parameter	**CAS #**	**Waste Profile Comparison Value (mg/kg)**	**Grab/Confirmation Comparison Value (mg/kg)**	**Comparison Value Source (1)**	**APPL LOQ (mg/Kg)**	**APPL LOD (mg/Kg)**	**APPL DL (mg/Kg)**
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	NA	0.33	0.167	0.061
4-Nitroaniline	100-01-6	27	25	RSL	0.33	0.167	0.073
4-Nitrophenol	100-02-7	NA	NA	NA	0.66	0.167	0.060
Acenaphthene	83-32-9	3,600	360	RSL	0.33	0.167	0.054
Acenaphthylene	208-96-8	NA	NA	NA	0.33	0.167	0.053
Acetophenone	98-86-2	7,800	780	RSL	0.33	0.167	0.090
Anthracene	120-12-7	18,000	1,800	RSL	0.33	0.167	0.061
Atrazine	1912-24-9	2.4	2.4	RSL	0.33	0.167	0.090
Benzaldehyde	100-52-7	7,800	780	RSL	0.33	0.167	0.090
Benzo (a) anthracene	56-55-3	0.357	0.357	BG[2]	0.33	0.167	0.058
Benzo (a) pyrene	50-32-8	0.357	0.357	BG[2]	0.33	0.167	0.051
Benzo (b) fluoranthene	205-99-2	0.365	0.365	BG[2]	0.33	0.167	0.060
Benzo (g,h,i) perylene	191-24-2	NA	NA	NA	0.33	0.167	0.055
Benzo (k) fluoranthene	207-08-9	1.6	1.6	RSL	0.33	0.167	0.061
Benzoic acid	65-85-0	250,000	25,000	RSL	0.33	0.167	0.03
Biphenyl	92-52-4	47	4.7	RSL	0.33	0.167	0.090
Bis (2-chlorethoxy) methane	111-91-1	190	19	RSL	0.33	0.167	0.050
Bis (2-chloroethyl) ether	111-44-4	0.23	0.23	RSL	0.33	0.167	0.050
Bis (2-chloroisopropyl) ether	108-60-1	3,100	310	RSL	0.33	0.167	0.047
Bis (2-ethylhexyl) phthalate	117-81-7	39	39	RSL	0.66	0.167	0.062

QAPP Worksheet #15.2- Reference Limits and Evaluation Table (*continued*)

Matrix:	Soil						
Analytical Group:	Semivolatile Organic Compounds + TICs (8270D)						
Parameter	**CAS #**	**Waste Profile Comparison Value (mg/kg)**	**Grab/Confirmation Comparison Value (mg/kg)**	**Comparison Value Source (1)**	**APPL LOQ (mg/Kg)**	**APPL LOD (mg/Kg)**	**APPL DL (mg/Kg)**
Butyl benzyl phthalate	85-68-7	290	290	RSL	0.33	0.167	0.056
Caprolactam	105-60-2	31,000	3,100	RSL	0.33	0.167	0.090
Carbazole	86-74-8	NA	NA	NA	0.33	0.167	0.082
Chrysene	218-01-9	16	16	RSL	0.33	0.167	0.061
Di-n-butyl phthalate	84-74-2	6,300	630	RSL	0.33	0.167	0.066
Di-n-octyl phthalate	117-84-0	630	63	NA	0.33	0.167	0.058
Dibenz (a,h) anthracene	53-70-3	0.51	0.51	BG[2]	0.33	0.167	0.059
Dibenzofuran	132-64-9	73	7.3	RSL	0.66	0.167	0.057
Diethyl phthalate	84-66-2	51,000	5,100	RSL	0.33	0.167	0.062
Dimethyl phthalate	131-11-3	NA	NA	NA	0.33	0.167	0.063
Diphenylamine	122-39-4	1,600	160	RSL	0.33	0.167	0.08
Fluoranthene	206-44-0	2,400	240	RSL	0.33	0.167	0.065
Fluorene	86-73-7	2,400	240	RSL	0.33	0.167	0.061
Hexachlorobenzene	118-74-1	0.51	0.51	BG[2]	0.66	0.167	0.060
Hexachlorobutadiene	87-68-3	1.2	1.2	RSL	0.33	0.167	0.052
Hexachlorocyclopentadiene	77-47-4	1.8	0.51 (2)	RSL/BG	0.33	0.167	0.044
Hexachloroethane	67-72-1	1.8	1.8	RSL	0.33	0.167	0.050
Indeno (1,2,3-cd) pyrene	193-39-5	0.335	0.335	BG[2]	0.33	0.167	0.060
Isophorone	78-59-1	570	570	RSL	0.33	0.167	0.057
N-Nitrosodi-n-propylamine	621-64-7	0.51	0.51	BG[2]	0.33	0.167	0.055
N-Nitrosodiphenylamine	86-30-6	110	110	RSL	0.33	0.167	0.051

QAPP Worksheet #15.2- Reference Limits and Evaluation Table (*continued*)

Matrix:	Soil						
Analytical Group:	Semivolatile Organic Compounds + TICs (8270D)						
Parameter	**CAS #**	**Waste Profile Comparison Value (mg/kg)**	**Grab/Confirmation Comparison Value (mg/kg)**	**Comparison Value Source (1)**	**APPL LOQ (mg/Kg)**	**APPL LOD (mg/Kg)**	**APPL DL (mg/Kg)**
Naphthalene	91-20-3	3.8	3.8	RSL	0.33	0.167	0.051
Pentachlorophenol	87-86-5	1.2	1.2	BG[2]	0.66	0.167	0.059
Phenanthrene	85-01-8	NA	NA	NA	0.66	0.167	0.058
Phenol	108-95-2	19,000	1,900	RSL	0.33	0.167	0.043
Pyrene	129-00-0	1,800	180	RSL	0.33	0.167	0.054
Benzal chloride	98-87-3	NA	NA	NA	TIC	TIC	TIC
Benzyl Bromide	100-39-0	NA	NA	NA	TIC	TIC	TIC
2-Bromoethanol	540-51-2	NA	NA	NA	TIC	TIC	TIC
4-Chloroacetophenone	99-91-2	NA	NA	NA	TIC	TIC	TIC
1-Chloro-2,4-dinitrobenzene	97-00-7	NA	NA	NA	TIC	TIC	TIC
2-Chloroethanol	107-07-3	NA	NA	NA	TIC	TIC	TIC
Chloropicrin	76-06-2	2.0	0.20	RSL	TIC	TIC	TIC
Dimethylaniline	121-69-7	160	16	RSL	TIC	TIC	TIC
Diphenyl Ether	101-84-8	NA	NA	NA	TIC	TIC	TIC

Notes:

(1) Comparison values were obtained from the USEPA Regional Screening Levels (RSLs), updated November 2015.
The Waste Profile Comparison Value was the Resident Soil RSL based on a target risk of 1E-06 or hazard quotient of 1.0 as presented in the RSL table located here: http://semspub.epa.gov/work/03/2220581.pdf.
The Grab/Confirmation Comparison Value was the Resident Soil RSL based on a target risk of 1E-06 or hazard quotient of 0.1 as presented in the RSL table located here: http://semspub.epa.gov/work/03/2220579.pdf.
(2) When the comparison value was lower than the background (BG) concentration, the BG value was used as the comparison value. BG concentrations are the 95th percentile concentration presented in the Background Soil Sampling Report - Spring Valley Formerly Used Defense Site (Parsons 2008).

NA = Not available.

QAPP Worksheet #15.3 -Reference Limits and Evaluation Table

Matrix:	Soil						
Analytical Group:	Explosives (8330B)						
Parameter	**CAS #**	**Waste Profile Comparison Value (mg/kg)**	**Grab/Confirmation Comparison Value (mg/kg)**	**Comparison Value Source (1)**	**APPL LOQ (mg/Kg)**	**APPL LOD (mg/Kg)**	**APPL DL (mg/Kg)**
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	6.1	6.1	RSL	0.50	0.200	0.080
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0	3,900	390	RSL	0.50	0.200	0.080
2,4,6-Trinitrotoluene (TNT)	118-96-7	21	3.6	RSL	0.50	0.200	0.083
1,3,5-Trinitrobenzene	99-35-4	2,200	220	RSL	0.50	0.200	0.079
1,3-Dinitrobenzene	99-65-0	6.3	0.63	RSL	0.45	0.200	0.063
2,4-Dinitrotoluene	121-14-2	1.7	1.7	RSL	0.50	0.200	0.083
2,6-Dinitrotoluene	606-20-2	0.36	0.36	RSL	0.50	0.200	0.083
2-Amino-4,6-dinitrotoluene	35572-78-2	150	15	RSL	0.50	0.200	0.075
2-Nitrotoluene	88-72-2	3.2	3.2	RSL	0.50	0.200	0.066
3-Nitrotoluene	99-08-1	6.3	0.63	RSL	0.50	0.200	0.071
4-Amino-2,6-dinitrotoluene	19406-51-0	150	15	RSL	0.50	0.200	0.075
4-Nitrotoluene	99-99-0	34	25	RSL	0.50	0.200	0.080
Nitrobenzene	98-95-3	5.1	5.1	RSL	0.50	0.200	0.075
Nitroglycerin	55-63-0	6.3	0.63	RSL	0.50	0.200	0.085
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	479-45-8	160	16	RSL	0.50	0.200	0.091
Pentaerythritol Tetranitrate (PETN)	78-11-5	130	13	RSL	2.50	1.000	0.579

Notes:

(1) Comparison values were obtained from the USEPA Regional Screening Levels (RSLs), updated November 2015.
The Waste Profile Comparison Value was the Resident Soil RSL based on a target risk of 1E-06 or hazard quotient of 1.0 as presented in the RSL table located here: http://semspub.epa.gov/work/03/2220581.pdf.
The Grab/Confirmation Comparison Value was the Resident Soil RSL based on a target risk of 1E-06 or hazard quotient of 0.1 as presented in the RSL table located here: http://semspub.epa.gov/work/03/2220579.pdf.

QAPP Worksheet #15.4 - Reference Limits and Evaluation Table

Matrix:	Soil						
Analytical Group:	Total Metals (6010C/6020A/7471B)						

Parameter	**CAS #**	**Waste Profile Comparison Value (mg/kg)**	**Grab/Confirmation Comparison Value (mg/kg)**	**Comparison Value Source (1)**	**APPL LOQ (mg/kg)**	**APPL LOD (mg/kg)**	**APPL DL (mg/kg)**
Aluminum	7429-90-5	77,000	19,100(2)	RSL/BG	50.0	4.00	1.98
Antimony	7440-36-0	31	5.2(2)	RSL/BG	2.0	0.60	0.35
Arsenic	7440-38-2	20	20	SV Remed. Goal (3)	2.5	0.80	0.65
Barium	7440-39-3	15,000	1,500	RSL	2.0	0.40	0.07
Beryllium	7440-41-7	160	16	RSL	0.5	0.20	0.04
Cadmium	7440-43-9	71	7.1	RSL	0.5	0.20	0.05
Chromium	7440-47-3	120,000	12,000	RSL(4)	3.5	0.40	0.14
Cobalt	7440-48-4	23	17.8(2)	RSL/BG	1.0	0.30	0.10
Copper	7440-50-8	3,100	310	RSL	5.0	0.40	0.21
Lead	7439-92-1	400	400	RSL	0.9	0.80	0.25
Manganese	7439-96-5	1,800	968(2)	RSL/BG	4.5	0.40	0.13
Mercury	7439-97-6	11	1.1	RSL (5)	0.1	0.04	0.01
Nickel	7440-02-0	1,500	150	RSL	4.0	0.40	0.11
Selenium	7782-49-2	390	39	RSL	3.0	1.00	0.85
Silver	7440-22-4	390	39	RSL	1.5	0.20	0.15
Strontium	7440-24-6	47,000	4,700	RSL	0.75	0.400	0.210
Thallium	7440-28-0	2.2(2)	2.2(2)	BG	3.0	1.20	0.62
Tellurium*	13494-80-9	39.11	39.11	Tox Review (6)	1.0	0.33	0.11
Tin	7440-31-5	47,000	4,700	RSL	1.0	0.50	0.14
Titanium	7440-32-6	2,690(2)	2,690(2)	BG	0.5	0.40	0.12

QAPP Worksheet #15.4 - Reference Limits and Evaluation Table (*continued*)

Matrix:	Soil						
Analytical Group:	Total Metals (6010C/6020A/7471B)						
Parameter	**CAS #**	**Waste Profile Comparison Value (mg/kg)**	**Grab/Confirmation Comparison Value (mg/kg)**	**Comparison Value Source (1)**	**APPL LOQ (mg/kg)**	**APPL LOD (mg/kg)**	**APPL DL (mg/kg)**
Vanadium	7440-62-2	390	75.5(2)	RSL/BG	2.0	0.40	0.10
Zinc	7440-66-6	23,000	2,300	RSL	8.0	4.00	1.15
Zirconium*	7440-67-7	48.3	48.3	BG	1.2	0.63	0.21

Notes:

(1) Comparison values were obtained from the USEPA Regional Screening Levels (RSLs), updated November 2015.
The Waste Profile Comparison Value was the Resident Soil RSL based on a target risk of 1E-06 or hazard quotient of 1.0 as presented in the RSL table located here: http://semspub.epa.gov/work/03/2220581.pdf.
The Grab/Confirmation Comparison Value was the Resident Soil RSL based on a target risk of 1E-06 or hazard quotient of 0.1 as presented in the RSL table located here: http://semspub.epa.gov/work/03/2220579.pdf.
(2) When the comparison value was lower than the background (BG) concentration, the BG value was used as the comparison value. BG concentrations are the 95th percentile concentration presented in the Background Soil Sampling Report - Spring Valley Formerly Used Defense Site (Parsons 2008).
(3) Comparison value for arsenic is the remedial goal determined by the Spring Valley PDT.
(4) RSL for chromium is based on Chromium(III), insoluble salts.
(5) RSL for mercury is based on Mercury (elemental)

(6) Based on a review of toxicological literature.

NA = Not available

*TestAmerica-St. Louis will analyze Tellurium and Zirconium with SW6020A.

QAPP Worksheet #15.5 - Reference Limits and Evaluation Table

Matrix:	Soil
Analytical Group:	Total Cyanide (9010C/9014), Perchlorate (6850), Iodide (9056A), and Fluoride (300.0)

Parameter	**CAS #**	**Waste Profile Comparison Value (mg/kg)**	**Grab/Confirmation Comparison Value (mg/kg)**	**Comparison Value Source (1)**	**APPL LOQ (mg/Kg)**	**APPL LOD (mg/Kg)**	**APPL DL (mg/Kg)**
Total Cyanide	57-12-5	2.7	0.27	RSL	0.5	0.32	0.28
Perchlorate	14797-73-0	55	5.5	RSL	0.006	0.004	0.002
Iodide*	20461-54-5	780	78	RSL(2)	10.0	2.0	1.0
Fluoride	16984-48-8	3,100	310	RSL	1.0	0.32	0.08

Notes:

(1) Comparison values were obtained from the USEPA Regional Screening Levels (RSLs), updated November 2015.
The Waste Profile Comparison Value was the Resident Soil RSL based on a target risk of 1E-06 or hazard quotient of 1.0 as presented in the RSL table located here: http://semspub.epa.gov/work/03/2220581.pdf.
The Grab/Confirmation Comparison Value was the Resident Soil RSL based on a target risk of 1E-06 or hazard quotient of 0.1 as presented in the RSL table located here: http://semspub.epa.gov/work/03/2220579.pdf.
(2) RSL for iodide is based on Iodine.
DL highlighted in yellow is greater than the waste profile and grab/confirmation comparison values. In some cases, the DL is greater than the screening value. This is common in some analyses due to sample preparation and analytical limitations. This could lead to a situation where the analyte is present at a concentration greater than the screening value, but is reported as "not detected" leading to an underestimate of risk. However, such occasions are expected to be rare and are not likely to drive the recommendation for the RA.

* Iodide analysis will be performed by TestAmerica-St. Louis with method SW9056A.

QAPP Worksheet #15.6 - Reference Limits and Evaluation Table

Matrix:	Soil						
Analytical Group:	CA/ABPs						
Parameter	**CAS #**	**Waste Profile Comparison Value (µg/kg)**	**Grab Comparison Value (µg/kg)**	**Comparison Value Source (1)**	**ECBC LOQ (µg/kg)**	**ECBC LOD (µg/kg)**	**ECBC DL (µg/kg)**
Chemical Agent							
Mustard (HD)	505-60-2	10	10	HBESL (2)	10	5.0	2.0
Lewisite (L) (3)	541-25-3	300	300	HBESL (2)	100	50	24
Agent Breakdown Products							
1,4-Dithiane	505-29-3	780,000	78,000	RSL	100	50	18
1,4-Thioxane	15980-15-1	610,000	61,000	2008 Report (4)	100	50	17
Thiodiglycol	111-48-8	5,400,000	540,000	RSL	130	63	23
2-Chlorovinyl arsenous acid (CVAA) (3)	85090-33-1	300	300	HBESL	100	50	24
2-Chlorovinyl arsenous oxide (CVAO) (3)	3088-37-7	300	300	HBESL	100	50	24

Notes:

(1) Comparison values were obtained from the USEPA Regional Screening Levels (RSLs), updated November 2015.
The Waste Profile Comparison Value was the Resident Soil RSL based on a target risk of 1E-06 or hazard quotient of 1.0 as presented in the RSL table located here: http://semspub.epa.gov/work/03/2220581.pdf.
The Grab Comparison Value was the Resident Soil RSL based on a target risk of 1E-06 or hazard quotient of 0.1 as presented in the RSL table located here: http://semspub.epa.gov/work/03/2220579.pdf.
(2) Health Based Environmental Screening Level (residential soil) from US Army Public Health Command (USAPHC) updated July 2011 as presented in the table located here:
http://phc.amedd.army.mil/PHC%20Resource%20Library/Chem%20Agent%20Health%20Criteria%20Summary%20Table%202_WaterSoilWaste_%20USAPHC%20Update%20July%202010%20agg_VH%20edits_26%20July.pdf
(3) Lewisite, 2-chlorovinyl arsenous acid (CVAA), and 2-chlorovinyl arsenous oxide (CVAO) are all detected with the same analysis based on a derivitization.
(4) Development of the American University Experiment Station (AUES) List of Chemicals, November 14, 2008

QAPP Worksheet #15.7 - Reference Limits and Evaluation Table

Matrix:	Soil						
Analytical Group:	Pesticides/PCBs (8081B/8082A)						
Parameter	**CAS #**	**Waste Profile Comparison Value (mg/kg)**	**Grab/Confirmation Comparison Value (mg/kg)**	**Comparison Value Source (1)**	**APPL LOQ (mg/Kg)**	**APPL LOD (mg/Kg)**	**APPL DL (mg/Kg)**
4,4'-DDD	72-54-8	2.3	2.3	RSL	0.050	0.0040	0.0004
4,4'-DDE	72-55-9	2.0	2.0	RSL	0.05	0.004	0.002
4.4'-DDT	50-29-3	1.9	1.9	RSL	0.050	0.0016	0.0004
alpha-BHC	319-84-6	0.086	0.086	RSL	0.05	0.002	0.001
beta-BHC	319-85-7	0.30	0.30	RSL	0.05	0.002	0.001
delta-BHC	319-86-8	NA	NA	NA	0.05	0.002	0.001
gamma-BHC (Lindane)	58-89-9	0.57	0.57	RSL	0.05	0.002	0.001
Aldrin	309-00-2	0.039	0.039	RSL	0.05	0.002	0.001
alpha-Chlordane	5103-71-9	1.7	1.7	RSL(2)	0.05	0.002	0.001
gamma-Chlordane	5103-74-2	1.7	1.7	RSL(2)	0.05	0.002	0.001
Dieldrin	60-57-1	0.034	0.034	RSL	0.05	0.002	0.001
Endrin	72-20-8	19	1.9	RSL	0.05	0.002	0.001
Endrin aldehyde	7421-93-4	NA	NA	NA	0.05	0.004	0.003
Endrin ketone	53494-70-5	NA	NA	NA	0.05	0.004	0.004
Endosulfan I	959-98-8	470	47	RSL(3)	0.050	0.0016	0.0004
Endosulfan II	33213-65-9	470	47	RSL(3)	0.050	0.0016	0.0004
Endosulfan sulfate	1031-07-8	NA	NA	NA	0.05	0.002	0.001
Heptachlor	76-44-8	0.13	0.13	RSL	0.05	0.002	0.001
Heptachlor expoxide	1024-57-3	0.070	0.070	RSL	0.05	0.002	0.001
Methoxychlor	72-43-5	320	32	RSL	0.05	0.002	0.001
Toxaphene	8001-35-2	0.49	0.49	RSL	1.0	0.05	0.01
Aroclor 1016	12674-11-2	4.1	0.41	RSL	0.05	0.020	0.010
Aroclor 1221	11104-28-2	0.20	0.20	RSL	0.05	0.020	0.006
Aroclor 1232	11141-16-5	0.17	0.17	RSL	0.05	0.010	0.004
Aroclor 1242	53469-21-9	0.23	0.23	RSL	0.05	0.010	0.004

QAPP Worksheet #15.7 - Reference Limits and Evaluation Table (*continued*)

Matrix:	Soil						
Analytical Group:	Pesticides/PCBs (8081B/8082A)						
Parameter	**CAS #**	**Waste Profile Comparison Value (mg/kg)**	**Grab/Confirmation Comparison Value (mg/kg)**	**Comparison Value Source (1)**	**APPL LOQ (mg/Kg)**	**APPL LOD (mg/Kg)**	**APPL DL (mg/Kg)**
Aroclor 1248	12672-29-6	0.23	0.23	RSL	0.05	0.010	0.004
Aroclor 1254	11097-69-1	0.24	0.12	RSL	0.05	0.010	0.004
Aroclor 1260	11096-82-5	0.24	0.24	RSL	0.05	0.010	0.004
Aroclor 1262	37324-23-5	NA	NA	NA	0.05	0.012	0.011
Aroclor 1268	11100-14-4	NA	NA	NA	0.05	0.012	0.011

Notes:

(1) Comparison values were obtained from the USEPA Regional Screening Levels (RSLs), updated November 2015.
The Waste Profile Comparison Value was the Resident Soil RSL based on a target risk of 1E-06 or hazard quotient of 1.0 as presented in the RSL table located here: http://semspub.epa.gov/work/03/2220581.pdf.
The Grab/Confirmation Comparison Value was the Resident Soil RSL based on a target risk of 1E-06 or hazard quotient of 0.1 as presented in the RSL table located here: http://semspub.epa.gov/work/03/2220579.pdf.
(2) RSL for alpha-Chlordane and gamma-Chlordane is based on Chlordane
(3) RSL for Endosulfan I and Endosulfan II is based on Endosulfan
NA = Not available.

QAPP Worksheet #15.8 - Reference Limits and Evaluation Table

Matrix:	Water/Soil				
Analytical Group:	TCLP VOCs (1311/8260B)				
Parameter	**CAS #**	**40 CFR §261.24 Screening Levels (mg/L)**	**APPL LOQ (mg/L)**	**APPL LOD (mg/L)**	**APPL DL (mg/L)**
1,1-Dichloroethene	75-35-4	0.7	0.001	0.0005	0.0003
1,2-Dichloroethane	107-06-2	0.5	0.001	0.0003	0.00014
1,4-Dichlorobenzene	106-46-7	7.5	0.001	0.0003	0.00019
2-Butanone (MEK)	78-93-3	200.0	0.01	0.002	0.0006
Benzene	71-43-2	0.5	0.001	0.0003	0.00016
Carbon tetrachloride	56-23-5	0.5	0.001	0.003	0.0001
Chlorobenzene	108-90-7	100.0	0.001	0.0005	0.00021
Chloroform	67-66-3	6.0	0.001	0.0003	0.00016
Tetrachloroethene	127-18-4	0.7	0.001	0.0003	0.00024
Trichloroethylene	79-01-6	0.5	0.001	0.0003	0.00016
Vinyl chloride	75-01-4	0.2	0.001	0.0003	0.00023

QAPP Worksheet #15.9 - Reference Limits and Evaluation Table

Matrix:	Water/Soil				
Analytical Group:	TCLP SVOCs (1311/8270D)				
Parameter	**CAS #**	**40 CFR §261.24 Screening Levels (mg/L)**	**APPL LOQ (mg/L)**	**APPL LOD (mg/L)**	**APPL DL (mg/L)**
1,4-Dichlorobenzene	106-46-7	7.5	0.010	0.005	0.001
2,4,5-Trichlorophenol	95-95-4	400.0	0.010	0.005	0.0023
2,4,6-Trichlorophenol	88-06-2	2.0	0.010	0.005	0.0025
2,4-Dinitrotoluene	121-14-2	0.13	0.010	0.005	0.0027
2-Methylphenol	95-48-7	200.0	0.010	0.005	0.0019
4-Methylphenol	106-44-5	200.0	0.010	0.005	0.0017
Hexachlorobenzene	118-74-1	0.13	0.010	0.005	0.0027
Hexachlorobutadiene	87-68-3	0.5	0.010	0.005	0.0009
Hexachloroethane	67-72-1	3.0	0.010	0.005	0.0008
Nitrobenzene	98-95-3	2.0	0.010	0.005	0.0021
Pentachlorophenol	87-86-5	100.0	0.050	0.0050	0.0028
Pyridine	110-86-1	5.0	0.015	0.005	0.005

QAPP Worksheet #15.10 - Reference Limits and Evaluation Table

Matrix:	Water/Soil				
Analytical Group:	TCLP Metals (1311/6010C/7470A)				
Parameter	**CAS #**	**40 CFR §261.24 Screening Levels (mg/L)**	**APPL LOQ (mg/L)**	**APPL LOD (mg/L)**	**APPL DL (mg/L)**
Arsenic	7440-38-2	5.0	0.050	0.010	0.0043
Barium	7440-39-3	100.0	0.050	0.004	0.00075
Cadmium	7440-43-9	1.0	0.050	0.003	0.00051
Chromium	7440-47-3	5.0	0.050	0.004	0.00137
Lead	7439-92-1	5.0	0.10	0.004	0.00158
Mercury	7439-97-6	0.2	0.0002	0.00015	0.00006
Selenium	7782-49-2	1.0	0.050	0.010	0.0046
Silver	7440-22-4	5.0	0.010	0.0009	0.00085

QAPP Worksheet #15.11 - Reference Limits and Evaluation Table

Matrix:	Water/Soil			
Analytical Group:	Corrosivity and Ignitability			
Parameter	**Screening Levels**	**APPL LOQ**	**APPL LOD**	**APPL DL**
Corrosivity (9045D)	40 CFR §261.21	NA	NA	NA
Ignitability (1030)	40 CFR §261.21	NA	NA	NA

QAPP Worksheet #16 - Project Schedule/Timeline Table*

		Dates (MM/DD/YY)			
Activities	**Organization**	**Anticipated Date(s) of Initiation**	**Anticipated Date(s) of Completion**	**Deliverable**	**Deliverable Due Date**
Chemical Safety Submission	Parsons	1/2/2012	2/1/2012	Draft	**2/3/2012****
Chemical Safety Submission	Parsons	2/27/2012	3/5/2012	Draft Final	**3/23/12****
Chemical Safety Submission	Parsons	3/13/2012	3/20/2012	Final	**8/15/12****
Work Plan	Parsons	1/02/12	3/02/12	Draft	**3/9/12****
Work Plan	Parsons	3/23/12	4/05/12	Draft Final	**8/31/12****
Work Plan	Parsons	4/27/12	5/03/12	Final	**1/22/13****
RA Field Effort	Parsons	4/18/12	6/22/17	N/A	**N/A**
Removal Action Closure Report	Parsons	6/6/17	7/17/17	Draft	**7/17/17***
Removal Action Closure Report	Parsons	7/31/17	8/14/17	Draft Final	**8/14/17***
Removal Action Closure Report	Parsons	9/6/17	9/27/17	Final	**9/27/17***

* Project Master Schedule (MS Project) will be updated and provided to the Partners on a regular basis. The above dates are tentative.
** Date Completed

QAPP Worksheet #17 - Sampling Design and Rationale

Describe and provide a rationale for choosing the sampling approach (e.g. grid system, biased statistical approach):

The sample design is based on the DQOs of the project. Confirmation samples will be collected on the sidewalls of the excavation boundary at 20 foot linear spacing intervals. The following three vertical samples will be collected at one sidewall sampling location:
a) 0-0.5' beneath ground surface or clean backfill;
b) 0.5' above the maximum excavation depth; and
c) a mid-point sample will be collected at the mid-point of the maximum excavation depth if the maximum depth is greater than 5 feet. The mid-point sample will not be collected if the excavation depth is less than 5 feet.

Soil samples will also be collected from the excavation floor. One floor sample will be collected per 20' grid if the excavation does not reach the bedrock. Soil samples will be collected using clean, disposable sampling equipment from locations in the excavation boundary. If the sample collected at any location does not meet the remediation goal of 20 mg/kg, the location will be excavated further in 12 inches increments and additional samples will be collected to confirm that arsenic concentration is below 20 mg/kg. The excavation will be extended to the full depth of the sidewall, and 10 feet in both directions laterally from the sample point.

Describe the sampling design and rationale in terms of what matrices will be sampled, what analytical groups will be analyzed and at what concentration levels, the sampling locations (including QC, critical, and background samples), the number of samples to be taken, and the sampling frequency (including seasonal considerations):

No background samples will be collected since site-specific background data already exists.

All samples will be analyzed for Spring Valley Suite of Parameters including - CA/ABPs, explosives, VOCs, SVOCs, pesticides, PCBs, metals, total cyanide, perchlorate, fluoride, and iodide. Disposal samples will be analyzed for appropriate disposal parameters.

QC samples (field duplicate, MS/MSD samples) collected at 5% per matrix excluding waste characterization samples.

QAPP Worksheet #18 - Sampling Locations and Methods/SOP Requirements Table

Sampling Location/ ID No.	Matrix	Depth (ft bgs)	Analytical Group	Concentration Level	Sampling SOP	Rationale for Sampling Location	Deliverable	Deliverable Due Date
TBD	Soil	TBD	Explosives, metals, VOCs, SVOCs, total cyanide, pesticides, PCBs, perchlorate, iodide, fluoride, and CA/ABPs	Low	See Worksheet 21	Sidewall confirmation sample locations were based on 20 feet linear spacing. The following three vertical samples will be collected at one sidewall sampling location: a) 0-0.5 feet beneath ground surface or clean backfill; b) 0.5 feet above the maximum excavation depth; c) Mid-point sample of the maximum excavation depth if the depth is greater than 5 feet.	For APPL and its subcontractors: Level IV data packages and SEDD/ADR.net files For ECBC: Level IV data packages and MS Excel EDDs.	21 days after sample receipt

ECBC will provide Clearance Report via email as soon as the results are available and Level IV reports on a CD periodically.

QAPP Worksheet #19 - Analytical SOP Requirements Table

Matrix	Analytical Group	Analytical and Preparation Method/SOP Reference[1]	Containers (Number, Size, and Type)	Sample Volume/Weight	Preservation Requirements (Chemical, Temperature, Light Protected)	Maximum Holding Time (Preparation/Analysis)[2]
Soil	VOCs	Preparation Method/SOP: SW5035A/ ANA8260 Analysis Method/SOP: SW8260B / ANA8260	3 x preweighed VOA vials	5 g	Cool to ≤6° C 2 x vials with 5mL DI water and Sodium Bisulfate 1 x vial with 5mL MeOH	14 days
Soil	SVOCs	Preparation Method/SOP: SW3550C/ SON009 Analysis Method/SOP: SW8270D/ ANA8270	8 oz (250 mL) amber glass wide-mouth jar with Teflon lined screw cap	30g	Cool to ≤6° C	Samples extracted within 14 days and extracts analyzed within 40 days of extraction
Soil	Explosives	Preparation Method/SOP: SW8330B/MSE018 Analysis Method/SOP: 8330B/HPL8330	1 x 8oz jar	10g	Cool to ≤6° C	Samples must be extracted within 14 days of drying and analyzed within 40 days following extraction
Soil	Metals	Preparation Method/SOP: SW3050B/ PRE3050B Analysis Method/SOP: SW6010C / ANA6010 TA: SW846 6020A/ST-MT-0001	4 oz (125 mL) amber glass wide-mouth jar with Teflon lined screw cap 1x2oz glass jar	1g 15 g	None	6 months
Soil	Mercury	Preparation Method/SOP: SW7471B/ PRE7471B Analysis Method/SOP: SW7471B / ANA7471	4 oz (125 mL) amber glass wide-mouth jar with Teflon lined screw cap	1g	Cool to ≤6° C	28 days

Soil	Total Cyanide	Preparation Method/SOP: EPA 9010C/9014 / ANA9010C/9014 Analysis Method/SOP: EPA 9010C/9014 / ANA9010C/9014	4 oz (125 mL) amber glass wide-mouth jar with Teflon lined screw cap	50g	Cool to ≤6° C	14 days
Soil	Perchlorate	EPA 6850 / HPL6850	1 x 4oz glass jar	1g	Cool to ≤6° C	28 days
Soil	Pesticides	Preparation Method/SOP: SW3550C/ SON002 Analysis Method/SOP: SW8081B / ANA8081	8 oz (250 mL) amber glass wide-mouth jar with Teflon lined screw cap	30g	Cool to ≤6° C	14 days/40 days
Soil	PCBs	Preparation Method/SOP: SW3550C/ SON002 Analysis Method/SOP: SW8082A / ANA8082	8 oz (250 mL) amber glass wide-mouth jar with Teflon lined screw cap (may be shared with the Pesticide jar)	30g	Cool to ≤6° C	14 days/40 days
Soil	Iodide	SW846 9056A/ST-WC-0028	1 x 2oz glass jar	5g	Cool to ≤6° C	28 days
Soil	Fluoride	Preparation Method/SOP: EPA 300.0 / HPL9056 Analysis Method/SOP: EPA 300.0 / HPL9056	4 oz jar	10g	Cool to ≤6° C	28 days

QAPP Worksheet #19 - Analytical SOP Requirements Table (*continued*)

Matrix	Analytical Group	Analytical and Preparation Method/SOP Reference[1]	Containers (Number, Size, and Type)	Sample Volume/Weight	Preservation Requirements (Chemical, Temperature, Light Protected)	Maximum Holding Time (Preparation/Analysis)[2]
Water	CA/ABPs	IOP-MT-08, IOP-MT-57	2 x 40mL amber VOA vials		Cool to ≤6° C	None[3]
Soil	CA/ABPs	IOP-MT-08, IOP-MT-57	1 x 4oz amber glass jar		Cool to ≤6° C	None[3]
Water	TCLP-VOC	Preparation Method/SOP: 1311, SW5030C / 9-ANA1311 , ANA8260 Analysis Method/SOP: SW8260C / ANA8260	3 x 40mL VOA vials with septa (+ 1L amber glass if sample is anticipated to be <0.5% solids)	40 mL	HCl to pH is >2, Cool to 4±2°C	14 days to TCLP extraction/preparation, 14 days from TCLP to analysis
Soil	TCLP-VOC	Preparation Method/SOP: 1311, SW5030C / 9-ANA1311 , ANA8260 Analysis Method/SOP: SW8260C / ANA8260	1 x 16oz wide-mouth jar with Teflon lined screw cap	50g	Cool to ≤6° C	14 days to TCLP extraction/preparation, 14 days from TCLP to analysis
Water	TCLP-SVOC	Preparation Method/SOP: SW1311, SW3510C / SEP004 Analysis Method/SOP: SW8270D/ ANA8270	Two 1-Liter amber glass with Teflon-lined lid	1 Liter	Cool to ≤6° C	Samples leached within 14 days; leachate extracted within 7 days and extracts analyzed within 40 days following extraction
Soil	TCLP-SVOC	Preparation Method/SOP: 1311, SW3510C / 11-PRE1311, SEP004 Analysis Method/SOP: SW8270D/ ANA8270	1 x 16oz wide-mouth jar with Teflon lined screw cap	200g	Cool to ≤6° C	Samples leached within 14 days; leachate extracted within 7 days and extracts analyzed within 40 days following extraction
Water	TCLP-Metals	Preparation Method/SOP: SW1311, 3010A / PRE1311, PRE3010 Analysis Method/SOP: SW6010C / ANA6010	1 x 500 mL plastic bottles	50 mL	None	6 months to TCLP extraction/preparation, 6 months from TCLP to analysis

QAPP Worksheet #19 - Analytical SOP Requirements Table (*continued*)

Matrix	**Analytical Group**	**Analytical and Preparation Method/SOP Reference**[1]	**Containers (Number, Size, and Type)**	**Sample Volume/Weight**	**Preservation Requirements (Chemical, Temperature, Light Protected)**	**Maximum Holding Time (Preparation/Analysis)**[2]
Soil	TCLP-Metals	Preparation Method/SOP: 1311, SW3010A / 11-PRE1311, PRE3010 Analysis Method/SOP: SW6010C / ANA6010	1 x 16oz wide-mouth jar with Teflon lined screw cap	200g	None	6 months to TCLP extraction/preparation, 6 months from TCLP to analysis
Water	TCLP-Mercury	Preparation Method/SOP: SW1311, SW7470A/ PRE1311, PRE7470A Analysis Method/SOP: SW7470A / ANA7470A	1 x 500 mL plastic bottles	50 mL	Cool to ≤6° C HNO_3 to pH<2	28 days to TCLP extraction/preparation, 28 days from TCLP to analysis
Soil	TCLP-Mercury	Preparation Method/SOP: 1311, SW7470A/ 11-PRE1311, PRE7470A Analysis Method/SOP: SW7470A / ANA7470A	1 x 16oz wide-mouth jar with Teflon lined screw cap	200g	Cool to ≤6° C	28 days to TCLP extraction/preparation, 28 days from TCLP to analysis
Water	Ignitability	U.S. EPA 1020A *GEN-120*	(1) 250-mL amber glass bottle	100 mL	Cool to ≤6° C	28 days
Soil	Ignitability	EPA 1030 / ANA1030	4oz jar	50g	Cool to ≤6° C	as soon as possible after removal from the sample container
Water	Corrosivity (pH)	Preparation Method/SOP: EPA 9040C/ ANA9040C Analysis Method/SOP: EPA 9040C/ ANA9040C	125mL plastic	50mL	Cool to ≤6° C	ASAP
Soil	Corrosivity (pH)	Preparation Method/SOP: EPA 9045D/ ANA9045 Analysis Method/SOP: EPA 9045D/ ANA9045	4 oz (125 mL) amber glass wide-mouth jar with Teflon lined screw cap	20g	Cool to ≤6° C	ASAP

[1] See Worksheet 23

[2] Maximum holding time is calculated from the time the sample is collected to the time the sample is prepared/extracted.
Holding times have not been established for these methods. Samples will be analyzed in accordance with the referenced SOP and every effort will be made to analyze samples within seven (7) days of collection.

QAPP Worksheet #20 - Field Quality Control Sample Summary Table

Analytical and Preparation SOP Reference[1]	**No. of Sampling Locations**	**No. of Field Duplicate Pairs**	**No. of Field Triplicates**	**No. of QA Splits**	**No. of Matrix Spike/Matrix Spike Duplicate (MS/MSD)**	**No. of Trip Blanks (for VOCs only)**	**No. of Equipment Blanks (EB)**	**No. of Temperature Blanks**	**No. of PT Samples**	**Total No. of Samples to Lab**
See QAPP Worksheet #19	TBD	1 per 10 field samples	Not applicable (NA)	Not applicable (NA)	1 per 20 field samples	1 trip blank per cooler	1 per sampling event	1 per shipment	Not Anticipated	To be Determined(TBD)

QC samples do not apply to waste characterization samples. MS/MSD and EBs apply to CA/ABP analysis only.

QAPP Worksheet #21 - Project Sampling SOP References Table

Reference Number	Title, Revision Date and/or Number	Originating Organization	Equipment Type	Modified for Project Work? (Y/N)	Comments
1	Equipment Decontamination and Investigation Derived Waste (IDW) Handling	Parsons	Steam cleaner, racks, buckets/bucket liners, deionized water, brushes, and Alconox solution	No	None
2	Soil Sample Collection and Field Screening	Parsons	Hand auger and Terra Core samplers. PID, Minicams, arsine, HCN and HCl monitors.	No	None
3	Sample Containers, Preservation, and Holding Times	Parsons	2 oz, 4 oz, 8 oz, and 16 oz glass jars; 1 L amber glass; 1 L plastic bottles; and 40 mL VOA vials	No	None
4	Sample Storage, Packaging, and Shipment	Parsons	Freezer, coolers, packaging materials, ice, tap, shipping labels and custody seals.	No	None
5	Sample Control and Custody Procedures	Parsons	Proper custody procedures will be implemented to minimize sample access and maintain limited handling. To maintain and document sample possession, chain of custody procedures are followed. A sample is under custody if: - It is in your possession, or - It is in your view, after being in your possession, or - It was in your possession and then you then locked it up to prevent tampering, or - It is in a designated secure area.	No	None

QAPP Worksheet #22 - Field Equipment Maintenance, Testing, and Inspection Table

Field Equipment	Calibration Activity	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person
All Field Equipment Listed Below	NA	Follow manufacture's maintenance recommendations	NA	"out of the box" Inventory Check	Start and end of each day	All necessary items are present to correctly operate the equipment	Locate or Replace Missing items	Equipment Operator
GPS - Wide Area Augmentation System (WAAS) corrected handheld receivers	NA	NA	Benchmark Location Check	NA	Daily (if used)	< 3 meters	Retest, Repair, and/or Replace Equipment	Equipment Operator
Water Quality Instruments		NA (rental device)	Calibration solutions	"out of the box" inventory check	Start and end of each day	Calibration standards and instrument measurement range located in user manual	Retest, repair, and/or replace equipment	Sampler
PID		NA (rental device)	Calibration gases	"out of the box" inventory check	Start and end of each day	Calibration standards and instrument measurement range located in user manual	Retest, repair, and/or replace equipment	Equipment Operator

QAPP Worksheet #22 - Field Equipment Maintenance, Testing, and Inspection Table (*continued*)

Field Equipment	Calibration Activity	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person
Analog Instrument (i.e. Schonstedt)	NA	NA	IVS	Check Battery and Electrical Connections	Daily	Qualitatively Detect Test Items	Retest, Repair, and/or Replace Equipment	Equipment Operator
Personal Digital Assistant	NA	NA	NA	Check Battery and Electronic Storage Capacity	Start and end of each day	Batteries must be charged or extra batteries should be available. Storage capacity is sufficient for anticipated activities	Replace/Recharge Battery or Electronic Storage Devices	Equipment Operator
Digital Camera	NA	NA	NA	Check Battery and Electronic Storage Capacity	Start and end of each day	Batteries must be charged or extra batteries should be available. Storage capacity is sufficient for anticipated activities	Replace/Recharge Battery or Electronic Storage Devices	Equipment Operator

QAPP Worksheet #22 - Field Equipment Maintenance, Testing, and Inspection Table (*continued*)

Field Equipment	Calibration Activity	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person
Cell Phone	NA	NA	NA	• Check Battery • Check cell phone has adequate coverage at the site	Start and end of each day	Batteries must be charged or extra batteries should be available.	• Replace/Charge Battery • Determine Alternate communication plan for out of coverage areas	Equipment Operator
Steam Cleaning Equipment	NA	NA	NA	Check for excessive wear.	Start and end of each day	All necessary components in good working order.	Repair worn heavily worn components.	Equipment Operator
Drager Tubes	NA	NA	NA	Check for expired tubes	Monthly	Check bellows for functionality	Replace if bellows is worn	Equipment Operator
Summa Cannister	NA	NA	NA	"out of the box" inventory check	Start and end of each day	All necessary components in good working order.	Replace if valve is defective	Equipment Operator

QAPP Worksheet #22 - Field Equipment Maintenance, Testing, and Inspection Table (*continued*)

Field Equipment	Calibration Activity	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person
HCl Monitor	Daily	Check Batteries Check data logger	Daily	Zero unit upon startup Check for wear and tear Check for drift in readings	Start and end of each day	Calibration standards and instrument measurement range located in user manual	Retest, repair, and/or replace equipment	Equipment Operator
HCN Monitor	Daily	Check Batteries	Daily	Zero unit upon startup Check for wear and tear Check for drift in readings	Start and end of each day	Calibration standards and instrument measurement range located in user manual	Retest, repair, and/or replace equipment	Equipment Operator
Arsine Monitor	Daily	Check Batteries Check data logger	Daily	Zero unit upon startup Check for wear and tear Check for drift in readings	Start and end of each day	Instrument measurement range located in user manual	Retest, repair, and/or replace equipment	Equipment Operator

QAPP Worksheet #23 - Analytical SOP References Table

Lab SOP Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Matrix and Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work (Y/N)
Analytical Methods						
ANA8260	ANALYSIS OF WATER/SOIL/SLUDGE BY EPA METHOD 8260, Revision 13, 08/2015	Definitive	Soil/Water: VOCs	GC-MS	APPL Clovis, CA	N
ANA8270	SEMIVOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8270, Revision 7, 10/2015	Definitive	Soil/Water: SVOCs	GC-MS	APPL Clovis, CA	N
ANA6010	INDUCTIVELY COUPLED PLASMA-ATOMIC EMISSION SPECTROSCOPY BY EPA METHOD 6010, Rev. 8, 10/2015	Definitive	Soil and Water: Metals	Inductively Coupled Argon Plasma Emission Spectrometer (ICP-AES)	APPL , Clovis, CA	N
ANA7471	DETERMINATION OF MERCURY IN SOLID OR SEMISOLID WASTE EPA METHOD 7471, Rev 3, 08/2015	Definitive	Soil: Mercury	CVAA	APPL , Clovis, CA	N
HPL8330	Explosive compounds: Diode array detector by high pressure liquid chromatography, Rev. 6, 01/2015	Definitive	Soil and Water: Explosives	HPLC	APPL , Clovis, CA	N
ANA8081	Organochlorine Pesticides by gas chromatogaphy by EPA Method 8081, Revision 7, 10/2015	Definitive	Soil/Water: Chlorinated Pesticides	GC-ECD	APPL Clovis, CA	N
ANA8082	PCBs and Congeners by EPA Method 8082, Revision 4, 10/2015	Definitive	Soil/Water: PCBs	GC-ECD	APPL Clovis, CA	N
ANA9010C/9014	Total Cyanide Analysis EPA SW846 Method 9010C/9013/9014, Revision 3, 06/2015	Definitive	Water and soil: Cyanide	Spectrophotometer	APPL Clovis, CA	N
HPL9056	Inorganic Anion Analysis, Revision 8, 10/2015	Definitive	Water: Anions	IC	APPL Clovis, CA	N
ST-MT-0001	Analysis of Metals by Inductively Coupled Plasma/Mass Spectrometry, Rev. 24, 06/22/15	Definitive	Metals	ICP-MS	TestAmerica-St. Louis	N
ST-WC-0028	The Analysis of Anions by Ion Chromatography , Rev. 22, 05/05/15	Definitive	Iodide	IC	TestAmerica-St. Louis	N

Lab SOP Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Matrix and Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work (Y/N)
Analytical Methods (Continued)						
GEN-1020	Flashpoint Determination – Setaflash, Rev. 7, 1/31/13	definitive	Water / Flashpoint	Seta Flash Closed Cup Tester	ALS Environmental, Kelso	N
ANA1030	Ignitability by EPA Method 1030; Revison 2, 06/2015	definitive	Soil / Ignitability	Benzomatic Surefire Brass torch	APPL Clovis, CA	N
ANA9040C	pH, EPA SW846 Method 9040C, Revision 1, 06/2015	Definitive	Water: pH	pH meter	APPL Clovis, CA	N
ANA9045	pH in soil and waste, EPA SW846 Method 9045C&D; Revision 3, 06/2015	Definitive	Soil: pH	pH meter	APPL Clovis, CA	N

QAPP Worksheet #23 - Analytical SOP References Table (*continued*)

Lab SOP Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Matrix and Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work (Y/N)
Preparatory Methods						
IOP-MT-08	Analysis of Chemical Warfare Agents and Breakdown Products in Extracts using a Gas Chromatography/Mass Spectrometer System, Rev 8,	Definitive	CA/ABPs: Water, soil, and sediment	NA	ECBC	N
IOP-MT-57 Appendix V	Analysis of Chemical Warfare Agents and Degradation Products in Environmental Matricies using a Liquid Chromatography/Triple Quadrapole Mass Spectrometer (LC-QQQ) Analysis, Rev 5	Definitive	CA/ABPs: Water, soil, and sediment	NA	ECBC	N
ANA8260	ANALYSIS OF WATER/SOIL/SLUDGE BY EPA METHOD 8260, Revision 13, 08/2015	Definitive	Soil/Water: VOCs	NA	APPL Clovis, CA	N

SON009	8270, BNA, SIM AND PAH SONICATION EXTRACTION OF SOIL, SLUDGE AND SOLIDS (EPA METHOD 3550C); Revision 10, 07/2015	Definitive	Soil: SVOCs	None	APPL Clovis, CA	N
PRE3050B	ACID DIGESTION OF SEDIMENTS, SLUDGES, AND SOILS BY EPA METHOD 3050B Rev, 4, 10/2015	Definitive	Soil: Metals	NA	APPL , Clovis, CA	N
PRE7471B	DIGESTION OF MERCURY IN SOLID OR SEMISOLID WASTE EPA METHOD 7471B Rev, 0, 10/2015	Definitive	Soil: Mercury	NA	APPL, Clovis, CA	N
MSE018	EPA Method 8330 Mechanical orbital shaker extraction for solid explosive samples, Rev. 1, 07/2015	Definitive	Soil (Grab): Explosives	NA	APPL , Clovis, CA	N
SEP025	Low Level OCL/OP Separatory Funnel Extraction of water by EPA method 3510C, Revision 5, 07/2015	Definitive	Water: Chlorinated Pesticides and PCBs	None	APPL Clovis, CA	N
SON002	OCL, PCB, OP and Carbamate sonication extraction of soil, sludge, solids and wipes (EPA method 3550C) , Revision 5, 10/2015	Definitive	Soil: Chlorinated Pesticides and PCBs	None	APPL Clovis, CA	N

QAPP Worksheet #24.1 - APPL Analytical Instrument Calibration Table

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
GC-MS	Tune Check	Prior to ICAL and prior to each 12-hour period of sample analysis.	Specific ion abundance criteria of BFB or DFTPP from method.	Retune instrument and veify.	Analyst or certified instrument technician	ANA8260
GC-MS	Initial calibration (ICAL) for all analytes (including surrogates)	At instrument set-up, prior to sample analysis	Each analyte must meet one of the three options below: Option 1: RSD for each analyte ≤ 15%; Option 2: linear least squares regression for each analyte: r2 ≥ 0.99; Option 3: non-linear least squares regression (quadratic) for each analyte: r2 ≥ 0.99.	Correct problem then repeat ICAL.	Analyst or certified instrument technician	ANA8260
GC-MS	Retention Time window position establishment	Once per ICAL and at the beginning of the analytical sequence.	Position shall be set using the midpoint standard of the ICAL curve when ICAL is performed. On days when ICAL is not performed, the initial CCV is used.	NA.	Analyst or certified instrument technician	ANA8260
GC-MS	Evaluation of Relative Retention Times (RRT)	With each sample.	RRT of each reported analyte within ± 0.06 RRT units.	Correct problem, then rerun ICAL.	Analyst or certified instrument technician	ANA8260

GC-MS	Initial Calibration Verification (ICV)	Once after each ICAL, analysis of a second source standard prior to sample analysis.	All reported analytes within ± 20% of true value.	Correct problem. Rerun ICV. If that fails, repeat ICAL.	Analyst or certified instrument technician	ANA8260
GC-MS	Continuing Calibration Verification (CCV)	Daily before sample analysis; after every 12 hours of analysis time; and at the end of the analytical batch run.	All reported analytes and surrogates within ± 20% of true value. All reported analytes and surrogates within ± 50% for end of analytical batch CCV.	Recalibrate, and reanalyze all affected samples since the last acceptable CCV; or Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails, take corrective action(s) and re-calibrate; then reanalyze all affected samples since the last acceptable CCV.	Analyst or certified instrument technician	ANA8260
GC-MS	Tune Check	Prior to ICAL and prior to each 12-hour period of sample analysis.	Specific ion abundance criteria of BFB or DFTPP from method.	Retune instrument and verify.	Analyst or certified instrument technician	ANA8270
GC-MS	Performance Check (Method 8270 only)	At the beginning of each 12-hour period, prior to analysis of samples.	Degradation ≤ 20% for DDT. Benzidine and pentachlorophenol shall be present at their normal responses, and shall not exceed a tailing factor of 2.	Correct problem, then repeat performance checks.	Analyst or certified instrument technician	ANA8270

GC-MS	Initial calibration (ICAL) for all analytes (including surrogates)	At instrument set-up, prior to sample analysis	Each analyte must meet one of the three options below: Option 1: RSD for each analyte ≤ 15%; Option 2: linear least squares regression for each analyte: r2 ≥ 0.99; Option 3: non-linear least squares regression (quadratic) for each analyte: r2 ≥ 0.99.	Correct problem then repeat ICAL.	Analyst or certified instrument technician	ANA8270
GC-MS	Retention Time window position establishment	Once per ICAL and at the beginning of the analytical sequence.	Position shall be set using the midpoint standard of the ICAL curve when ICAL is performed. On days when ICAL is not performed, the initial CCV is used.	NA.	Analyst or certified instrument technician	ANA8270
GC-MS	Evaluation of Relative Retention Times (RRT)	With each sample.	RRT of each reported analyte within ± 0.06 RRT units.	Correct problem, then rerun ICAL.	Analyst or certified instrument technician	ANA8270
GC-MS	Initial Calibration Verification (ICV)	Once after each ICAL, analysis of a second source standard prior to sample analysis.	All reported analytes within ± 20% of true value.	Correct problem. Rerun ICV. If that fails, repeat ICAL.	Analyst or certified instrument technician	ANA8270
GC-MS	Continuing Calibration Verification (CCV)	Daily before sample analysis; after every 12 hours of analysis time; and at the end of the analytical batch run.	All reported analytes and surrogates within ± 20% of true value. All reported analytes and surrogates within ± 50% for end of analytical batch CCV.	Recalibrate, and reanalyze all affected samples since the last acceptable CCV; or Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails, take corrective	Analyst or certified instrument technician	ANA8270

				action(s) and re-calibrate; then reanalyze all affected samples since the last acceptable CCV.		
ICP Method 6010	Linear Dynamic Range (LDR) or high-level check standard	At initial set up and checked every 6 months with a high standard at the upper limit of the range.	Within ± 10% of true value.	Dilute samples within the calibration range, or re-establish/ verify the LDR.	Analyst or certified instrument technician	ANA6010
ICP Method 6010	Initial Calibration (ICAL) for all analytes	Daily ICAL prior to sample analysis.	Minimum one high standard and a calibration blank. If more than one calibration standard is used, $r^2 \geq 0.99$.	Correct problem, then repeat ICAL.	Analyst or certified instrument technician	ANA6010
ICP Method 6010	Initial Calibration Verification (ICV)	Once after each ICAL, analysis of a second source standard prior to sample analysis.	All reported analytes within ± 10% of true value.	Correct problem. Rerun ICV. If that fails, repeat ICAL.	Analyst or certified instrument technician	ANA6010
ICP Method 6010	Continuing Calibration Verification (CCV)	After every 10 field samples, and at the end of the analysis sequence.	All reported analytes within ± 10% of the true value.	Recalibrate, and reanalyze all affected samples since the last acceptable CCV; or Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails, take	Analyst or certified instrument technician	ANA6010

				corrective action(s) and re-calibrate; then reanalyze all affected samples since the last acceptable CCV.		
ICP Method 6010	Low-level Calibration Check Standard (Low-level ICV)	Daily.	All reported analytes within ± 20% of true value.	Correct problem and repeat ICAL.	Analyst or certified instrument technician	ANA6010
ICP Method 6010	Initial and Continuing Calibration Blank (ICB/CCB)	Before beginning a sample run, after every 10 field samples, and at end of the analysis sequence.	No analytes detected > LOD.	Correct problem and repeat ICAL. All samples following the last acceptable calibration blank must be reanalyzed.	Analyst or certified instrument technician	ANA6010
ICP Method 6010	Interference Check Solutions (ICS) (also called Spectral Interference Checks)	After ICAL and prior to sample analysis.	ICS-A: Absolute value of concentration for all non- spiked project analytes < LOD (unless they are a verified trace impurity from one of the spiked analytes); ICS-AB: Within ± 20% of true value. All analytes must be within the LDR. ICS-AB is not needed if instrument can read negative responses.	Terminate analysis; locate and correct problem; reanalyze ICS, reanalyze all samples.	Analyst or certified instrument technician	ANA6010

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	SOP Reference
CVAA Method 7470A/7471B	Initial calibration (ICAL) for all analytes : minimum 5 standards and a calibration blank	Daily ICAL prior to sample analysis.	$r^2 \geq 0.99$.	Correct problem, then repeat ICAL.	Analyst or certified instrument technician	ANA7470A, ANA7471
CVAA Method 7470A/7471B	Second source calibration verification (ICV)	Once after each ICAL, prior to beginning a sample run.	All reported analytes within ± 10% of the true value.	Correct problem. Rerun ICV. If that fails, Rerun ICAL.	Analyst or certified instrument technician	ANA7470A, ANA7471
CVAA Method 7470A/7471B	Continuing calibration verification (CCV)	After every 10 field samples and at the end of the analysis sequence.	All reported analytes within ± 10% of the true value.	Recalibrate, and reanalyze all affected samples since the last acceptable CCV; or Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails, take corrective action(s) and re-calibrate; then reanalyze all affected samples since the last acceptable CCV.	Analyst or certified instrument technician	ANA7470A, ANA7471

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	SOP Reference
CVAA Method 7470A/7471B	Initial and Continuing Calibration Blank (ICB/CCB)	Before beginning a sample run, after every 10 field samples, and at end of the analysis sequence.	No analytes detected > LOD.	Correct problem and repeat ICAL. All samples following the last acceptable calibration blank must be reanalyzed.	Analyst or certified instrument technician	ANA7470A, ANA7471
HPLC (Method 8330B)	Initial Calibration (ICAL) for all analytes (including surrogates) 5-point ICAL for linear calibration (6-points for quadratic)	At instrument setup and after ICV or CCV failure, prior to sample analysis.	ICAL must meet one of the three options below: Option 1: RSD for each analyte ≤ 15%; Option 2: linear least squares regression for each analyte: r2 ≥ 0.99; Option 3: non-linear least squares regression (quadratic) for each analyte: r2 ≥ 0.99.	Correct problem then repeat initial calibration	Analyst or certified instrument technician	HPL8330
HPLC (Method 8330B)	Second source calibration verification (ICV)	Once after each initial calibration	Analytes within ± 20% of expected value (initial source)	Correct problem. Rerun ICV. If that fails, repeat ICAL.	Analyst or certified instrument technician	HPL8330
HPLC (Method 8330B)	RT window width	At method set-up and after major maintenance	RT width is ± 3 times standard deviation for each analyte RT from 72-hour study.	N/A	Analyst or certified instrument technician	HPL8330

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	SOP Reference
HPLC (Method 8330B)	Establishment and verification of the RT window for each analyte and surrogate	Once per ICAL and at the beginning of the analytical shift for establishment of RT; and with each CCV for verification of RT	Using the midpoint standard or the CCV at the beginning of the analytical shift for RT establishment; analyte must fall within established window during RT verification	N/A	Analyst or certified instrument technician	HPL8330
HPLC (Method 8330B)	Continuing Calibration Verification (CCV)	Before sample analysis, after every 10 field samples, and at the end of the analysis sequence.	All reported analytes and surrogates within ± 20% of the true value.	Recalibrate, and reanalyze all affected samples since the last acceptable CCV; Or Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails, take corrective action(s) and re-calibrate; then reanalyze all affected samples since the last acceptable CCV.	Analyst or certified instrument technician	HPL8330
GC-ECD	Breakdown check (Endrin/DDT Method 8081 only)	Before sample analysis and at the beginning of each 12-hour shift.	Degradation of DDT and Endrin must each be ≤ 15%.	Correct problem, then repeat breakdown checks.	Analyst or certified instrument technician	ANA8081

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	SOP Reference
GC-ECD	Initial Calibration (ICAL) for all analytes (including surrogates) .	At instrument set-up and after ICV or CCV failure, prior to sample analysis.	Minimum 5 levels for linear and 6 levels for quadratic. Quantitation for multicomponent analytes such as chlordane, toxaphene, and Aroclors must be performed using a 5-point calibration. Results may not be quantitated using a single point. ICAL must meet one of the three options below: Option 1: RSD for each analyte ≤ 20%; Option 2: linear least squares regression for each analyte: $r^2 \geq 0.99$; Option 3: non-linear least squares regression (quadratic) for each analyte: $r^2 \geq 0.99$.	Correct problem then repeat ICAL.	Analyst or certified instrument technician	ANA8081, ANA8082
GC-ECD	Retention Time window position establishment	Once per ICAL and at the beginning of the analytical sequence.	Position shall be set using the midpoint standard of the ICAL curve when ICAL is performed. On days when ICAL is not performed, the initial CCV is used.	NA.	Analyst or certified instrument technician	ANA8081, ANA8082
GC-ECD	Retention Time (RT) window width	At method set-up and after major maintenance (e.g., column change).	RT width is ± 3 times standard deviation for each analyte RT from the 72-hour study.	NA.	Analyst or certified instrument technician	ANA8081, ANA8082
GC-ECD	Initial Calibration Verification (ICV)	Once after each ICAL, analysis of a second source standard prior to sample analysis.	All reported analytes within established RT windows. All reported analytes within ± 20% of true value.	Correct problem, rerun ICV. If that fails, repeat ICAL.	Analyst or certified instrument technician	ANA8081, ANA8082

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	SOP Reference
GC-ECD	Continuing Calibration Verification (CCV)	Before sample analysis, after every 10 field samples, and at the end of the analysis sequence with the exception of CCVs for Pesticides multi-component analytes (i.e. Toxaphene, Chlordane), which are only required before sample analysis.	All reported analytes and surrogates within established RT windows. All reported analytes and surrogates within ± 20% of true value.	Recalibrate, and reanalyze all affected samples since the last acceptable CCV; or Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails, take corrective action(s) and re-calibrate; then reanalyze all affected samples since the last acceptable CCV.	Analyst or certified instrument technician	ANA8081, ANA8082
Spectrophotometer	ICAL (minimum three standards and a calibration blank)	Daily ICAL prior to sample analysis	r2 ≥ 0.99.	Correct problem, then repeat ICAL.	Analyst or certified instrument technician	ANA9010C/9014
Spectrophotometer	Distillation Verification (one high and one low)	Once after each ICAL, with two distilled ICAL standards; prior to sample analysis. Not required if all ICAL standards are distilled	Within ± 10% of non- distilled std value.	Correct problem, then repeat distilled standards	Analyst or certified instrument technician	ANA9010C/9014
Spectrophotometer	Second-source calibration verification (ICV)	Once after each ICAL, prior to beginning a sample run.	Within ± 10% of true value.	Correct problem and verify second source standard. Rerun ICV. If that fails, correct problem and repeat calibration.	Analyst or certified instrument technician	ANA9010C/9014

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	SOP Reference
IC	Initial Calibration (ICAL) for all analytes (Minimum 3 standards and a calibration blank.)	Daily ICAL prior to sample analysis	$r^2 \geq 0.99$.	Correct problem, then repeat ICAL.	Lab Manager/Analyst	HPL9056
IC	Second-source calibration verification (ICV)	Once after each ICAL, analysis of a second source standard prior to sample analysis.	All reported analytes within established RT windows. All reported analytes within ± 10% of true value	Correct problem and verify second source standard. Rerun ICV. If that fails, correct problem and repeat calibration.	Lab Manager/Analyst	HPL9056
IC	Continuing calibration verification (CCV)	Before sample analysis; after every 10 field samples; and at the end of the analysis sequence	All reported analytes within established retention time windows. All reported analytes within ± 10% of true value.	Recalibrate, and reanalyze all affected samples since the last acceptable CCV; or Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails, take corrective action(s) and re-calibrate; then reanalyze all affected samples since the last acceptable CCV.	Lab Manager/Analyst	HPL9056

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	SOP Reference
HPLC-MS	Interference Threshold Study	At initial setup and when major changes occur in the method's operating procedures (e.g., addition of cleanup procedures, column changes, mobile phase changes).	Measure the threshold of common suppressors (chloride, sulfate, carbonate, bicarbonate) that can be present in the system without affecting the quantitation of perchlorate. The threshold is the concentration of the common suppressors where perchlorate recovery falls outside an 80-120% window.	NA.	Analyst	HPL6850
HPLC-MS	Mass Calibration	Instrument must have a valid mass calibration prior to any sample analysis. The mass calibration is updated on an as-needed basis (e.g., QC failures, ion masses show large deviations from known masses, major instrument maintenance is performed, or the instrument is moved).	Mass calibration range must bracket the ion masses of interest. The most recent mass calibration must be used for an analytical run, and the same mass calibration must be used for all data files in an analytical run. Mass calibration must be verified by acquiring a full scan continuum mass spectrum of a perchlorate stock standard.	If the mass calibration fails, recalibrate. If it still fails, consult manufacturer instructions on corrective maintenance.	Analyst	HPL6850

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	SOP Reference
HPLC-MS	Tune Check	Prior to ICAL and after any mass calibration or maintenance is performed.	Tuning standards must span the mass range of the analytes of interest and meet acceptance criteria outlined in the laboratory SOP.	Retune instrument and verify. If the tune check will not meet acceptance criteria, an instrument mass calibration must be performed and the tuning redone.	Analyst	HPL6850
HPLC-MS	Initial Calibration (ICAL)	At instrument setup or after ICV or CCV failure, prior to sample analysis.	Minimum of 6 calibration levels must be used. ICAL must meet one of the two options below: Option 1: RSD for each analyte ≤ 15%; Option 2: linear least squares regression for each analyte: r2 ≥ 0.995.	Correct problem, then repeat ICAL.	Analyst	HPL6850
HPLC-MS	Initial Calibration Verification (ICV) using second source standard	Once after each ICAL.	Perchlorate concentration must be within ± 15% of its true value.	Correct problem. Rerun ICV. If that fails, repeat ICAL.	Analyst	HPL6850

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	SOP Reference
HPLC-MS	Continuing Calibration Verification (CCV)	On days an ICAL is performed, after every 10 field samples and at the end of the analytical sequence. On days an ICAL is not performed, at the beginning of the sequence, after every 10 field samples and at the end of the analytical sequence.	Perchlorate concentration must be within ± 15% of its true value.	Recalibrate, and reanalyze all affected samples since the last acceptable CCV; or Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails, take corrective action(s) and re-calibrate; then reanalyze all affected samples since the last acceptable CCV.	Analyst	HPL6850

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	SOP Reference
HPLC-MS	Interference Check Sample (ICS)	One ICS is prepared with every batch of 20 samples and must undergo the same preparation and pretreatment steps as the samples in the batch. It verifies the method performance at the matrix conductivity threshold (MCT). At least one ICS must be analyzed daily. The ICS shall be prepared at the LOQ.	Perchlorate concentration must be within ± 20% of its true value.	Correct problem. Reanalyze all samples and QC samples in the batch. If poor recovery from the cleanup filters is suspected, a different lot of filters must be used to re-extract all samples in the batch. If column degradation is suspected, a new column must be calibrated before the samples can be reanalyzed.	Analyst	HPL6850
HPLC-MS	Laboratory Reagent Blank (LRB)	Prior to calibration and at the end of the analytical sequence.	No perchlorate detected > ½ LOQ.	Reanalyze reagent blank (until no carryover is observed) and all samples processed since the contaminated blank.	Analyst	HPL6850

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	SOP Reference
Seta flash unit	p-xylene calibration check	Once per 20 samples	p-xylene: 25-28ºC.	If the p-xylene flashpoint is outside the 25-28ºC acceptance criteria, clean the cup and retest the p-xylene. If the flashpoint is still outside the acceptance criteria, try a new lot of p-xylene.	analyst	GEN-1020
ICP-MS	Linear Dynamic Range (LDR) or high-level check standard	At initial set up and checked every 6 months high a high standard at the upper limit of the range	Within + 10% of true value	Dilute samples within the calibration range, or re-establish/verify the LDR	TestAmerica – St. Louis Analyst	ST-MT-0001
ICP-MS	Tuning	Prior to ICAL	Mass calibration < 0.1 amu from the true value; Resolution < 0.9 amu full width at 10% peak height	Retune instrument and verify	TestAmerica – St. Louis Analyst	ST-MT-0001
ICP-MS	Initial Calibration (ICAL) – minimum one high standard and a calibration blank	Daily initial calibration prior to sample analysis	3 standards and a blank. Correlation Coefficient of ≥ 0.998	Recalibrate	TestAmerica – St. Louis Analyst	ST-MT-0001
ICP-MS	Second Source Calibration Verification (ICV)	Once after each initial calibration, prior to sample analysis	Value of second source for all analyte(s) within ± 10% of expected	Recalibrate	TestAmerica – St. Louis Analyst	ST-MT-0001

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	SOP Reference
ICP-MS	Continuing Calibration Verification (CCV)	After every 10 samples and at the end of the analysis sequence	All analytes within + 10% of expected value	Recalibrate – rerun 10 samples previous to failed CCV.	TestAmerica – St. Louis Analyst	ST-MT-0001
ICP-MS	Low-level Calibration Chech Standard (Low-level ICV)	Daily	All analytes within + 20% of expected value	Correct problem and repeat ICAL	TestAmerica – St. Louis Analyst	ST-MT-0001
ICP-MS	Interference Check Solutions (ICS)	After ICAL and prior to sample analysis	ICS-A: Absolute value of concentration for all non-spiked project analytes < LOD(unless they are a verified trace impurity from on e of the spike analytes) ICS-AB: within + 20% of true value	Terminate analysis; locate and correct problem; reanalyze ICS, reanalyze all samples	TestAmerica – St. Louis Analyst	ST-MT-0001
Ion Chromatography	Initial Calibration (ICAL) – five-point calibration and a calibration blank	Weekly initial calibration prior to sample analysis	The intercept of the curve at zero must be < +/- the reporting limit. Correlation Coefficient of ≥ 0.99	Recalibrate	TestAmerica – St. Louis Analyst	ST-WC-0028
Ion Chromatography	Retention Time window position establishment	Once per multipoint calibration	Position set at the midpoint of the ICAL curve or initial CCV	NA	TestAmerica – St. Louis Analyst	ST-WC-0028
Ion Chromatography	Retention Time window width	At method set-up and after major maintenance	RT width is + 3 times standard deviation for each analyte RT over a 24-hr period	NA	TestAmerica – St. Louis Analyst	ST-WC-0028

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	SOP Reference
Ion Chromatography	Second Source Calibration Verification (ICV)	Once after each initial calibration, prior to sample analysis	Value of second source for all analyte(s) within ± 10% of expected	Recalibrate	TestAmerica – St. Louis Analyst	ST-WC-0028
Ion Chromatography	Continuing Calibration Verification (CCV)	After every 10 samples and at the end of the analysis sequence	All analytes within + 10% of expected value	Recalibrate – rerun 10 samples previous to failed CCV.	TestAmerica – St. Louis Analyst	ST-WC-0028

QAPP Worksheet #24.2 - ECBC Analytical Instrument Calibration Table

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
GC/MS	Instrument Tune	Prior to ICAL and prior to each 24-hour period of sample analysis.	Method criteria defined in Table 1 of IOP MT-08	Correct problem and retune instrument.	Bench Analyst / Scientist	IOP MT-08
GC/MS	Instrument Blank	Prior to ICAL and at beginning of each analytical batch, after tune and prior to sample analysis	All reported analytes < ½ LOQ	Repeat analysis of instrument blanks until system is free of contamination. Then reanalyze all samples with detections since last acceptable instrument blank	Bench Analyst / Scientist	IOP MT-08
GC/MS	Initial calibration (ICAL) for all analytes (including surrogates)	At instrument set-up, as needed prior to sample analysis	$r^2 \geq 0.990$	Correct problem then repeat ICAL.	Bench Analyst / Scientist	IOP MT-08
GC/MS	Second Source Verification (SSV)	Immediately following ICAL	All reported analytes within ± 25% of the true value	Correct problem and reanalyze SSV. If still failing, repeat ICAL	Bench Analyst / Scientist	IOP MT-08

GC/MS	Continuing Calibration Verification (CCV)	Prior to samples on days ICAL not performed, after every 10 samples, and at the end of the analytical sequence	All reported analytes within ± 25% of the true value for initial and mid-batch CCV. All reported analytes within ± 50% of the true value for end-of-batch CCV	Recalibrate and reanalyze all samples since last acceptable CCV; – OR – Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails, correct problem and recalibrate. Then reanalyze all samples since last acceptable CCV.	Bench Analyst / Scientist	IOP MT-08
LC/QQQ	Instrument Blank	Prior to ICAL and at beginning of each analytical batch, after tune and prior to sample analysis	All reported analytes < ½ LOQ	Repeat analysis of instrument blanks until system is free of contamination. Then reanalyze all samples with detections since last acceptable instrument blank	Bench Analyst / Scientist	IOP MT-57
LC/QQQ	Initial calibration (ICAL) for all analytes (including surrogates)	At instrument set-up, as needed prior to sample analysis	$r^2 \geq 0.990$	Correct problem then repeat ICAL.	Bench Analyst / Scientist	IOP MT-57
LC/QQQ	Second Source Verification (SSV)	Immediately following ICAL	All reported analytes within ± 25% of the true value	Correct problem and reanalyze SSV. If still failing, repeat ICAL	Bench Analyst / Scientist	IOP MT-57

LC/QQQ	Continuing Calibration Verification (CCV)	Prior to samples on days ICAL not performed, after every 10 samples, and at the end of the analytical sequence	All reported analytes within ± 25% of the true value for initial and mid-batch CCV. All reported analytes within ± 50% of the true value for end-of-batch CCV	Recalibrate and reanalyze all samples since last acceptable CCV; – OR – Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails, correct problem and recalibrate. Then reanalyze all samples since last acceptable CCV.	Bench Analyst / Scientist	IOP MT-57

QAPP Worksheet #25.1 - APPL Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
GC-MS	Routine Maintenance under Service contract	N/A	N/A	Twice a year and additionally as needed	N/A	N/A	Certified instrument technician	ANA8260
GC-MS	Replace hydrocarbon traps and oxygen traps on helium and hydrogen gas lines; replace Chemical traps; Replacing converter tube in gas purifier system	Check oxygen/moisture indicator (OM-1) tube for a color change	Check GC system for high detector noise and reduced detector response.	As needed	N/A	N/A	Analyst or certified instrument technician	ANA8260
GC-MS	Routine Maintenance under Service contract	N/A	N/A	Twice a year and additionally as needed	N/A	N/A	Certified instrument technician	ANA8270
GC-MS	Clean and/or replace GC inlet.	Check System pressure for vacuum range	Check and Tighten Interface	As needed	N/A	N/A	Analyst or certified instrument	ANA8270

		and for steadiness with an HP Ion Gauge Pressure Measuring Device; Run a manual tune	column nut inside GC oven.				technician	
GC-MS	Inspect, clean and/or replace ALS syringe. Replace column.	N/A	N/A	As needed	N/A	N/A	Analyst or certified instrument technician	ANA8270
GC-MS	Add oil to vacuum rough pump	Check oil in vacuum rough pump	N/A	Every 4 to 6 weeks	N/A	N/A	Analyst or certified instrument technician	ANA8270
GC-MS	Replace/refill oxygen and moisture traps.	N/A	N/A	Yearly, or as needed	N/A	N/A	Analyst or certified instrument technician	ANA8270
ICP	Check instrument connections, gas flow, pressure.	Conduct leak test.	Visually inspect for wear or damage and indicator from computer controls.	Daily and annual maintenance from manufacturer	Intensity of spectrum is within manufacture's recommendation	Call for maintenance service.	Analyst or certified instrument technician	ANA6010
ICP	Clean the torch in Aqua Regia solution	Conduct leak test and adjust alignment.	Inspect for leaks and align the	Each week (minimum every 2 weeks)	Torch is centered and no leaks	Replace or call for maintenanc	Analyst or certified instrument	ANA6010

	and align the torch.		torch and ensure that it is in the center.			e service.	technician	
ICP	Clean the chamber and nebulizer.	N/A	Visually inspect for foreign objects.	Each week	Make sure chamber and nebulizer are clean	Replace or call for maintenance service.	Analyst or certified instrument technician	ANA6010
ICP	Clean the lens and optimize the detector sensitivity.	N/A	Clean up the dust from the lens.	Every 6 months	In accordance with manufacturer's recommendation or lab SOP	Install new lens.	Certified instrument technician	ANA6010
CVAA	Record Cathode Lamp Energy; Clean the gas liquid separator and cold vapor cell	Verify Nitrogen Tank Pressure	Verify Nitrogen Tank Pressure; Empty Waste Container	Daily and annual maintenance from manufacturer	Intensity of spectrum is within manufacture's recommendation	Call for maintenance service.	Analyst or certified instrument technician	ANA7470A, ANA7471
CVAA	Change pump windings of VGA-76 (vapor generation assembly)	NA	NA	Once monthly or when needed	NA	Call for maintenance service.	Analyst or certified instrument technician	ANA7470A, ANA7471
HPLC	Change guard cartridge, inlet filter and PTFE frit	N/A	Review pressure profile	As needed, based on pressure profile	N/A	Replace them and check often	Analyst or certified instrument technician	HPL8330
HPLC	Change analytical	N/A	Check peak tailing,	When chromatography	N/A	N/A	Analyst or certified	HPL8330

	column		decreased sensitivity, retention time changes, etc.	indicates			instrument technician	
HPLC	Replace mobile phase daily	N/A	N/A	Daily	N/A	N/A	Analyst or certified instrument technician	HPL8330
GC-ECD	Change gas purifier	N/A	Visually inspect if traps changing color	Every 6 to 12 months	No moisture	Replace indicating traps	Analyst or certified instrument technician	ANA8081, ANA8082
GC-ECD	Change syringes / syringe needles	N/A	Visually inspect for wear or damage	Every 3 months	N/A	Replace syringe if dirt is noticeable in the syringe	Analyst or certified instrument technician	ANA8081, ANA8082
GC-ECD	Change Inlet liner, Liner O-rings, and Inlet Septum	N/A	Visually inspect for dirt or deterioration	Weekly for liner Monthly for O-rings Daily for septum	N/A	Replace them and check often	Analyst or certified instrument technician	ANA8081, ANA8082
GC-ECD	Change front-end column	N/A	Check peak tailing, decreased sensitivity, retention time changes	Weekly, monthly, or when needed	N/A	Remove 1/2 to 1 meter from the front of the column when experiencing	Analyst or certified instrument technician	ANA8081, ANA8082

						problems		
GC-ECD	Perform 'Wipe Test' and clean up the baseline.	N/A	Baseline is noisy.	Every 6 month or as needed	In accordance with manufacturer's recommendation or lab SOP	Thermally clean by "baking-out" the instrument over-night.	Analyst or certified instrument technician	ANA8081
Spectrophotometer	Confirm calibration	1) Stray Radiant Energy Test 2) Wavelength Accuracy Test 3) Photometric Accuracy Test	NA	monthly	NA	NA	Analyst or certified instrument technician	ANA9010C/9014, INO22
Dionex IC	Inject DI rinse at the end of every run; Rinse the piston seals	NA	Check for and isolate leaks	Daily	none	Clean up and repair any leaks.	Analyst or certified instrument technician	ANA9056, INO029
Dionex IC	Locate and replace any pinched or damaged airlines	NA	NA	Weekly	NA	NA	Analyst or certified instrument technician	ANA9056, INO029
Dionex IC	Replace primary and rinse seals in pump heads	NA	NA NA	Every 6 months, more frequently if needed	NA	NA	Analyst or certified instrument technician	ANA9056, INO029
pH meter	Check LCD display and	3 point calibration using	Visually inspect for wear or	Daily and annual maintenance	± 0.05 units	Return to manufacturer for	Analyst or certified instrument	ANA9040C, ANA9045

	pH probe	known standards	damage and indicator from computer controls.	from manufacturer		recalibration or call for maintenance service.	technician	
HPLC	Change guard cartridge, inlet filter and Ftpp frit.	N/A	Review pressure profile.	As need based on pressure profile	N/A	Replace them and check often	Analyst or certified instrument technician	HPL6850
HPLC	Chang analytical column	N/A	Check peak tailing, decreased sensitivity, retention time changes, etc.	when chromatography indicates	N/A	N/A	Analyst or certified instrument technician	HPL6850
HPLC	Replace mobile phase daily	N/A	N/A	daily	N/A	N/A	Analyst or certified instrument technician	HPL6850
IC	Change guard columns, Replace Tubing, Change Pump Seals	Observation of deteriorating chromatography	Visual Inspection	As needed	No interference/ carry over peaks; no leaks; stable retention times	Replace guard column, replace worn tubing, change pump seals	TestAmerica-St. Louis Analyst	ST-WC-0028
ICPMS	Clean sample and skimmer	Sensitivity check; monitor	Instrument performanc	Daily or as needed	Intensity of Daily	Replace or clean as	TestAmerica –	ST-MT-0001

	cones; replace pump windings	ISTD counts for variation	e and sensitivity		performance check for Rh at least 200000 counts	needed; recalibrate as needed	St. Louis Analyst	

QAPP Worksheet #25.2 - ECBC Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
GC-MS	N/A	Tune Check	N/A	Prior to ICAL and at the start of each analytical sequence	BFB acceptance criteria listed in method	Clean source, retune instrument	Bench Analyst or trained technician	IOP-MT-08
GC-MS	Concentrating trap upkeep	N/A	N/A	As needed when ICAL / QC fails	Blank analysis free of contamination, sensitivity meets method requirements, and ICAL meets linearity criteria	Replace connections, gas line filters, or trap	Bench Analyst or trained technician	IOP-MT-08

GC-MS	Maintain acceptable column performance	N/A	Inspect chromate-grams for peak shape and column bleed	Ongoing, when QC fails	Acceptable resolution and peak shape	Clip or replace column	Bench Analyst or trained technician	IOP-MT-08
GC-MS	Injection Port upkeep	N/A	N/A	When contamina-tion is detected	Instrument blank analysis free of contamination	Replace injection port liner, clean injection port	Bench Analyst or trained technician	IOP-MT-08
GC-MS	Mass Selective Detector (MSD) ion source cleaning	N/A	N/A	When tune fails or fluctuating internal standard response is observed	Acceptable tune, sensitivity meets method requirements, and ICAL meets linearity criteria	Re-clean source or replace degraded / malfunctioning parts	Bench Analyst or trained technician	IOP-MT-08
GC-MS	On-going instrument service	N/A	N/A	As needed	Optimal performance, as outlined in SOP	N/A	Trained technician	IOP-MT-08
LC/QQQ (LC/MS/MS)	Routine maintenance per manufacturer's instructions	CCV, Instrument Tune, Instrument Blank	Monitor instrument performance	Ongoing, as needed when QC fails or contamination is detected	Acceptable QC, system free of contamination, tune and ICAL within criteria	Clean the spray chamber with solvent, reanalyze instrument blanks, replace/repair instrument parts, retune and recalibrate instrument	Analyst	IOP-MT-57

QAPP Worksheet #26 - Sample Handling System

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT

Sample Collection (Personnel/Organization): Field Team/Parsons

Sample Packaging (Personnel/Organization): Field Team/Parsons

Coordination of Shipment (Personnel/Organization): Field Team/Parsons

Type of Shipment/Carrier: Commercial Carrier/To Be Determined

SAMPLE RECEIPT AND ANALYSIS

Sample Receipt (Personnel/Organization): Sample Custodian/APPL, ALS-Kelso, TA-St. Louis ECBC

Sample Custody and Storage (Personnel/Organization): Sample Custodian/ APPL, ALS-Kelso, TA-St. Louis ECBC

Sample Preparation (Personnel/Organization): Sample Analyst/ APPL, ALS-Kelso, TA-St. Louis ECBC

Sample Determinative Analysis (Personnel/Organization): Sample Analyst/ APPL, ALS-Kelso, TA-St. Louis ECBC

SAMPLE ARCHIVING

Field Sample Storage (No. of days from analysis): 90 days

Sample Extract/Digestate Storage (No. of days from analysis): 90 days

Biological Sample Storage (No. of days from sample collection): Not Applicable

SAMPLE DISPOSAL

Personnel/Organization: Sample Custodian/ APPL, ALS-Kelso, TA-St. Louis ECBC

Number of Days from Analysis: 90 days

QAPP Worksheet #27 - Sample Custody Requirements Table

Field Sample Custody Procedures (sample collection, packaging, shipment, and delivery to laboratory):	
	Sample custody documentation procedures described in this section will be followed throughout all sample collection during this investigation. Components of sample custody procedures include the use of field logbooks, sample labels, and chain-of-custody (COC) forms. Parsons sampling personnel must complete all proper forms and documents for each sample taken. After collection, containerization, and documentation, samples will be maintained under the custody of field team members until being relinquished to laboratory courier service. Parsons field team leader and QC manager will ensure that all samples required to undergo headspace analysis and low-level agent analysis will be held till the samples are confirmed clear of agent. The sample shipment container must not be unsealed until the laboratory receives custody and breaks the seal. A sample is under custody if: • It is in actual possession of the sampling crew, • It is in the view of the sampling crew, after being in their physical possession, • It was in the physical possession of the sampling crew and then was secured to prevent tampering, or • It is in a designated and identified secure area, such as in a locked trailer or vehicle.
	Samples will be shipped and delivered to the designated laboratory for analysis daily or every other day, as required. Before samples are shipped, the Parsons field team leader (or designee) will contact the laboratory to inform them of shipments. The samples will be shipped in ice chests by an overnight carrier set up by the laboratory. A COC form will be sealed in a plastic bag and taped to the inside lid of each ice chest. Each chest will be sealed with tape and a COC seal. United States Department of Transportation (USDOT) shipping requirements will be followed when applicable. It is anticipated that the environmental samples collected during the investigation will have low concentrations of any contaminant. If samples collected during the project are suspected to contain between 10 parts per million (ppm) and 15 percent of any contaminant, the sample is potentially hazardous according to USDOT regulations, and must be shipped without ice. If the concentration of the contaminant is suspected to be above the 10 ppm / 15 percent threshold, the sample will be packed without ice and shipped according to USDOT regulations for hazardous samples.
Laboratory Sample Custody Procedures (receipt of samples, archiving, disposal):	
	A designated laboratory sample custodian will perform the following procedures to maintain a COC once the samples have arrived at the laboratory. • Check the original field-prepared COC and compare it with the labeled contents of each sample container for correctness and traceability. • Check the temperature of a water sample enclosed with the environmental samples or check the temperature in the ice chest. Record the temperature to the nearest 0.1 degree Celsius (°C) on the COC form. Sample preservation will be documented in the field. The laboratory shall check the COC forms for the preservation noted by the field team. • If there are no problems with sample integrity or COC information, the sample custodian will sign, date, and note the time in the “laboratory receipt box” on the original COC form. Pertinent information, such as shipping company name, should be recorded in the remarks section of the original COC form.

QAPP Worksheet #27 - Sample Custody Requirements Table (*continued*)

	• Once received, the sample custodian shall assign a laboratory work order number to the samples received from one shipment. The samples shall not be logged if the sample containers are mislabeled or broken, or if custody seals are broken. The PM and laboratory PM will be notified of any such situations immediately, and corrective actions will be implemented.
	• The laboratory work number is used for identification of samples within the laboratory. Each sample will receive a unique laboratory work number when it is received by the laboratory. The sample custodian shall log the laboratory work number and the field sample identification into a laboratory sample custody log. The laboratory sample custody log may either be hard copy or computerized, depending on the laboratory..
	• In addition to correlating laboratory work numbers with field sample identification, the laboratory log shall also contain the laboratory storage cooler number (if applicable) that the sample will be stored in while on the laboratory premises. Samples will be logged when they are removed and returned from storage for analysis.
	• On analysis, a laboratory lot control number will be assigned to the sample. All samples within a given laboratory analysis group (e.g., samples sharing the same laboratory QC measurement samples) will have identical laboratory lot control numbers.
	• Sample custody within the laboratory is to be maintained by a secure perimeter in which no unauthorized personnel are allowed entry without proper identification (i.e., visitor's badge).
	• Samples received by the laboratory will be retained at the preservation temperature until the data reports have been reviewed by Parsons. Sample containers and remaining sample material should be disposed of appropriately when all analyses and related QA/QC work are completed. Disposal of the sample will be recorded on the sample custody log.
Sample Identification Procedures:	
	• Unique sample identification, • Date and time of sample collection, • Source of sample (including name, location, and sample type), • Designation of matrix spike / matrix spike duplicate (MS/MSD), • Preservative used, • Analyses required, • Name of collector(s), • Pertinent field data (e.g., pH, temperature), • Serial numbers of custody seals and transportation cases (if used), and • Custody transfer signatures and dates and times of sample transfer from the field to transporters and to the laboratory or laboratories.
Chain-of-custody Procedures:	
	COC records provide a means of tracing each sample from the time of collection through shipment and final analysis, producing a written record of all persons handling the samples. A sample is defined as being under one's custody if it is in one's possession or in view after being in one's possession or if that person locked the sample up or put it in a designated secure area. The COC form will list sample identification, matrix, date and time of collection, preservatives used, analyses requested, name of sample collector(s), and the signature and time of each person receiving and relinquishing the samples. The "Remarks" column of the COC form will be used to record any additional information that may be of use to the laboratory for prescreening the samples. A COC record will accompany the samples at all times. When transferring possession of samples, the individuals relinquishing and receiving the samples will sign, date, and note the time on the record. This record documents transfer of sample custody from the sampler, through any intermediary custodians, to the laboratory.

QAPP Worksheet #27 - Sample Custody Requirements Table (*continued*)

	Samples will be properly packaged for shipment and dispatched to the appropriate laboratory for analysis with a separate signed COC record included in each sample box or ice chest. Shipping containers will be custody-sealed for shipment to the laboratory by overnight express delivery. Bills of lading will be retained as part of the permanent documentation in the project file. The original COC will accompany the shipment, and a copy will be retained by the field supervisor. The laboratory will make and maintain a file copy, and the completed original will be returned to the task manager as a part of the final analytical report. This record serves to document sample custody transfer from the sampler to the shipper and to the laboratory. On receipt of samples, the laboratory will provide a written report to the field investigation manager summarizing the conditions of samples, sample numbers received and corresponding laboratory numbers, and the estimated date for completion of laboratory analysis.

QAPP Worksheet #28.1a - APPL QC Samples Table for VOCs

Matrix	**Soil/Water**
Analytical Group	VOCs
Analytical Method/SOP Reference	EPA Methods SW8260B / ANA8260
Analytical Organization	APPL Inc.

QC Sample	**Frequency & Number**	**Analytical/Prep Method and SOP QC Acceptance Limits**	**Corrective Action**	**Person(s) Responsible for Corrective Action**	**Data Quality Indicator**	**Measurement Performance Criteria**
Internal standards (IS)	Every field sample, standard and QC sample.	Retention time within ± 10 seconds from retention time of the midpoint standard in the ICAL; EICP area within - 50% to +100% of ICAL midpoint standard.	Inspect mass spectrometer and GC for malfunctions and correct problem. Reanalysis of samples analyzed while system was malfunctioning is mandatory.	Analyst Lab QA Officer Project Chemist	Accuracy / Sensitivity	Retention time within ± 10 seconds from retention time of the midpoint standard in the ICAL; EICP area within - 50% to +100% of ICAL midpoint
Method Blank (MB)	One per preparatory batch.	No analytes detected > ½ LOQ or > 1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater. Common contaminants must not be detected > LOQ.	Correct problem. If required, reprep and reanalyze MB and all samples processed with the contaminated blank.	Analyst Lab QA Officer Project Chemist	Accuracy / Sensitivity	All target analytes ≤ 1/2 laboratory LOQ, For common laboratory contaminants, no analytes detected > LOQ
Laboratory Control Sample (LCS)	One per preparatory batch.	A laboratory must use the QSM v5.0 Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	Correct problem, then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available.	Analyst Lab QA Officer Project Chemist	Accuracy / Precision - Analytical	QC acceptance criteria specified by DoD QSM v5.0
Matrix Spike (MS)	One per preparatory batch.	A laboratory must use the QSM v5.0 Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not	Examine the project- specific requirements. Contact the client as to additional measures to be taken.	Analyst Lab QA Officer Project Chemist	Precision - Analytical	For matrix evaluation, use QC acceptance criteria specified by DoD QSM v5.0

		listed, use in-house LCS limits if project limits are not specified.				
Matrix Spike Duplicate (MSD) or Matrix Duplicate (MD)	One per preparatory batch.	A laboratory must use the QSM v5.0 Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified. MSD or MD: RPD of all analytes ≤ 20% (between MS and MSD or sample and MD).	Examine the project- specific requirements. Contact the client as to additional measures to be taken.	Analyst Lab QA Officer Project Chemist	Precision - Analytical	For matrix evaluation, use QC acceptance criteria specified by DoD QSM v5.0
Surrogate Spike	All field and QC samples.	QC acceptance criteria specified by the project, if available; otherwise use QSM Appendix C limits or in-house LCS limits if analyte(s) are not listed.	Correct problem, then reprep and reanalyze all failed samples for all surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference with surrogate is present, reanalysis may not be necessary.	Analyst Lab QA Officer Project Chemist	Accuracy	QC acceptance criteria specified by DoD QSM v5.0

Table 28.1b: Measurement Performance Criteria for VOCs

	Soil	
	MS/MSD and LCS/LCSD	
Analyte	**%R**	**RPD**
VOCs in Soil (EPA 8260B)		
1,1,1-TRICHLOROETHANE	73-130	20
1,1,2,2-TETRACHLOROETHANE	70-124	20
1,1,2-TRICHLOROETHANE	78-121	20
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	66-136	20
1,1-DICHLOROETHANE	76-125	20
1,1-DICHLOROETHENE	70-131	20
1,2,4-TRICHLOROBENZENE	67-129	20

Analyte	**Soil**	
	MS/MSD and LCS/LCSD	
	%R	**RPD**
1,2-DIBROMO-3-CHLOROPROPANE	61-132	20
1,2-DIBROMOETHANE	78-122	20
1,2-DICHLOROBENZENE	78-121	20
1,2-DICHLOROETHANE	73-128	20
1,2-DICHLOROPROPANE	76-123	20
1,3-DICHLOROBENZENE	77-121	20
1,4-DICHLOROBENZENE	75-120	20
2-BUTANONE	51-148	20
2-HEXANONE	53-145	20
4-METHYL-2-PENTANONE	65-135	20
ACETONE	36-164	20
ACETONITRILE	54-143	20
ACROLEIN	47-155	20
BENZENE	77-121	20
BENZYL CHLORIDE	64-120	20
BROMOBENZENE	78-121	20
BROMOCHLOROMETHANE	78-125	20
BROMODICHLOROMETHANE	75-127	20
BROMOFORM	67-132	20
BROMOMETHANE	53-143	20
CARBON DISULFIDE	63-132	20

Analyte	**Soil**	
	MS/MSD and LCS/LCSD	
	%R	**RPD**
CARBON TETRACHLORIDE	70-135	20
CHLOROBENZENE	79-120	20
DIBROMOCHLOROMETHANE	74-126	20
CHLOROETHANE	59-139	20
CHLOROFORM	78-123	20
CIS-1,2-DICHLOROETHENE	77-123	20
CIS-1,3-DICHLOROPROPENE	74-126	20
CYCLOHEXANE	67-131	20
DICHLORODIFLUOROMETHANE	29-149	20
ETHYLBENZENE	76-122	20
ISOPROPYLBENZENE	68-134	20
M,P-XYLENE	77-124	20
METHYL ACETATE	53-144	20
METHYL CYCLOHEXANE	66-133	20
METHYL TERT-BUTYL ETHER	73-125	20
METHYLENE CHLORIDE	70-128	20
O-XYLENE	77-123	20
STYRENE	76-124	20
TETRACHLOROETHENE	73-128	20
TOLUENE	77-121	20
TRANS-1,2-DICHLOROETHENE	74-125	20

Analyte	Soil	
	MS/MSD and LCS/LCSD	
	%R	RPD
TRANS-1,3-DICHLOROPROPENE	71-130	20
TRICHLOROETHENE	77-123	20
TRICHLOROFLUOROMETHANE	62-140	20
VINYL CHLORIDE	56-135	20
XYLENES (TOTAL)	78-124	20
SURROGATE: 1,2-DICHLOROETHANE-D4 (S)	71-136	
SURROGATE: 4-BROMOFLUOROBENZENE (S)	79-119	
SURROGATE: DIBROMOFLUOROMETHANE (S)	78-119	
SURROGATE: TOLUENE-D8 (S)	85-116	

QAPP Worksheet #28.2a - APPL QC Samples Table for SVOCs

Matrix	**Soil/Water**
Analytical Group	SVOCs
Analytical Method/SOP Reference	EPA Methods 8270D/ ANA8270
Analytical Organization	APPL Inc.

QC Sample	Frequency & Number	Analytical/Prep Method and SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator	Measurement Performance Criteria
Internal standards (IS)	Every field sample, standard and QC sample.	Retention time within ± 10 seconds from retention time of the midpoint standard in the ICAL; EICP area within - 50% to +100% of ICAL midpoint standard.	Inspect mass spectrometer and GC for malfunctions and correct problem. Reanalysis of samples analyzed while system was malfunctioning is mandatory.	Analyst Lab QA Officer Project Chemist	Accuracy / Sensitivity	Retention time within ± 10 seconds from retention time of the midpoint standard in the ICAL; EICP area within - 50% to +100% of ICAL midpoint
Method Blank (MB)	One per preparatory batch.	No analytes detected > ½ LOQ or > 1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater. Common contaminants must not be detected > LOQ.	Correct problem. If required, reprep and reanalyze MB and all samples processed with the contaminated blank.	Analyst Lab QA Officer Project Chemist	Accuracy / Sensitivity	All target analytes ≤ 1/2 laboratory LOQ, For common laboratory contaminants, no analytes detected > LOQ
Laboratory Control Sample (LCS)	One per preparatory batch.	A laboratory must use the QSM v5.0 Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	Correct problem, then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available.	Analyst Lab QA Officer Project Chemist	Accuracy / Precision - Analytical	QC acceptance criteria specified by DoD QSM v5.0
Matrix Spike (MS)	One per preparatory batch.	A laboratory must use the QSM v5.0 Appendix C Limits for batch control if project limits are not	Examine the project- specific requirements. Contact the client as to additional measures to be	Analyst Lab QA Officer Project Chemist	Precision - Analytical	For matrix evaluation, use QC acceptance criteria specified by DoD QSM v5.0

		specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	taken.			
Matrix Spike Duplicate (MSD) or Matrix Duplicate (MD)	One per preparatory batch.	A laboratory must use the QSM v5.0 Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified. MSD or MD: RPD of all analytes ≤ 20% (between MS and MSD or sample and MD).	Examine the project- specific requirements. Contact the client as to additional measures to be taken.	Analyst Lab QA Officer Project Chemist	Precision - Analytical	For matrix evaluation, use QC acceptance criteria specified by DoD QSM v5.0
Surrogate Spike	All field and QC samples.	QC acceptance criteria specified by the project, if available; otherwise use QSM Appendix C limits or in-house LCS limits if analyte(s) are not listed.	Correct problem, then reprep and reanalyze all failed samples for all surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference with surrogate is present, reanalysis may not be necessary.	Analyst Lab QA Officer Project Chemist	Accuracy	QC acceptance criteria specified by DoD QSM v5.0

Table 28.2b: Measurement Performance Criteria for SVOCs

	Soil	
	MS/MSD and LCS/LCSD	
Analyte	**%R**	**RPD**
SVOCs in Soil (EPA 8270D)		
1,1'-BIPHENYL	40-117	20
2,4,5-TRICHLOROPHENOL	41-124	20
2,4,6-TRICHLOROPHENOL	39-126	20
2,4-DICHLOROPHENOL	40-122	20

	Soil	
	MS/MSD and LCS/LCSD	
Analyte	**%R**	**RPD**
2,4-DIMETHYLPHENOL	30-127	20
2,4-DINITROPHENOL	15-130	20
2-CHLORONAPHTHALENE	41-114	20
2-CHLOROPHENOL	34-121	20
2-METHYLNAPHTHALENE	38-122	20
2-METHYLPHENOL	32-122	20
2-NITROANILINE	44-127	20
2-NITROPHENOL	36-123	20
3,3´-DICHLOROBENZIDINE	22-121	20
3-NITROANILINE	33-119	20
3/4-METHYLPHENOL	34-119	20
4,6-DINITRO-2-METHYLPHENOL	29-132	20
4-BROMOPHENYL PHENYL ETHER	46-124	20
4-CHLORO-3-METHYLPHENOL	45-122	20
4-CHLOROANILINE	17-106	20
4-CHLOROPHENYL PHENYL ETHER	45-121	20
4-NITROANILINE	35-115	20
4-NITROPHENOL	30-132	20
ACENAPHTHENE	40-123	20
ACENAPHTHYLENE	32-132	20
ACETOPHENONE	33-115	20

	Soil	
	MS/MSD and LCS/LCSD	
Analyte	**%R**	**RPD**
ANTHRACENE	47-123	20
ATRAZINE	47-127	20
BENZALDEHYDE	20-140	20
BENZ (A) ANTHRACENE	49-126	20
BENZO (A) PYRENE	45-129	20
BENZO (B) FLUORANTHENE	45-132	20
BENZO (G,H,I) PERYLENE	43-134	20
BENZO (K) FLUORANTHENE	47-132	20
BENZOIC ACID	10-110	20
BIS (2-CHLORETHOXY) METHANE	36-121	20
BIS (2-CHLOROETHYL) ETHER	31-120	20
BIS (2-CHLOROISOPROPYL) ETHER	33-131	20
BIS (2-ETHYLHEXYL) PHTHALATE	51-133	20
BUTYL BENZYL PHTHALATE	48-132	20
CAPROLACTAM	46-117	20
CARBAZOLE	50-123	20
CHRYSENE	50-124	20
DI-N-BUTYL PHTHALATE	51-128	20
DI-N-OCTYL PHTHALATE	45-140	20
DIBENZ (A,H) ANTHRACENE	45-134	20
DIBENZOFURAN	44-120	20

Analyte	**Soil**	
	MS/MSD and LCS/LCSD	
	%R	**RPD**
DIETHYL PHTHALATE	50-124	20
DIMETHYL PHTHALATE	48-124	20
DIPHENYLAMINE	48-111	20
FLUORANTHENE	50-127	20
FLUORENE	43-125	20
HEXACHLOROBENZENE	45-122	20
HEXACHLOROBUTADIENE	32-123	20
Hexachlorocyclopentadiene	10-126	20
HEXACHLOROETHANE	28-117	20
INDENO (1,2,3-CD) PYRENE	45-133	20
ISOPHORONE	30-122	20
N-NITROSODI-N-PROPYLAMINE	36-120	20
N-NITROSODIPHENYLAMINE	38-127	20
NAPHTHALENE	35-123	20
PENTACHLOROPHENOL	25-133	20
PHENANTHRENE	50-121	20
PHENOL	34-121	20
PYRENE	47-127	20
Benzal chloride	TIC	TIC
Benzyl Bromide	TIC	TIC
2-Bromoethanol	TIC	TIC

Analyte	**Soil**	
	MS/MSD and LCS/LCSD	
	%R	**RPD**
4-Chloroacetophenone	TIC	TIC
1-Chloro-2,4-dinitrobenzene	TIC	TIC
2-Chloroethanol	TIC	TIC
Chloropicrin	TIC	TIC
N,N-Dimethylaniline	TIC	TIC
Diphenyl Ether	TIC	TIC
SURROGATE: 2,4,6-TRIBROMOPHENOL (S)	39-132	
SURROGATE: 2-FLUORBIPHENYL (S)	44-115	
SURROGATE: 2-FLUOROPHENOL (S)	35-115	
SURROGATE: NITROBENZENE-D5 (S)	37-122	
SURROGATE: PHENOL (S)	33-122	
SURROGATE: TERPHENYL-D14 (S)	54-127	

QAPP Worksheet #28.3a - APPL QC Samples Table for Metals

Matrix	**Soil/Water**
Analytical Group	Metals
Analytical Method/SOP Reference	EPA Method SW6010C/ ANA6010
Analytical Organization	APPL Inc.

QC Sample	**Frequency & Number**	**Analytical/Prep Method and SOP QC Acceptance Limits**	**Corrective Action**	**Person(s) Responsible for Corrective Action**	**Data Quality Indicator**	**Measurement Performance Criteria**
Method Blank	One per preparatory batch.	No analytes detected > 1/2 LOQ or > 1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater.	Correct problem. If required, reprep and reanalyze method blank and all samples processed with the contaminated blank.	Analyst Lab QA Officer Project Chemist	Accuracy / Sensitivity	No analytes detected > 1/2 LOQ or > 1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater.
Laboratory Control Sample (LCS)	One per preparatory batch.	A laboratory must use the QSM v5.0 Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	Correct problem, then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available.	Analyst Lab QA Officer Project Chemist	Accuracy / Precision - Analytical	QC acceptance criteria specified by DoD QSM v 5.0
Matrix spike (MS) / Matrix Spike Duplicate (MSD)	One per preparatory batch.	A laboratory must use the QSM v5.0 Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified. MSD or MD: RPD of all analytes ≤ 20% (between MS and MSD or	Examine the project- specific requirements. Contact the client as to additional measures to be taken.	Analyst Lab QA Officer Project Chemist	Precision - Analytical	For matrix evaluation, use QC acceptance criteria specified by DoD QSM v 5.0

		sample and MD).				
Dilution test	One per preparatory batch if MS or MSD fails. Only applicable for samples with concentrations > 50 x LOQ (prior to dilution).	Five-fold dilution must agree within ± 10% of the original measurement.	No specific CA, unless required by the project.	Analyst Lab QA Officer Project Chemist	Accuracy / Precision - Analytical	Per the DoD QSM v 5.0
Post-digestion spike (PDS) addition	Perform if MS/MSD fails. One per preparatory batch (using the same sample as used for the MS/MSD if possible). Criteria applies for samples with concentrations <50 X LOQ prior to dilution.	Recovery within 80-120%.	No specific CA, unless required by the project.	Analyst Lab QA Officer Project Chemist	Accuracy / Precision - Analytical	Per the DoD QSM v 5.0

Table 28.3b: Measurement Performance Criteria for Metals

Analyte	**Soil**		**Water**	
	MS/MSD and LCS/LCSD		**MS/MSD and LCS/LCSD**	
	%R	**RPD**	**%R**	**RPD**
Metals (SW6010C)				
ALUMINUM (AL)	74-119	20	86-115	20
ANTIMONY (SB)	79-114	20	88-113	20
ARSENIC (AS)	82-111	20	87-113	20
BARIUM (BA)	83-113	20	88-113	20
BERYLLIUM (BE)	83-113	20	89-112	20
BORON (B)	72-114	20	85-113	20
CADMIUM (CD)	82-113	20	88-113	20
CHROMIUM (CR)	85-113	20	90-113	20
COBALT (CO)	85-112	20	89-114	20
COPPER (CU)	81-117	20	86-114	20
LEAD (PB)	81-112	20	86-113	20
MANGANESE (MN)	84-114	20	90-114	20
NICKEL (NI)	83-113	20	88-113	20
SELENIUM (SE)	78-111	20	83-114	20
SILVER (AG)	82-112	20	84-115	20
STRONTIUM (SR)	83-114	20	90-113	20
THALLIUM (TL)	83-111	20	85-114	20
TIN (SN)	80-120	20	88-115	20
TITANIUM (TI)	83-114	20	91-111	20

	Soil		**Water**	
	MS/MSD and LCS/LCSD		**MS/MSD and LCS/LCSD**	
Analyte	**%R**	**RPD**	**%R**	**RPD**
VANADIUM (V)	82-114	20	90-111	20
ZINC (ZN)	82-113	20	87-115	20

QAPP Worksheet #28.4a - APPL QC Samples Table for Mercury

Matrix		**Soil/Water**				
Analytical Group		Mercury				
Analytical Method/SOP Reference		EPA Method SW7470A, 7471B/ ANA7470A, ANA7471				
Analytical Organization		APPL Inc.				
QC Sample	**Frequency & Number**	**Analytical/Prep Method and SOP QC Acceptance Limits**	**Corrective Action**	**Person(s) Responsible for Corrective Action**	**Data Quality Indicator**	**Measurement Performance Criteria**
Method Blank	One per matrix per analytical method for each batch of at most 20 samples	No analytes detected > 1/2 LOQ or > 1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater.	Correct problem. If required, reprep and reanalyze MB and all samples processed with the contaminated blank If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply B-flag to all results for the specific analyte(s) in all samples in the associated preparatory batch.	Analyst Lab QA Officer Project Chemist	Accuracy / Sensitivity	All target analytes ≤ 1/2 laboratory LOQ, For common laboratory contaminants, no analytes detected > LOQ

Laboratory Control Sample (LCS)	One per preparatory batch.	A laboratory must use the QSM v5.0 Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	Correct problem, then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available.	Analyst Lab QA Officer Project Chemist	Accuracy / Precision - Analytical	QC acceptance criteria specified by DoD QSM v5.0
Matrix Spike (MS)	One per preparatory batch.	A laboratory must use the QSM v5.0 Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	Examine the project- specific requirements. Contact the client as to additional measures to be taken.	Analyst Lab QA Officer Project Chemist	Precision - Analytical	For matrix evaluation, use QC acceptance criteria specified by DoD QSM v5.0
Matrix Spike Duplicate (MSD) or Matrix Duplicate (MD	One per preparatory batch.	A laboratory must use the QSM Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified. MSD or MD: RPD of all analytes ≤ 20% (between MS and MSD or sample and MD).1	Examine the project- specific requirements. Contact the client as to additional measures to be taken.	Analyst Lab QA Officer Project Chemist	Precision - Analytical	For matrix evaluation, use QC acceptance criteria specified by DoD QSM v5.0

Table 28.4b: Measurement Performance Criteria for Mercury

	Soil		Water	
	MS/MSD and LCS/LCSD		MS/MSD and LCS/LCSD	
Analyte	**%R**	**RPD**	**%R**	**RPD**
Mercury (SW7470A/SW7471B)				
MERCURY (HG)	80-124	20	82-119	20

QAPP Worksheet #28.5a - APPL QC Samples Table for Explosives

Matrix	**Soil/Water**
Analytical Group	Explosives
Analytical Method/SOP Reference	EPA Method SW8330B/ HPL8330
Analytical Organization	APPL Inc.

QC Sample	**Frequency & Number**	**Analytical/Prep Method and SOP QC Acceptance Limits**	**Corrective Action**	**Person(s) Responsible for Corrective Action**	**Data Quality Indicator**	**Measurement Performance Criteria**
Soil drying procedure	Each sample, LCS, and Method Blank.	Laboratory must have a procedure to determine when the sample is dry to constant mass. Record date, time, and ambient temperature on a daily basis while drying samples.	NA	Analyst/Technician	NA	NA
Method Blank	One per preparatory batch Grinding Blank may be used as the batch method blank.	No analytes detected > 1/2 LOQ or > 1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater.	Correct problem. If required, reprep and reanalyze method blank and all samples processed with the contaminated blank. If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply B-flag to all results for the specific analyte(s) in all samples in the associated preparatory batch.	Analyst Lab QA Officer Project Chemist	Accuracy / Sensitivity	No analytes detected > 1/2 LOQ or > 1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater.
Laboratory Control Sample (LCS)	One per preparatory batch.	A laboratory must use the QSM v5.0 Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	Correct problem. If required, reprep and reanalyze the LCS and all samples in the associated preparatory batch for the failed analytes, if sufficient sample material is available.	Analyst Lab QA Officer Project Chemist	Accuracy / Precision - Analytical	QC acceptance criteria specified by DoD QSM v5.0

Matrix spike (MS) / Matrix Spike Duplicate (MSD)	One per preparatory batch.	A laboratory must use the QSM v5.0 Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	Examine the project-specific DQOs. Contact the client as to additional measures to be taken.	Analyst Lab QA Officer Project Chemist	Precision - Analytical	QC acceptance criteria specified by DoD QSM v5.0
Surrogate Spike	All field and QC samples.	QC acceptance criteria specified by the project, if available; otherwise use QSM v5.0 Appendix C limits or in-house LCS limits if analyte(s) are not listed.	Correct problem, then reprep and reanalyze all failed samples for all surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference with surrogate is present, reanalysis may not be necessary.	Analyst Lab QA Officer Project Chemist	Accuracy / Precision - Analytical	QC acceptance criteria specified by DoD QSM v5.0
Confirmation of positive results (second column)	All positive results must be confirmed.	Calibration and QC criteria are the same for the confirmation analysis as for initial or primary column analysis. Results between primary and second column RPD ≤ 40%.	Report from both columns. Apply J-flag if RPD > 40%. Discuss in the case narrative.	Analyst Lab QA Officer Project Chemist	Precision - Analytical	QC acceptance criteria specified by DoD QSM v5.0

Table 28.5b: Measurement Performance Criteria for Explosives

Analyte	Soil		Water	
	MS/MSD and LCS/LCSD		MS/MSD and LCS/LCSD	
	%R	RPD	%R	RPD
Explosives (SW8330B)				
1,3,5-TRINITROBENZENE	80-116	20	73-125	20
1,3-DINITROBENZENE	73-119	20	78-120	20
2,4,6-TRINITROTOLUENE	71-120	20	71-123	20
2,4-DINITROTOLUENE	75-121	20	78-120	20
2,6-DINITROTOLUENE	79-117	20	77-127	20
2-AMINO-4,6-DINITROTOLUENE	71-123	20	79-120	20
2-NITROTOLUENE	70-124	20	70-127	20
3-NITROTOLUENE	67-129	20	73-125	20
4-AMINO-2,6-DINITROTOLUENE	64-127	20	76-125	20
4-NITROTOLUENE	71-124	20	71-127	20
HMX	74-124	20	65-135	20
NITROBENZENE	67-129	20	65-134	20
NITROGLYCERIN	73-124	20	74-127	20
PETN	72-128	20	73-127	20
RDX	67-129	20	68-130	20
TETRYL	68-135	20	64-128	20
SURROGATE: 1,2-DINITROBENZENE (S)	78-119		83-119	

QAPP Worksheet #28.6a - APPL QC Samples Table for Chlorinated Pesticides and PCBs

Matrix	**Soil/Water**
Analytical Group	Chlorinated Pesticides and PCBs
Analytical Method/SOP Reference	EPA Method SW8081B, SW8082A / ANA8081, ANA8082
Analytical Organization	APPL Inc.

QC Sample	**Frequency & Number**	**Analytical/Prep Method and SOP QC Acceptance Limits**	**Corrective Action**	**Person(s) Responsible for Corrective Action**	**Data Quality Indicator**	**Measurement Performance Criteria**
Method Blank (MB)	One per preparatory batch.	No analytes detected > 1/2 LOQ or > 1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater.	Correct problem. If required, reprep and reanalyze MB and all samples processed with the contaminated blank. If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply B-flag to all results for the specific analyte(s) in all samples in the associated preparatory batch.	Analyst Lab QA Officer Project Chemist	Accuracy / Sensitivity	All target analytes ≤ 1/2 laboratory LOQ, For common laboratory contaminants, no analytes detected > LOQ
Laboratory Control Sample (LCS)	One per preparatory batch.	A laboratory must use the QSM v5.0 Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	Correct problem, then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available.	Analyst Lab QA Officer Project Chemist	Accuracy / Precision - Analytical	QC acceptance criteria specified by DoD QSM v5.0
Matrix Spike (MS)	One per preparatory batch.	A laboratory must use the QSM v5.0 Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	Examine the project- specific requirements. Contact the client as to additional measures to be taken.	Analyst Lab QA Officer Project Chemist	Precision - Analytical	For matrix evaluation, use QC acceptance criteria specified by DoD QSM v5.0
Matrix Spike Duplicate (MSD) or	One per preparatory batch.	A laboratory must use the QSM v5.0 Appendix C Limits for batch control if project limits are not	Examine the project- specific requirements. Contact the client as to additional measures to be	Analyst Lab QA Officer Project Chemist	Precision - Analytical	For matrix evaluation, use QC acceptance criteria specified by

Matrix Duplicate (MD)		specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified. RPD ≤ 30% (between MS and MSD or sample and MD).	taken.			DoD QSM v5.0
Surrogate Spike	All field and QC samples.	QC acceptance criteria specified by the project, if available; otherwise use QSM v5.0 Appendix C limits or in-house LCS limits if analyte(s) are not listed.	Correct problem, then reprep and reanalyze all failed samples for all surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference with surrogate is present, reanalysis may not be necessary.	Analyst Lab QA Officer Project Chemist	Accuracy	QC acceptance criteria specified by DoD QSM v5.0
Confirmation of positive results (second column)	All positive results must be confirmed	Calibration and QC criteria for second column are the same as for initial or primary column analysis. Results between primary and secondary column RPD ≤ 40%.	Apply J-flag if RPD > 40%. Discuss in the case narrative.	Analyst Lab QA Officer Project Chemist	Accuracy	Results between primary and secondary column RPD ≤ 40%.

Table 28.6b: Measurement Performance Criteria for Chlorinated Pesticides and PCBs

	Soil		Water	
	MS/MSD and LCS/LCSD		MS/MSD and LCS/LCSD	
Analyte	**%R**	**RPD**	**%R**	**RPD**
Chlorinated Pesticides (SW8081A)				
4,4'-DDD	56-139	30	56-143	30
4,4'-DDE	56-134	30	57-135	30
4,4'-DDT	50-141	30	51-143	30
ALDRIN	45-136	30	45-134	30
ALPHA-BHC	45-137	30	54-138	30
ALPHA-CHLORDANE	54-133	30	60-129	30
BETA-BHC	50-136	30	56-136	30
DELTA-BHC	47-139	30	52-142	30
DIELDRIN	56-136	30	60-136	30
ENDOSULFAN I	53-132	30	62-126	30
ENDOSULFAN II	53-134	30	52-135	30
ENDOSULFAN SULFATE	55-136	30	62-133	30
ENDRIN	57-140	30	60-138	30
ENDRIN ALDEHYDE	35-137	30	51-132	30
ENDRIN KETONE	55-136	30	58-134	30
GAMMA-BHC	49-135	30	59-134	30
GAMMA-CHLORDANE	53-135	30	56-136	30
HEPTACHLOR	47-136	30	54-130	30
HEPTACHLOR EPOXIDE	52-136	30	61-133	30

	Soil		**Water**	
	MS/MSD and LCS/LCSD		**MS/MSD and LCS/LCSD**	
Analyte	**%R**	**RPD**	**%R**	**RPD**
METHOXYCHLOR	52-143	30	54-145	30
TOXAPHENE	33-141	30	33-134	30
SURROGATE: TCMX (S)	42-129	NA	44-124	NA
SURROGATE: DECACHLOROBIPHENYL (S)	55-130	NA	30-135	NA
PCBs (SW8082A)				
AROCLOR 1016	47-134	30	46-129	30
AROCLOR 1260	53-140	30	45-134	30
SURROGATE: DECACHLOROBIPHENYL (S) *	60-125	NA	40-135	NA

* Tetrachloro-m-xylene is included in the DoD QSM v5.0 Appendix C Table 17- Method 8082 Solid Matrix. This surrogate is applicable to EPA Method 8081 only as it coelutes with PCB compounds. The surrogate used will be Decachlorobiphenyl. The DoD QSM v5.0 Appendix C Tables 17 and 18 provide LCS control limits for Aroclors 1016, 1254 and 1260. Per the method criteria, only Aroclors 1016 and 1260 will be used in Laboratory Control Spikes.

QAPP Worksheet #28.7a - APPL QC Samples Table for Perchlorate

Matrix	SOIL/WATER
Analytical Group	Perchlorate
Analytical Method/SOP Reference	EPA Method 6850 / HPL6850
Analytical Organization	APPL Inc.

QC Sample	**Frequency & Number**	**Analytical/Prep Method and SOP QC Acceptance Limits**	**Corrective Action**	**Person(s) Responsible for Corrective Action**	**Data Quality Indicator**	**Measurement Performance Criteria**
Laboratory Reagent Blank (LRB)	Prior to calibration and at the end of the analytical sequence.	No perchlorate detected > ½ LOQ.	Reanalyze reagent blank (until no carryover is observed) and all samples processed since the contaminated blank.	Analyst Lab QA Officer Project Chemist	Accuracy/Bias Contamination	No perchlorate detected > ½ LOQ
Method Blank (MB)	One per preparatory batch.	No analytes detected > 1/2 LOQ or > 1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater.	Correct problem. Reprep and reanalyze method blank and all samples processed with the contaminated blank. Flagging is only appropriate in cases where the samples cannot be reanalyzed.	Analyst Lab QA Officer Project Chemist	Accuracy / Sensitivity	All target analytes ≤ 1/2 laboratory LOQ, For common laboratory contaminants, no analytes detected > LOQ
Laboratory Control Sample (LCS)	One per preparatory batch.	LCS must be spiked at the LOQ. A laboratory must use the QSM v5.0 Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	Correct problem. Reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available.	Analyst Lab QA Officer Project Chemist	Accuracy / Precision - Analytical	QC acceptance criteria specified by DoD QSM v5.0
Matrix Spike (MS)	One per preparatory batch per	The MS must be spiked at the LOQ. A laboratory must use the QSM	Examine the project specific requirements. Contact the client as to additional	Analyst Lab QA Officer Project Chemist	Precision - Analytical	For matrix evaluation, use QC acceptance criteria specified by DoD QSM v5.0

	matrix.	v5.0 Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	measures to be taken.			
Matrix Spike Duplicate (MSD) or Laboratory Duplicate (LD)	One per preparatory batch per matrix.	The MSD must be spiked at the LOQ. A laboratory must use the QSM Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified. MSD or MD: RPD of all analytes ≤ 15% (between MS and MSD or sample and MD).	Examine the project specific requirements. Contact the client as to additional measures to be taken.	Analyst Lab QA Officer Project Chemist	Precision - Analytical	For matrix evaluation, use QC acceptance criteria specified by DoD QSM v5.0
Internal Standard (IS)	Addition of ^{18}O-labeled perchlorate to every sample, batch QC sample, standard, instrument blank, and method blank.	Measured ^{18}O IS area within ± 50% of the value from the average of the IS area counts of the ICAL. RRT of the perchlorate ion must be 1.0 ± 2% (0.98 – 1.02).	Rerun the sample at increasing dilutions until the ± 50% acceptance criteria are met. If criteria cannot be met with dilution, the interference is suspected and the sample must be re- prepped using additional pretreatment steps.	Analyst Lab QA Officer Project Chemist	Accuracy	QC acceptance criteria specified by DoD QSM v5.0
Isotope Ratio ^{35}Cl/^{37}Cl	Every sample, batch QC sample, and standard.	Monitor for either the parent ion at masses 99/101 or the daughter ion at masses 83/85 depending on which ions	If criteria are not met, the sample must be rerun. If the sample was not pretreated, the sample must be re-extracted using cleanup	Analyst Lab QA Officer Project Chemist	Accuracy	QC acceptance criteria specified by DoD QSM v5.0

		are quantitated. Must fall within 2.3 to 3.8.	procedures. If, after cleanup, the ratio still fails, use alternative techniques to confirm presence of perchlorate, e.g., a post spike sample or dilution to reduce any interference.			

Table 28.7b: Measurement Performance Criteria for Perchlorate

	Soil		**Water**	
	MS/MSD and LCS/LCSD		**MS/MSD and LCS/LCSD**	
Analyte	**%R**	**RPD**	**%R**	**RPD**
Perchlorate (6850)				
Perchlorate	84-121	15	84-119	15

QAPP Worksheet #28.8a - APPL QC Samples Table for Cyanide

Matrix	**Soil/Water**
Analytical Group	Cyanide
Analytical Method/SOP Reference	EPA 9010C/9014 / ANA9010C/9014
Analytical Organization	APPL Inc.

QC Sample	**Frequency & Number**	**Analytical/Prep Method and SOP QC Acceptance Limits**	**Corrective Action**	**Person(s) Responsible for Corrective Action**	**Data Quality Indicator**	**Measurement Performance Criteria**
Method blank	One per preparatory batch of up to 20 samples.	No analytes detected > 1/2 LOQ or > 1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater.	Correct problem. If required, reprep and reanalyze method blank and all samples processed with the contaminated blank.	Analyst Lab QA Officer Project Chemist	Sensitivity/ Bias	No analytes detected > 1/2 LOQ or > 1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater.
LCS	One per preparatory batch of up to 20 samples.	A laboratory must use the QSM v5.0 Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	Correct problem, then re- rep and reanalyze the LCS and all samples in the associated preparatory batch, if sufficient sample material is available..	Analyst Lab QA Officer Project Chemist	Accuracy/ Precision	QC acceptance criteria specified by DoD QSM v5.0
MS	One per preparatory batch of up to 20 samples.	A laboratory must use the QSM v5.0 Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	Examine the project- specific requirements. Contact the client as to additional measures to be taken.	Analyst Lab QA Officer Project Chemist	Accuracy/ Precision	For matrix evaluation, use QC acceptance criteria specified by DoD QSM v5.0
Sample Duplicate or Matrix Spike Duplicate	One per preparatory batch of up to 20 samples.	A laboratory must use the QSM Appendix C Limits for batch control if project limits are not specified.	Examine the project- specific requirements. Contact the client as to additional measures to be taken.	Analyst Lab QA Officer Project Chemist	Accuracy/ Precision	For matrix evaluation, use QC acceptance criteria specified by DoD QSM v5.0

		If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified. MSD or MD: RPD of all analytes ≤ 20% (between MS and MSD or sample and MD).				

Table 28.8b: Measurement Performance Criteria for Cynaide

		Soil		Water	
		MS/MSD and LCS/LCSD		MS/MSD and LCS/LCSD	
Analyte	**CAS No.**	**%R**	**RPD**	**%R**	**RPD**
Cyanide (EPA 9010C/9014)					
CYANIDE		76-120	20	83-116	20

QAPP Worksheet #28.10a - APPL QC Samples Table for Anions

Matrix		**Soil/Water**				
Analytical Group		Anions				
Analytical Method/SOP Reference		EPA Method 300.0 / HPL9056				
Analytical Organization		APPL Inc.				
QC Sample	**Frequency & Number**	**Analytical/Prep Method and SOP QC Acceptance Limits**	**Corrective Action**	**Person(s) Responsible for Corrective Action**	**Data Quality Indicator**	**Measurement Performance Criteria**
Method blank	One per preparatory batch of up to 20 samples.	No analytes detected > 1/2 LOQ or > 1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater.	Correct problem. If required, reprep and reanalyze MB and all samples processed with the contaminated blank. If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply B-flag to all results for the specific analyte(s) in all samples in the associated preparatory batch.	Analyst Lab QA Officer Project Chemist	Sensitivity/ Bias	No analytes detected > 1/2 LOQ or > 1/10 the amount measured in any sample or 1/10 the regulatory limit
LCS	One per preparatory batch of up to 20 samples.	A laboratory must use the QSM v5.0 Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	Correct problem, then reprep and reanalyze the LCS and all samples in the associated batch for failed analytes, if sufficient material is available.	Analyst Lab QA Officer Project Chemist	Accuracy/ Precision	QC acceptance criteria specified by DoD QSM v5.0
Matrix Spike (MS)	One per preparatory batch of up to	A laboratory must use the QSM v5.0 Appendix C Limits for batch control if project limits	Follow project specific requirements. Contact the client as to additional measures to be taken.	Analyst Lab QA Officer Project Chemist	Accuracy/ Precision	QC acceptance criteria specified by DoD QSM v5.0

	20 samples.	are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.				
Matrix Spike Duplicate (MSD) or Matrix Duplicate (MD)	One per every 10 samples.	A laboratory must use the QSM v5.0 Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified. MSD or MD: RPD of all analytes ≤ 15% (between MS and MSD or sample and MD).	Correct problem and reanalyze sample and duplicate.	Analyst Lab QA Officer Project Chemist	Accuracy/ Precision	QC acceptance criteria specified by DoD QSM v5.0

Table 28.10b: Measurement Performance Criteria for Anions

	Soil		**Water**	
	MS/MSD and LCS/LCSD		**MS/MSD and LCS/LCSD**	
Analyte	**%R**	**RPD**	**%R**	**RPD**
Anions (EPA 300.0)				
FLUORIDE	87-111	15	88-112	15

QAPP Worksheet #28.11a – TestAmerica QC Samples Table for Iodide

Matrix: Soil

Analytical Group: Iodide

Analytical Method: SW846 9056A

Analytical Organization: TestAmerica -St. LouisQC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits¹	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1/Batch (20 samples)	>½ LOQ	Identify and correct problem. If necessary, re-prepare and analyze method blank and the samples processed with the contaminated blank.	Analyst / Section Supervisor	Accuracy/Bias-Contamination	No Target Compounds >1/2 LOQ
Laboratory Control Sample (LCS)	1/Batch (20 samples)	Acceptance criteria: 80-120 % recovery	Identify and correct problem, then reanalyze. If %R is still out, re-prepare and reanalyze the LCS and the samples in the affected batch.	Analyst / Section Supervisor	Accuracy/Bias	QC acceptance criteria
Sample Duplicate	1/Batch (20 samples)	Acceptance criteria: 15% RPD	Assess data to determine whether there is a matrix effect or analytical error. Evaluate LCS for failed target analytes. Potential matrix effects should be discussed in the report narrative. Outliers will be flagged on data sheets.	Analyst / Section Supervisor	Precision	QC acceptance criteria
Matrix Spike	1/Batch (20 samples)	Acceptance criteria: 80-120 % recovery	Assess data to determine whether there is a matrix effect or analytical error. Evaluate LCS for failed target analytes. Potential matrix effects should be discussed in the report narrative. Outliers will be flagged on data sheets.	Analyst / Section Supervisor	Accuracy/Bias	QC acceptance criteria

QAPP Worksheet #28.12a - TestAmerica QC Samples Table for Metals

Matrix: Soil

Analytical Group: Metals (Tellurium and Zirconium)

Analytical Method: SW846 6020A

Analytical Organization: TestAmerica-St. Louis

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits¹	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method blank	One per preparation batch	No target analytes detected greater than one-half RL and 1/10 the amount measured in any sample or 1/10 regulatory limit (whichever is greater). No laboratory common contaminants detected greater than RL.	Correct problem, then re-reanalyze method blank and all samples processed with the contaminated blank	Lab Manager/ Analyst	Representativeness	Acceptable results per stated QC Acceptance Limits
Laboratory Control Sample (LCS)	One LCS per analytical batch	Acceptance criteria: Te: 75-125 %Recovery; Zr: 80-120 %Recovery	Identify and correct problem, then reanalyze. If %R is still out, re-prepare and reanalyze the LCS and the samples in the affected batch.	Lab Manager/ Analyst	Accuracy/Bias	QC acceptance criteria
Matrix Spike/ Matrix Spike Duplicate	1/Batch (20 samples)	Acceptance criteria: Te: 75-125 %Recovery; Zr: 80-120 %Recovery 20% RPD	Assess data to determine whether there is a matrix effect or analytical error. Evaluate LCS for failed target analytes. Potential matrix effects should be discussed in the report narrative. Outliers will be flagged on data sheets.	Lab Manager/ Analyst	Accuracy/Bias	QC acceptance criteria

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits[1]	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Initial and Continuing Calibration Blank	Before beginning a sample run, after every 10 samples, and at end of the analysis sequence	No analytes detected > 2 × MDL	Any sample associated with a blank that fails the criteria checks will be reprocessed in a subsequent preparation batch, except when the sample analysis resulted in a non-detect. If no sample volume remains for reprocessing, the results will be reported with appropriate data qualifying codes.	Lab Manager/ Analyst	Accuracy	No analytes detected > 2 × MDL
Serial dilution	Each new sample matrix	1:5 dilution must agree within ±10% of original determination.	Perform post-digestion spike if serial diltion does not meet criteria	Lab Manager/ Analyst	Accuracy	1:5 dilution must agree within ±10% of original determination.
Post-digestion spike	When serial dilution or matrix spike fails	Recovery within 80-120%	Re-analyze post-digestion spike.	Lab Manager/ Analyst	Accuracy	Recovery within 80-120%

QAPP Worksheet #28.13a - APPL QC Samples Table for pH

Matrix	**Soil/Water**					
Analytical Group	pH					
Analytical Method/SOP Reference	EPA Method 9040C, 9045D / ANA9040C, ANA9045					
Analytical Organization	APPL Inc.					
QC Sample	**Frequency & Number**	**Analytical/Prep Method and SOP QC Acceptance Limits**	**Corrective Action**	**Person(s) Responsible for Corrective Action**	**Data Quality Indicator**	**Measurement Performance Criteria**
Sample duplicate (replicate)	One per every 10 samples.	%D ≤ 3% (between sample and sample duplicate).	Correct problem and reanalyze sample and duplicate.	Analyst Lab QA Officer Project Chemist	Accuracy/ Precision	QC acceptance criteria specified by DoD QSM 5.0

Table 28.13b: Measurement Performance Criteria for pH

	Soil		**Water**	
	MS/MSD and LCS/LCSD		**MS/MSD and LCS/LCSD**	
Analyte	**%R**	**RPD**	**%R**	**RPD**
pH (EPA 9040C, 9045D)				
pH	NA	NA	NA	NA

QAPP Worksheet #28.14a – ALS Kelso QC Samples Table for Flashpoint / Ignitability

Matrix	**Water**
Analytical Group	Flashpoint/ Ignitability
Analytical Method/SOP Reference	EPA 1020A / GEN-120
Analytical Organization	ALS-Kelso

QC Sample	Frequency & Number	Analytical/Prep Method and SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator	Measurement Performance Criteria
Method blank	One per preparatory batch of up to 20 samples.	No flash below 110ºC	Correct problem, then reprep and reanalyze the MB and all samples in the associated batch for failed analytes.	Analyst Lab QA Officer Project Chemist	Sensitivity/ Bias	No flash below 110ºC
Sample Duplicate	One per every 10 samples.	RPD ≤ 20%	Correct problem and reanalyze sample and duplicate.	Analyst Lab QA Officer Project Chemist	Accuracy/ Precision	RPD ≤ 20%

QAPP Worksheet #28.15a - ECBC QC Samples Table for CA / ABPs

Matrix	**Soil/Water**
Analytical Group	CA/ABPs
Analytical Method/SOP Reference	IOP-MT-08, IOP-MT-57
Analytical Organization	ECBC

QC Sample	Frequency & Number	Analytical/Prep Method and SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator	Measurement Performance Criteria
Method Blank	One per preparation batch of at most 20 samples	No target compounds > ½ LOQ	Re-extract or re-analyze samples associated with the MB	Analyst Lab QA Officer	Accuracy/Bias, Representativeness	No target compounds > ½ LOQ
Surrogate	All field and QC samples	Lab-derived control limits as seen in the table below.	Correct problem, then re-extract and reanalyze sample. If obvious chromatographic interference with surrogate is present, reanalysis may not be necessary. Document all unresolved surrogate failures in case narrative.	Analyst Lab QA Officer	Accuracy/Bias	Lab-derived control limits
Internal standard (IS)	Every field sample, standard and QC sample.	Retention time within ± 10 seconds from retention time of the midpoint standard in the ICAL; EICP area within - 50% to +100% of ICAL midpoint standard.	Inspect mass spectrometer and GC for malfunctions and correct problem. Reanalysis of samples analyzed while system was malfunctioning is mandatory.	Analyst Lab QA Officer	Accuracy/Bias, Representativeness	Retention time within ± 10 seconds from retention time of the midpoint standard in the ICAL; EICP area within - 50% to +100% of ICAL midpoint standard
LCS	One per preparation batch of at most 20 samples	Lab-derived control limits as seen in the table below	Correct problem, then reanalyze. If still out, reprep and reanalyze the LCS and all samples in the affected batch	Analyst Lab QA Officer	Precision/Accuracy	Lab-derived control limits (limits updated annually at a minimum)
MS/MSD	One per batch of at most 20	Lab-derived control limits as seen in the table below	Assess data to determine whether there is a matrix effect	Analyst Lab QA Officer	Precision/Accuracy	Lab-derived control limits

	samples		or analytical error. Analyze LCS for failed target analytes. Potential matrix effects should be communicated to the prime contractor.			

QAPP Worksheet #28.15b – ECBC Recovery & Precision Limits[1] for CA / ABPs

Matrix: Soil
Analytical Group: CA/ABPs

Analyte	Precision (RPD)	Recovery Limits (LCS/MS/MSD)
Mustard (HD)	27	73-126
Lewisite (CVAA, CVAO)	48	43-161
1,4-Dithiane	23	76-135
1,4-Thioxane	23	75-129
Thiodiglycol	48	54-132
BFB (Surrogate)	NA	84-115

[1] *Recovery and precision limits are the laboratory historical control limits. Laboratory historical control limits are subject to change as a result of periodic re-evaluation. Limits in use at the time of sample analysis are available from the laboratory.*

NA = Not applicable

QAPP Worksheet #29 - Project Documents and Records Table

Sample Collection Documents and Records	On-site Analysis Documents and Records	Off-site Analysis Documents and Records	Data Assessment Documents and Records
Field notes	Sample receipt, custody, and tracking records	Sample receipt, custody, and tracking records	Data validation reports
Chain-of-Custody Records	Standards traceability information	Standards traceability information	
Air bills	Equipment calibration information	Equipment calibration information	
Custody seals	Equipment maintenance, testing, and inspection information/records	Sample preparation logs/records	
Telephone logs	Correction action information/records	Analysis run logs, equipment maintenance, testing, and inspection records	
Corrective Action Records	Project communication records/information	Corrective action records	
		Sample analysis data and documentation	
		Analysis data and documentation for standards, QA/QC procedures and checks, QC sample analyses Instrument printouts/raw data for field samples, standards, QC checks, and QC samples	
		Data package completeness checklists. Sample disposal records	
		Telephone communication records	
		Raw data storage	SEDD/EDDs

QAPP Worksheet #30 - Analytical Services Table

Matrix	Analytical Group	Sample Location/ID Numbers	Analytical SOP	Standard Data Package Turnaround Time	Laboratory/Organization (Name and Address, Contact Person and Telephone Number)
Soil	VOCs + top 20 TICs	To be Determined (TBD)	See Worksheet #23	21 days	APPL, Inc.908 North Temperance Ave. Clovis, CA 93611
Soil	SVOCs + top 20 TICs	TBD	See Worksheet #23	21 days	
Soil	Explosives	TBD	See Worksheet #23	21 days	
Soil	Pesticides/PCBs	TBD	See Worksheet #23	21 days	
Soil	Metals	TBD	See Worksheet #23	21 days	APPL Inc. and TA-St. Louis (TA will analyze Tellurium and Zirconium in soil samples only)
Soil	Total Cyanide	TBD	See Worksheet #23	21 days	
Soil	Perchlorate	TBD	See Worksheet #23	21 days	
Soil	Iodide	TBD	See Worksheet #23	21 days	TA-St. Louis
Soil	Fluoride	TBD	See Worksheet #23	21 days	
Soil/Water	Waste Characterization Parameters*	TBD	See Worksheet #23	21 days	APPL and ALS-Kelso (ALS-Kelso will run Ignitability test for IDW water samples only)

*Waste characterization for soil and water samples include TCLP-VOC, TCLP-SVOC, TCLP-metals, Corrosivity, and Ignitability

QAPP Worksheet #30 - Analytical Services Table (*continued*)

Matrix	Analytical Group	Sample Location/ID Numbers	Analytical SOP	Standard Data Package Turnaround Time	Laboratory/Organization (Name and Address, Contact Person and Telephone Number)
Soil/Water	CA/ABPs	TBD	See Worksheet #23	Clearance Report will be issued in 24 - 48 hours and raw data provided weekly.	US Army Edgewood Chemical and Biological Center (ECBC) ATTN: RDCB-DPO-ML (John Schwarz/Building E3330 Room 184) 5183 Blackhawk RD, Gunpowder, MD 21010-5424 phone: 410.436.2150 fax: 410.436.2969

QAPP Worksheet #31 - Planned Project Assessments Table

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment[1]	Person(s) Responsible for Responding to Assessment Findings[1]	Person(s) Responsible for Identifying and Implementing Corrective Action (CA)[1]	Person(s) Responsible for Monitoring Effectiveness of CA[1]
Field Record Verification	As Needed	Internal	Parsons	Sean Buckley Project Manager, Parsons	Sean Buckley, Project Manager, Parsons	Sean Buckley, Project Manager, Parsons	Sean Buckley, Project Manager, Parsons
Laboratory Internal Data Review	Every data package	Internal	APPL	Frances Lediaev, QA Manager, APPL	Frances Lediaev, QA Manager, APPL	Diane Anderson, Project Manager, APPL	Frances Lediaev, QA Manager, APPL
		Internal	ECBC	Jill Meuser, QA Manager, ECBC	Jill Meuser, QA Manager, ECBC	John Schwarz, Lab Manager, ECBC	Jill Meuser, QA Manager, ECBC
Laboratory Data Validation	Every data package	Internal	Parsons	Tammy Chang, Project Chemist, Parsons	Tammy Chang, Project Chemist, Parsons	Tammy Chang, Project Chemist, Parsons	Tammy Chang, Project Chemist, Parsons

[1] List Title and Organizational Affiliation

QAPP Worksheet #32 - Assessment Findings and Corrective Action Responses

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings (Name, Title, Organization)	Time frame of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response (Name, Title, Org.)	Time frame for Response
Field Record Verification	Corrective Action QC Form (Appendix F, Forms)	Sean Buckley, Project Manager, Parsons James Salisbury, Technical Director, Parsons Parsons Field Team Members	2 business days	Corrective Action QC Form (Appendix F, Forms)	Sean Buckley, Project Manager, Parsons	2 business days
Laboratory Analysis Data Verification	Data Packages	Sean Buckley, Project Manager, Parsons Tammy Chang, Project Chemist, Parsons Diane Anderson, Project Manager, APPL John Schwarz, Lab Manager, ECBC	2 business days	Corrective Action QC Form (Appendix F, Forms)	Sean Buckley, Project Manager, Parsons Tammy Chang, Project Chemist, Parsons	2 business days

QAPP Worksheet #33 - QA Management Reports Table

Type of Report	Frequency (daily, weekly, monthly, quarterly, annually, etc.)	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation (Title and Organizational Affiliation)	Report Recipient(s) (Title and Organizational Affiliation)
Field Activity Report	Daily when there are field activities	Next business day	Parsons Site Manager	Parsons Project Manager and Project Chemist
Daily Quality Control Report (DQCR)	Daily when there is sample collected or shipped	Next business day	Parsons Site Manager and Parsons Field Team Leader	Parsons Project Manager, Project Chemist, and Project Quality Control Manager
Laboratory Data Validation Report*	Each data package	Upon completion of field work	Parsons Project Chemist	Parsons Project Manager, Project Chemist, and Project Quality Control Manager

*Report will be provided to the client in final report.

QAPP Worksheet #34 - Verification (Step I) Process Table

Verification Input	Description	Internal/External	Responsible for Verification (Name, Organization)
Chain of custody and shipping forms	Chain of custody (COC) forms and shipping documentation will be reviewed internally upon their completion and verified against the packed sample coolers they represent. See COC procedures on Worksheet #27 for further details.	I E	Tammy Chang, Parsons Diane Anderson (APPL) John Schwarz (ECBC
Field Notes	Field Notes will be reviewed internally and retained in the project file.	I	Joe Kaputa, Parsons
Laboratory data	All laboratory data packages will be verified internally by the laboratory performing the work for completeness and technical accuracy prior to submittal.	E	Diane Anderson (APPL) John Schwarz (ECBC
			John Schwarz, ECBC
	All received data packages will be verified internally according to the data review and validation procedures specified in Worksheet #35.	I	Tammy Chang, Parsons Beth Driskill, Parsons

QAPP Worksheet #35 - Validation (Steps IIa and IIb) Process Table

Step IIa/IIb	**Verification Input**	**Description**	**Responsible for Verification (Name, Organization)**
IIa	SOPs	Ensure that all sampling and analytical SOPs were followed.	Tammy Chang, Parsons Beth Driskill, Parsons
IIa	Documentation of method QC results	Establish that all method required QC samples were run and met required limits.	Tammy Chang, Parsons Beth Driskill, Parsons
IIb	Documentation of QAPP QC Sample Results	All sample results met the project quantitation limit specified in the QAPP.	Tammy Chang, Parsons Beth Driskill, Parsons
IIb	Project Limits of Quantitation (LOQ)	Comparing the LOQ listed in the data packages vs QAPP, considering all dilution factors, if involved	Tammy Chang, Parsons Beth Driskill, Parsons

QAPP Worksheet #36 - Analytical Data Validation (Steps IIa and IIb) Summary

Step IIa/IIb	Matrix	Analytical Group	Concentration Level	Validation Criteria	Data Validator (title and organizational affiliation)
IIa/IIb	Soil	Inorganics-Metals	Low	(1) DoD QSM version 5.0; (2) UFP-QAPP; and (3) Laboratory SOPs	Tammy Chang, Project Chemist, Parsons or designee
IIa/IIb	Soil	Inorganics-Total cyanide	Low		
IIa/IIb	Soil	Inorganics-Perchlorate	Low		
IIa/IIb	Soil	Inorganics-Iodide	Low		
IIa/IIb	Soil	Inorganics-Fluoride	Low		
IIa/IIb	Soil	Organics-VOCs	Low		
IIa/IIb	Soil	Organics-SVOCs	Low		
IIa/IIb	Soil	Organics-Explosives	Low		
IIa/IIb	Soil	Organics - Pesticides/PCBs	Low		
IIa/IIb	Soil	Organics-CA/ABPs	Low		

QAPP Worksheet #37 - Usability Assessment

Summarize the usability assessment process and all procedures, including interim steps and any statistics, equations, and computer algorithms that will be used:

Precision

Precision is the measure of variability among individual sample measurements under prescribed conditions. The relative percent difference (RPD) between primary and field duplicate samples, laboratory sample duplicate (SD) pairs, and matrix spike/matrix spike duplicate (MS/MSD) sample results demonstrate the precision of the sample matrix. When the LCS results meet the accuracy criteria listed in this QAPP, results are also believed to be precise, and represent the precision of the laboratory, independent from sample matrix. This is based on the LCS being within control limits in comparison to LCS results from previous analytical batches of similar methods and matrices. Precision will be expressed in terms of RPD between the values resulting from primary and duplicate sample analyses. RPD is calculated as follows:

$RPD = [\ |(x_1 - x_2)\ |\ /\ \bar{x}\ ][100]$

where:

x_1 = analyte concentration in the primary sample,

x_2 = analyte concentration in the duplicate sample, and

$\bar{x}$ = average analyte concentration of the primary and the duplicate sample.

Acceptable levels of precision will vary according to the sample matrix, the specific analytical method, and the analytical concentration relative to the method detection limit (MDL). For field duplicate samples, the target RPDs are ≤ 50 percent for soil. An RPD within the control limit indicates satisfactory precision in a measurement system.

Accuracy

Accuracy is a measure of the closeness of a reported concentration to the true value. Accuracy is expressed as a bias (high or low) and is determined by calculating percent recovery (%R) from MS/MSDs, LCSs, and surrogate spikes (where applicable). MS/MSD and surrogate spike recoveries indicate accuracy relevant to a unique sample matrix. LCS recoveries indicate accuracy relevant to an analytical batch lot, and are strictly a measure of accuracy conditions in preparation and analysis independent of samples and matrices. The %R of an analyte, and the resulting degree of accuracy expected for the analysis of spiked samples for QC, are dependent upon the sample matrix, method of analysis, dilution (if required) and the compound or element being measured. Accuracy expressed as %R is calculated as follows:

$\%R = [(A-B)/C] \times 100$

Where:

A = spiked sample concentration,

B = measured sample concentration (without spike), and

C = concentration of spike added.

Accuracy criteria for the laboratory are defined by control limits listed in Worksheets 28.

QAPP Worksheet #37 - Usability Assessment (*continued*)

Completeness

Completeness is defined as the percentage of laboratory measurements judged to be valid on a method-by-method basis. In addition to valid results (data not rejected), broken and/or spilled samples, and any other problems that may compromise sample representativeness are included in the assessment of completeness. Valid data are defined as all data and/or qualified data considered to meet the DQOs for this project. Data completeness is expressed as percent complete (PC) and should be ≥ 95 percent. The goal for meeting analytical holding times is 100 percent. At the end of each sampling event, the completeness of the data will be assessed. If any data omissions are apparent, the parameter in question will be resampled and/or reanalyzed, if feasible. Laboratory results will be monitored as they become available to assess laboratory performance and its effect on data completeness requirements.

PC is calculated as follows:

$$PC = [N_A/N_I] \times 100$$

Where:

N_A = Actual number of valid analytical results obtained, and

N_I = Theoretical number of results obtainable under ideal conditions.

Comparability

Comparability expresses the confidence with which data from one sample, sampling round, site, laboratory, or project can be compared to those from another. Comparability during sampling is dependent upon sampling program design and time periods. Comparability during analysis is dependent upon analytical methods, detection limits, laboratories, units of measure, and sample preparation procedures. Comparability is determined on a qualitative rather than quantitative basis. For this project, comparability of all data collected will be ensured by adherence to standard sample collection procedures, standard field measurement procedures, and standard reporting methods, including consistent units. For example, concentrations will be reported in a manner consistent with general industry practice (e.g., soil data will be reported on a dry-weight basis). In addition, to support the comparability of fixed-base laboratory analytical results with those obtained from previous or future testing, all samples will be analyzed by USEPA-approved methods, where available. The USEPA-recommended maximum permissible sample holding times (Worksheet #19) for organic and inorganic parameters will not be exceeded. All analytical standards will be traceable to standard reference materials. Instrument calibrations will be performed in accordance with USEPA method specifications, and will be checked at the frequency specified for the methods. The results of these analyses can then be compared to analyses by other laboratories and/or to analyses for other sites addressed by this investigation.

Representativeness

Representativeness expresses the extent to which collected data define site contamination. Where appropriate, sample results will be statistically characterized to determine the degree to which the data accurately and precisely represent a characteristic of a population, parameter variation at a sampling point, a process, or an environmental condition. Sample collection, handling, preservation, and analytical procedures are designed to obtain the most representative sample possible.

QAPP Worksheet #37 - Usability Assessment (*continued*)

Representative samples will be achieved by the following:

- Collection of samples from locations representing site conditions;
- Use of appropriate sample preservation techniques;
- Use of appropriate sampling procedures, including proper equipment;
- Use of appropriate analytical methods for the required parameters and LOQs; and,
- Analysis of samples within the required holding times.

Sample representativeness is also affected by the portion of each sample chosen for analysis. The laboratory will adequately homogenize all samples prior to taking aliquots for analysis to ensure that the reported results are representative of the sample received.

Sensitivity

The concentration of any one target compound that can be detected and/or quantified is a measure of sensitivity for that compound. Sensitivity is instrument-, compound-, method-, and matrix-specific. The subcontract laboratory will flag (as an estimate, “J” flag) and report target compounds detected below the Limit of Quantitation down to the DL in an effort to meet applicable project decision-making criteria (e.g., USEPA [2015] Regional Screening Levels [RSLs]). Raw data collected in the field will be verified and included in the final report. Data verification and validation procedures employed during this project will ensure data collected meet project DQOs and assure a reasonable basis for decision making.

Describe the evaluation procedures used to assess overall measurement error associated with the project:

Field and Laboratory Data Verification

Project personnel will verify field data collected during this investigation by reviewing accuracy, precision, and completeness as summarized in Worksheet #34. Errors or inconsistencies will be resolved immediately by clarifying identified issues with appropriate field team members. Field team members will be responsible for following sampling and documentation procedures described in this QAPP. Discrepancies identified during the review of data will be addressed as uncertainty associated with the decision-making process. The following verification criteria must be clearly documented to assure field activity and laboratory data are sufficient and may serve as a legal record.

- Date and time of sample collection (needed to assess holding time compliance and clarifies identification of sample).
- Location of samples, including depth, when appropriate.
- COC documentation to demonstrate sample integrity and to maintain unique sample identity. COC documentation must include a unique sample identification number, sample collection date and time, signatures of persons relinquishing and receiving samples, laboratory name and location, and analyses requested.
- Field QA/QC procedures including field decontamination and field duplicate sample collection. Field QC procedures are required to demonstrate sample integrity.
- Detection limits to ensure proper analyses are performed to meet project action levels.
- Dates of extraction, analysis, and preservation to ensure analyses were performed within holding times.
- Laboratory QA/QC procedures to assess analytical precision and accuracy. Analytical batch QC, calibration check samples, initial and continuing calibrations, corrective action reports, and the results of reanalysis must be analyzed by the laboratory at the appropriate frequencies.

QAPP Worksheet #37 - Usability Assessment (*continued*)

- Non-conformances encountered and corresponding corrective action reports.

Discrepancies and incomplete information identified during data review will be addressed as uncertainty associated with the decision-making process. Laboratory data generated during this investigation will be subject to two types of review. A supervisory-level chemist other than the original data processor will verify analyte identification, quantitation, transcription, and QC data. Each page of checked data will be signed and dated by the verifier. The laboratory PM will work with the laboratory QA/QC manager to review all results, investigate QC trends and outliers, data anomalies, and noncompliance issues. Samples associated with out-of-control QC data will be identified in the data package case narrative, and an assessment of the utility of such analytical results will be made. The laboratory project manager will review each data deliverable package and must ensure that:

- All samples and analyses specified in the COC have been processed;
- Complete records exist for each analysis and the associated QC samples; and
- Procedures specified in this QAPP have been implemented.

Data Validation

Data validation will be performed only on analytical data generated by the fixed laboratory. Data validation will be performed in accordance with the DoD QSM version 5.0.

With the exception of waste characterization samples and geotechnical parameters, 100 percent of the data will be validated at USEPA Level IV. Data validation will be performed in accordance with DoD protocol, laboratory SOPs, and QC criteria specified in this document.

For Level III data validations, the data values for routine and QC samples are generally assumed to be reported correctly by the laboratory. Data quality will be assessed by comparing the QC parameters to the appropriate criteria as specified in this QAPP. If calculations for quantitation are verified, it is done on a limited basis and may required raw data in addition to the standard forms. The Level III validation process includes an evaluation of summary information including:

- Analytical results;
- Holding times;
- Field duplicates;
- Laboratory blanks;
- Surrogate spikes;
- Laboratory duplicates (if applicable);
- MS/MSDs;
- LCSs;
- Initial and continuing calibrations;
- Instrument performance criteria;
- Second-column confirmations;
- COC forms;
- Case narratives; and
- Sample temperatures during shipping and storage.

QAPP Worksheet #37 - Usability Assessment (*continued*)

Level IV follows the protocols and criteria established in DoD QSM 5.0, this UFP-QAPP, and laboratory SOPs. These guidelines apply to full validation data packages that include the raw data (e.g., spectra and chromatograms) and backup documentation of calibration standards, analysis run logs, dilution factors, batch QC data, samples preparation logs, and other types of information. This additional information is used for checking calculations for quantified analytical data in the full data validation process. Calculations are checked for laboratory QC samples (e.g., LCS and MS/MSD data) and routine field samples (including field duplicates). To assure that detection limit and data values are appropriate, and evaluation is made of instrument performance, method of calibration, and the original data for calibration standards. A Level IV validation includes a Level III validation plus a review of analytical raw data and calculation checks. Data qualifiers are applied to analytical results during the data validation process, based on adherence to method protocols and QA/QC limits. Analytical data may be qualified based on data validation reviews. Data validation results will be evaluated with respect to the attached qualifiers to determine data usability issues, if any. The following qualifiers may be assigned during the validation process.

B - The analyte was detected in the blank and the associated sample result was <5 x blank conc or <10 x blank conc for common lab contaminants.
J - The analyte was analyzed for and was positively identified, but the associated numerical value may not be consistent with the amount actually present in the environmental sample. The data should be considered as a basis for decision making and are usable for many purposes.
K - Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L - Analyte present. Reported value may be biased low. Actual value is expected to be higher.
R - The data are rejected as unusable for all purposes due to serious deficiencies in meeting QC criteria. Re-sampling and reanalysis are necessary to confirm the presence or absence of the analyte.
U - The analyte was analyzed for and is not present above the reported sample quantitation limit.
UJ - The analyte analyzed for was not present above the reported sample quantitation limit. The associated numerical value may not accurately or precisely represent the concentration necessary to detect the analyte in the sample.
UK - Not detected, quantitation limit is probably lower.
UL - Not detected, quantitation limit is probably higher.
N - Indicates presumptive evidence of the presence of a compound
J - Indicates an estimated value
Where the validation qualifiers impact the overall data interpretation and project recommendations, the report will discuss the issue and the necessary corrective action.

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Describe the evaluation procedures used to assess overall measurement error associated with the project:

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- Date and time of sample collection (needed to assess holding time compliance and clarifies identification of sample).
- Location of samples, including depth, when appropriate.
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QAPP Worksheet #37 - Usability Assessment (*continued*)

- Non-conformances encountered and corresponding corrective action reports.

Discrepancies and incomplete information identified during data review will be addressed as uncertainty associated with the decision-making process. Laboratory data generated during this investigation will be subject to two types of review. A supervisory-level chemist other than the original data processor will verify analyte identification, quantitation, transcription, and QC data. Each page of checked data will be signed and dated by the verifier. The laboratory PM will work with the laboratory QA/QC manager to review all results, investigate QC trends and outliers, data anomalies, and noncompliance issues. Samples associated with out-of-control QC data will be identified in the data package case narrative, and an assessment of the utility of such analytical results will be made. The laboratory project manager will review each data deliverable package and must ensure that:

- All samples and analyses specified in the COC have been processed;
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Data Validation

Data validation will be performed only on analytical data generated by the fixed laboratory. Data validation will be performed in accordance with the DoD QSM version 5.0.

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For Level III data validations, the data values for routine and QC samples are generally assumed to be reported correctly by the laboratory. Data quality will be assessed by comparing the QC parameters to the appropriate criteria as specified in this QAPP. If calculations for quantitation are verified, it is done on a limited basis and may required raw data in addition to the standard forms. The Level III validation process includes an evaluation of summary information including:

- Analytical results;
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- Surrogate spikes;
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- Initial and continuing calibrations;
- Instrument performance criteria;
- Second-column confirmations;
- COC forms;
- Case narratives; and
- Sample temperatures during shipping and storage.

QAPP Worksheet #37 - Usability Assessment (*continued*)

Level IV follows the protocols and criteria established in DoD QSM 5.0, this UFP-QAPP, and laboratory SOPs. These guidelines apply to full validation data packages that include the raw data (e.g., spectra and chromatograms) and backup documentation of calibration standards, analysis run logs, dilution factors, batch QC data, samples preparation logs, and other types of information. This additional information is used for checking calculations for quantified analytical data in the full data validation process. Calculations are checked for laboratory QC samples (e.g., LCS and MS/MSD data) and routine field samples (including field duplicates). To assure that detection limit and data values are appropriate, and evaluation is made of instrument performance, method of calibration, and the original data for calibration standards. A Level IV validation includes a Level III validation plus a review of analytical raw data and calculation checks. Data qualifiers are applied to analytical results during the data validation process, based on adherence to method protocols and QA/QC limits. Analytical data may be qualified based on data validation reviews. Data validation results will be evaluated with respect to the attached qualifiers to determine data usability issues, if any. The following qualifiers may be assigned during the validation process.

B - The analyte was detected in the blank and the associated sample result was <5 x blank conc or <10 x blank conc for common lab contaminants.
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K - Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L - Analyte present. Reported value may be biased low.   Actual value is expected to be higher.
R - The data are rejected as unusable for all purposes due to serious deficiencies in meeting QC criteria. Re-sampling and reanalysis are necessary to confirm the presence or absence of the analyte.
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UJ - The analyte analyzed for was not present above the reported sample quantitation limit. The associated numerical value may not accurately or precisely represent the concentration necessary to detect the analyte in the sample.
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N - Indicates presumptive evidence of the presence of a compound
J - Indicates an estimated value
Where the validation qualifiers impact the overall data interpretation and project recommendations, the report will discuss the issue and the necessary corrective action.

ATTACHMENT B

TIC MEMO

PARSONS

Memo

To: Leland Reeser, Spring Valley PM

From: David Badio/Thomas Bachovchin, Parsons

Date: 10/27/08

Re: Procedure for Evaluation of Tentatively Identified Compounds (TICs) for the Spring Valley Formerly Used Defense Site (SVFUDS)

This memorandum describes the procedures used by USACE to evaluate Tentatively Identified Compounds (TICs) for Spring Valley samples. USEPA provides the standard procedure by which TICs are evaluated. However, Spring Valley's history as an experiment station suggests that a number of 'non-routine' compounds associated with past activities could be encountered. Therefore, in addition to the standard TIC evaluation, a supplemental evaluation of TIC unknowns is performed to provide a more complete picture of analytical sample results.

STANDARD TIC EVALUATION

For all samples submitted for Volatile Organic Compounds (VOCs) and Semi-volatile Organic Compounds (SVOCs) analysis, the standard procedure is to evaluate the 20 largest chromatogram VOC TIC peaks and 20 largest SVOC TIC peaks. During Parsons' data validation, data submitted by the laboratory for the TICs are evaluated based on the criteria outlined in the USEPA's National Functional Guidelines and Region III modifications to those guidelines. For each sample, the laboratory conducts a mass spectral search of the National Institute of Standards and Technology (NIST) library (version updated 2007) and reports the possible identity for peaks which are not target compounds but which have an area within 10% of the nearest internal standard.

The data submitted by the laboratory for each TIC peak includes the mass spectral data for 3 to 5 NIST reference spectra (i.e., the 3-5 closest matches to the spectrum for the sample peak). A 'q-value' is provided along with the molecular weight and molecular formula for each possible match compound. The 'q-value' is a number between 0 and 100 with 0 being a complete mismatch and 100 being a perfect match.

Parsons data validator compares the spectral data for the sample peak and the laboratory's closest NIST library matches. The validator uses professional judgment to either accept the laboratory's selected TIC, select another TIC from the matches provided by the laboratory, or reject the laboratory's selections and report the TIC as an 'unknown'. For a good match, the major ions present in the library reference spectrum should be present in the sample spectrum at comparable intensities and the molecular ion in the reference spectrum should be present in the sample spectrum.

Generally, a high 'q-value' (> 90%, as an informal guideline) means an excellent match and the lab's TIC selection is carried forward and reported. Similarly, a low 'q-value' (< 40%, as an informal guideline) for each of the possible matches means the selections are rejected and the TIC is reported as an unknown. Where the 'q-value' for the laboratory's 'best match' TIC is between the high and low values, the validator must use personal technical judgment to determine how the TIC is reported.

SUPPLEMENTAL TIC EVALUATION

At SVFUDS, which operated as an experimental facility, numerous chemicals have the potential to be present. Those chemicals have been compiled and reported in the Parameters Report as well as the current Quality Assurance Project Plan (QAPP). The Parameters Report further organizes the chemicals into those with standard analytical methodologies and those that might only be expected to be seen as a TIC (if the chemical is present in the sample). A chemical listed as a TIC that has a spectrum in the NIST library can be matched as described above.

If the chemical does not have a spectrum in the NIST library, the initial library search will still provide probable matches and q-values. However, these matches are unlikely to be high probability and consequently the analyst often reports the TIC as an unknown. A review of the chemicals potentially present at SVFUDS indicates numerous target SVFUDS TICs with spectra not currently in the NIST library. Therefore, to further identify these chemicals in a given sample, a supplemental evaluation is performed. The intent is not to identify every unknown TIC, but rather to evaluate whether the unknown TIC is likely to be a target SVFUDS TIC, i.e., a chemical potentially present at SVFUDS.

The basis of the supplemental evaluation is the prediction of ion mass combinations for the target SVFUDS TICs. Simply stated, these are the ions, or combination of ions (major and secondary), predicted to result when the target SVFUDS TICs are ionized in the mass spectrometer. The ion masses for the target SVFUDS TICs not in the NIST library were developed by organic chemists at GPL Laboratories, Parsons' contracted laboratory. Table 1 presents the predicted ion mass combinations for the target SVFUDS TICs.

GPL's chemists derived the ion mass combinations by reviewing the chemical structure of each target SVFUDS TIC not in the NIST library and predicting how the compound might fragment and what significant peaks would result. GPL further searched the NIST library for compounds similar to the target SVFUDS TICs based on functional groups. For example, for chloronitrobenzene, similar compounds would be nitrobenzene and chlorobenzene, with benzene being the common functional group. The ion mass representing benzene, 78, is shown on the table to indicate that this functional group would need to be seen in the unknown TIC spectrum to consider chloronitrobenzene present in the sample (conversely, if an ion mass of 78 were not present, chloronitrobenzene would be ruled out as the TIC unknown).

The predicted ion masses are the primary step in the supplemental evaluation of TIC unknowns, but the analyst considers other factors as well. GPL manually reviews the mass spectrum for the unknown TIC, looking for functional groups and ions common to the unknown TIC and any target SVFUDS TIC. GPL also looks at the names of the compound matches that the computer generates, and compares them to the target SVFUDS TICs. Notable unknown peaks are enhanced and the middle spectrum is selected. Background spectra from both sides of the peak are manually subtracted in an attempt to reduce ion interferences contributed from closely eluted or co-eluting substances. Once a "clean" spectrum of the peak is obtained, it is studied again and an additional library search is conducted. If a possible match is identified, then it is reviewed by the appropriate supervisor, the lab director, and the lab QA manager. If all three individuals agree, then the positive TIC identification is reported to Parsons. The Parsons data validator would then decide whether to accept the match or otherwise qualify the finding.

The evaluation is done by the GPL analysts who have the data acquisition software and can review the spectra on screen. Their conclusions are in turn assessed by the Parsons data validator who makes the final evaluation of the unknown TIC found in the sample. It should be noted that, to date, no matches have been found using the supplemental evaluation process described above (i.e., no TIC unknowns in a sample have been determined to be target SVFUDS TICs).

Finally, the evaluation is based on the analyst's and validator's experience and professional judgment. It is therefore subjective to an extent and difficult to evaluate against prescribed guidance or procedures.

TABLE 1
Target SVFUDS TICs Not in the NIST Library

	A	B	C	D	E
1	**Target SVFUDS TIC**	**CAS No.**	**Category**	**Not in NIST Library**	**Ion Masses Used for Searching**
2	allyl isocyanate	1476-23-9	VOC TIC	TRUE	83
3	B-chloroethyl acetate	542-58-5	VOC TIC	TRUE	122, 124
4	B-chloroethyl chloroformate	627-11-2	VOC TIC	TRUE	63, 65, 107
5	B-chloroethyl methyl sulphide	542-81-4	VOC TIC	TRUE	110, 112
6	bromomethyl ether	4497-29-4	VOC TIC	TRUE	45,93,95
7	butylarsine (normal)	17753-29-6	VOC TIC	TRUE	134
8	chloroacetoluene	4209-24-9	VOC TIC	TRUE	91,92,109,107,105
9	chloromethyl butyl ether	2351-69-1	VOC TIC	TRUE	122, 124
10	chloromethyl chloroethyl ether	1462-33-5	VOC TIC	TRUE	128, 130
11	chloromethyl dichloroethyl ether		VOC TIC	TRUE	162, 164, 166
12	dichlorodivinyl ether	72533-02-9	VOC TIC	TRUE	138, 140, 142
13	dichloroethyl sulfide	505-60-2	VOC TIC	TRUE	158, 160, 162
14	dichloromethyl sulfide	3592-44-7	VOC TIC	TRUE	130, 132, 134
15	dichloropropyl sulfide	22535-54-2	VOC TIC	TRUE	186, 188, 190
16	dithioacetone	1687-47-4	VOC TIC	TRUE	124
17	ethylene thiocyanate	629-17-4	VOC TIC	TRUE	101,99,72,86
18	fluroromethyl ether	462-51-1	VOC TIC	TRUE	82
19	methyl chlorosulfonate	812-01-1	VOC TIC	TRUE	130, 132
20	methyldibromoarsine	676-70-0	VOC TIC	TRUE	89,235,250
21	methyldiethyoxyarsine	40515-06-8	VOC TIC	TRUE	180
22	methyldioxyarsine	25400-23-1	VOC TIC	TRUE	76,78,104,106,108
23	methyltrithiocarbonate	2314-48-9	VOC TIC	TRUE	91,138
24	nitrochloroacetanilide	17329-87-2	VOC TIC	TRUE	138,214
25	phosphorus sulfochloride	3982-91-0	VOC TIC	TRUE	168, 170, 172
26	tetrachloroacetone	632-21-3	VOC TIC	TRUE	83,85,111
27	tetrachloroethyl ether	7166-44-1	VOC TIC	TRUE	45,31,74,59
28	tribromochloroacetone	76841-88-8	VOC TIC	TRUE	120,173,201
29	trichloronitroethylene	4607-81-2	VOC TIC	TRUE	175, 177, 179
30	ACETYL SULFOCYANATE	542-90-5	SVOC TIC	TRUE	43, 58 101
31	benzoyl thiocynate		SVOC TIC	TRUE	77,105,147
32	bromobenzyl cyanide (bromobenzylnitrile, CA, Camite)	5798-79-8	SVOC TIC	TRUE	116
33	bromobutylrophenone	4981-64-0	SVOC TIC	TRUE	105
34	chloroacetanilide	539-03-7	SVOC TIC	TRUE	127,169
35	CHLOROACETOTHIENONE	29683-77-0	SVOC TIC	TRUE	45,58,84
36	chloracetoxylene	2623-45-2	SVOC TIC	TRUE	182, 184
37	CHLORMETHYLETHYLSULFIDE	1708-73-2	SVOC TIC	TRUE	110, 112
38	chloronitrobenzene	25167-93-5	SVOC TIC	TRUE	78
39	dibromoethyl selenide	41294-57-9	SVOC TIC	TRUE	91,93,95,110
40	dibromoethyl sulfide	7617-64-3	SVOC TIC	TRUE	167, 169
41	dibromopropyl sulfide	98280-65-0	SVOC TIC	TRUE	43,61,103,118
42	dichloroacetophenone	937-20-2	SVOC TIC	TRUE	77,105,120
43	dichlorobenzyl bromide	18880-04-1	SVOC TIC	TRUE	238, 240, 242, 244
44	dichlorodimethyl dithioloxalate		SVOC TIC	TRUE	91,103,118,182

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TABLE 1
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	A	B	C	D	E
1	**Target SVFUDS TIC**	**CAS No.**	**Category**	**Not in NIST Library**	**Ion Masses Used for Searching**
45	dichloroethyl chloroformate		SVOC TIC	TRUE	176, 178, 180
46	dichloroethyl disulfide	1002-41-1	SVOC TIC	TRUE	190, 192, 194
47	dichloroethyl selenide	4730-83-0	SVOC TIC	TRUE	91,93,95,110
48	dichloroethyl telluride dichloride	32157-00-9	SVOC TIC	TRUE	414,412,440,442,312
49	dichlorovinyl selenide		SVOC TIC	TRUE	91,93,95,110
50	diisothiocyanodimethyl ether	63918-92-3	SVOC TIC	TRUE	45,46,63,69,58
51	dinitrobenzyl chloride	610-57-1	SVOC TIC	TRUE	123, 181, 216
52	dinitrodichlorobenzene (parazol)	6306-39-4	SVOC TIC	TRUE	78
53	ethyl chlorosulfonate	625-01-4	SVOC TIC	TRUE	144, 146
54	ETHYL CHLORSULPHONIC ACID	625-01-4	SVOC TIC	TRUE	144, 146
55	ethyl fluorosulfonate	371-69-7	SVOC TIC	TRUE	128
56	ethyl isocyanoformate		SVOC TIC	TRUE	54, 84, 98
57	hexachloroethyl sulfide	13905-38-9	SVOC TIC	TRUE	43,61,76,103,118
58	HEXAMETHYLENE TETRAMINE	100-97-0	SVOC TIC	TRUE	42, 140
59	iodoacetophenone	4636-16-2	SVOC TIC	TRUE	105,77,120
60	isothiocyanodimethylether	19900-84-6	SVOC TIC	TRUE	103
61	isothiocyanomethyl ethyl ether	59565-12-7	SVOC TIC	TRUE	117
62	isothiocyanomethyl isothiocyanoethyl ether		SVOC TIC	TRUE	175
63	methylnitrosourethane	615-53-2	SVOC TIC	TRUE	30, 43, 132
64	nitronaphthalenes	27254-36-0	SVOC TIC	TRUE	160,195,197,241,243
65	NITRONCEPTHALENES	86-57-7	SVOC TIC	TRUE	160, 195, 197, 241, 243
66	NITROXYLENE	25168-04-1	SVOC TIC	TRUE	151
67	octochloroethyl sulfide	13905-39-0	SVOC TIC	TRUE	364, 366, 368
68	p-bromochloroacetophenone	4209-02-3	SVOC TIC	TRUE	173,175
69	p-chlor-chloracetanilide	3289-75-6	SVOC TIC	TRUE	127,169,93,120,167
70	perchloromethyl carbonate	32315-10-9	SVOC TIC	TRUE	43, 57, 71, 87
71	perchloromethyl sulfide	60565-85-7	SVOC TIC	TRUE	45,47,91,88
72	p-methoxy-chloracetophenone	2196-99-8	SVOC TIC	TRUE	77,105
73	SULPHONE DICHLOROMINE	80-08-0	SVOC TIC	TRUE	108, 140, 248
74	tetrachlorodinitrobenzene	20098-38-8	SVOC TIC	TRUE	304, 306, 308
75	tetrachlorodinitroethane	67226-85-1	SVOC TIC	TRUE	65,108
76	trinitronaphthalene	55810-17-8	SVOC TIC	TRUE	128

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47	dichloroethyl selenide	4730-83-0	SVOC TIC	TRUE	91,93,95,110
48	dichloroethyl telluride dichloride	32157-00-9	SVOC TIC	TRUE	414,412,440,442,312
49	dichlorovinyl selenide		SVOC TIC	TRUE	91,93,95,110
50	diisothiocyanodimethyl ether	63918-92-3	SVOC TIC	TRUE	45,46,63,69,58
51	dinitrobenzyl chloride	610-57-1	SVOC TIC	TRUE	123, 181, 216
52	dinitrodichlorobenzene (parazol)	6306-39-4	SVOC TIC	TRUE	78
53	ethyl chlorosulfonate	625-01-4	SVOC TIC	TRUE	144, 146
54	ETHYL CHLORSULPHONIC ACID	625-01-4	SVOC TIC	TRUE	144, 146
55	ethyl fluorosulfonate	371-69-7	SVOC TIC	TRUE	128
56	ethyl isocyanoformate		SVOC TIC	TRUE	54, 84, 98
57	hexachloroethyl sulfide	13905-38-9	SVOC TIC	TRUE	43,61,76,103,118
58	HEXAMETHYLENE TETRAMINE	100-97-0	SVOC TIC	TRUE	42, 140
59	iodoacetophenone	4636-16-2	SVOC TIC	TRUE	105,77,120
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62	isothiocyanomethyl isothiocyanoethyl ether		SVOC TIC	TRUE	175
63	methylnitrosourethane	615-53-2	SVOC TIC	TRUE	30, 43, 132
64	nitronaphthalenes	27254-36-0	SVOC TIC	TRUE	160,195,197,241,243
65	NITRONCEPTHALENES	86-57-7	SVOC TIC	TRUE	160, 195, 197, 241, 243
66	NITROXYLENE	25168-04-1	SVOC TIC	TRUE	151
67	octochloroethyl sulfide	13905-39-0	SVOC TIC	TRUE	364, 366, 368
68	p-bromochloroacetophenone	4209-02-3	SVOC TIC	TRUE	173,175
69	p-chlor-chloracetanilide	3289-75-6	SVOC TIC	TRUE	127,169,93,120,167
70	perchloromethyl carbonate	32315-10-9	SVOC TIC	TRUE	43, 57, 71, 87
71	perchloromethyl sulfide	60565-85-7	SVOC TIC	TRUE	45,47,91,88
72	p-methoxy-chloracetophenone	2196-99-8	SVOC TIC	TRUE	77,105
73	SULPHONE DICHLOROMINE	80-08-0	SVOC TIC	TRUE	108, 140, 248
74	tetrachlorodinitrobenzene	20098-38-8	SVOC TIC	TRUE	304, 306, 308
75	tetrachlorodinitroethane	67226-85-1	SVOC TIC	TRUE	65,108
76	trinitronaphthalene	55810-17-8	SVOC TIC	TRUE	128

APPENDIX F
FORMS

This appendix is a place holder as all the information required is contained within the Site-Wide WP. Relevant forms and templates are provided in Appendix F of the Site-Wide WP.

APPENDIX G
MSD CALCULATIONS

This appendix is a place holder as all the information required is contained within the Site-Wide WP. Calculations used to derive the minimum separation distance (MSD) to be employed for project operations are included in Appendix G of the Site-Wide WP. MEC are not anticipated at this site; therefore, the appendix is not applicable.

APPENDIX H
RÉSUMÉS

Name	Title	Organizational Affiliation	Responsibilities	Education and Experience Qualifications
Sean Buckley, P.G. PMP	Project Manager	Parsons	• Serves as single point of contact on this project • Monitors project deliverable quality, budget, and milestones and prepares related progress reports • Approves deliverables and ensures technical, cost, and schedule performance	• B.A., Geology • 20 years of program/project management experience on IT, construction and environmental projects
James Salisbury	Technical Director	Parsons	• Advises project team on project planning, execution, and reporting • Performs independent reviews of all deliverables	• M.S., Environmental Science; B.S., Biochemistry • Over 21 years experience on federal environmental projects • Over 12 years experience with munitions projects, including projects involving RCWM
Neeraja Iyer	Team Leader	Parsons	• Serves as a technical point of contact on project plans, assessments, and submittals • Supports Project Manager in monitoring deliverable quality, budget, and milestones and prepares related progress reports • Manages day-to-day Parsons work activities, including subcontractor services	• M.S., M.Sc., Environmental Science; B.Sc. Botany • 9 years of experience and 8 years of direct experience at CWM related projects.
Scott Wunschel	Site Manager	Parsons	• Supervises field staff and conducts inspections of field work • Plans, implements, and oversees all site activities ensuring compliance with health, safety, and quality objectives • Schedules field team activities, conducts daily safety meetings, and submits daily progress reports	• Explosive Ordnance Disposal (EOD) Certificate/ 1986/US Navy EOD School • 8-hour OSHA HAZWOPER Supervisor, 40-hour OSHA HAZWOPER, and 30-hour OSHA Construction Safety certifications • Over 20 years experience managing field work and safety and health oversight on military munitions and remediation projects.

Name	Title	Organizational Affiliation	Responsibilities	Education and Experience Qualifications
Bobby Nelms	UXOSO	Parsons	• Develops and implements approved explosives and UXO health and safety program • Conducts, documents, and reports results of safety inspections and provide reports to UXO Safety Manager • Holds the authority to stop work on safety related issues	• Graduate, U.S. Naval EOD School, Indian Head, MD, 1987 • USAESCH UXO Personnel Database, #0144 • 40-hr OSHA HAZWOPER, current 8-hr OSHA Refresher certifications, and OSHA 30 Hour Construction Safety and Health (March 2009) • More than 16 years of government experience, including active duty military and contractor experience and more than 5 years experience with USACE HTRW and munitions projects
Ed McVey	UXOQCS	Parsons	• Develops and implements MEC-specific sections of the Quality Control Plan (QCP) • Conducts audits and project inspections • Identifies, documents, reports and closes out all corrective actions	• Graduate, U.S. Naval EOD School, Indian Head, MD, 1991 • 40-hr OSHA HAZWOPER, current 8-hr OSHA Refresher certifications, and OSHA 30 Hour Construction Safety and Health (March 2009) • Served as UXOQCS, UXOSO, and Team Leader on munitions and environmental projects for over 17 years
Tammy Chang	Chemist	Parsons	• Oversees the development of chemical sampling and analysis plans • Reviews laboratory submittals and tracks and resolves related corrective actions • Ensures chemistry data are collected, managed, reviewed, validated and reported in accordance with approved plans/requirements, e.g., DQOs, UFP-QAPP, and SEDD data submittals • Solve all non-conformance issues related to the analyses of project samples	• M.S., Chemistry; B.S., Chemistry • Over 25 years experience in performing laboratory audits, chemical analyses, overseeing laboratory QA programs, developing QA/QC plans including UFP-QAPP for sampling and analysis, and conducting data validation

Name	Title	Organizational Affiliation	Responsibilities	Education and Experience Qualifications
Tom Kartachak	QC Manager	Parsons	• Ensure the QCP has been established, maintained, and implemented; •Establish guidelines to assist in the development of program, project, site, and task-specific QC policies and procedures; •Initiate, recommend, approve, or provide solutions to the quality problems identified in the QCP during system audits; •Conduct periodic audits/inspections of the project deliverables and submitting reports to the Parsons Sector Manager with copies to the PM; and •Report the adequacy, status, and effectiveness of ongoing projects to the Parsons Sector Manager	• M.S., Health and Safety; B.S., Biology • 16 years experience managing QA/QC for environmental remediation programs and 20 years working experience in environmental remediation program

APPENDIX I
TECHNICAL PROJECT PLANNING WORKSHEETS

The TPP process for the SVFUDS is implemented through the Spring Valley Partnering process. Members of the Spring Valley Partners comprise stakeholders who meet monthly to discuss and plan the SVFUDS activities. Monthly Partnering Meeting minutes will include progress on the 4825 Glenbrook Road RA effort.

APPENDIX J
CWM AIR MONITORING/SOIL SCREENING PLAN AND CWM SAMPLING ANALYSIS PLAN

EDGEWOOD CHEMICAL BIOLOGICAL CENTER

CHEMICAL BIOLOGICAL APPLICATIONS AND RISK REDUCTION

ENVIRONMENTAL MONITORING LABORATORY

SITE SPECIFIC AIR MONITORING PLAN
FOR
4825 GLENBROOK ROAD HIGH-PROBABILITY REMEDIAL ACTION OPERATIONS

The American University

Washington, DC

August 2013

Revision 2_1

U.S. ARMY RESEARCH, DEVELOPMENT AND ENGINEERING COMMAND

X

Michael Knudsen
ECBC EML Air Monitoring Manager

1.0 INTRODUCTION

This document serves as the site-specific air monitoring plan to support the project mission of the 4825 Glenbrook Road high-probability remedial action operations. The U.S. Army Edgewood Chemical Biological Center (ECBC) Environmental Monitoring Laboratory (EML) will conduct air monitoring in support of this mission.

2.0 PURPOSE and SCOPE

This plan establishes the policies, objectives, and responsibilities for the execution of the monitoring program to support operations at the site. The plan identifies the chemicals of concern and describes the rationale for monitoring strategies and equipment used during operations.

The objectives of site monitoring are:

- Provide worker and environmental protection by conducting analyses for the chemicals of concern.
- Provide early warning of potential releases of the chemicals of concern.
- Protect the environment and surrounding areas from a potential release.

3.0 MONITORING RESPONSIBILITIES

The responsibilities of the U.S. Army ECBC EML are:

- Provide guidance on monitoring operations conducted on site.
- Provide certified equipment, methods, and personnel capable of generating defensible monitoring data to be incorporated into the ECBC Environmental Monitoring Laboratory 40-year database.
- Provide trained and certified personnel to operate air monitoring and laboratory equipment.
- Perform monitoring procedures as outlined in the project scope of work, EML laboratory quality assurance programs, and this monitoring plan.
- Collect and retain all chemical warfare material air monitoring data generated during this project.
- Conduct project-specific on-site air monitoring and sample analyses to support site operations. Other analyses may be conducted to support safe operations as requested by the US Army Corps of Engineers
- Provide daily site reports to project personnel.

4.0 CHEMICALS OF CONCERN

The chemicals of concern for this operation are: HD, L, CG, PS and CK.

AIRBORNE EXPOSURE LIMITS

An airborne exposure limit (AEL) is a general term that describes the maximum allowable air concentrations for occupational and general population exposure to chemical warfare material (CWM). AELs for chemical warfare agents are published in the Department of the Army Pamphlet DA PAM 385-61 (2008) Table 2.1 and are referenced in Table 1.

Table 1: Airborne Exposure Limits for the CWM Chemicals of Concern

Chemical Name	**Abbreviation**	**CAS Number**	**Airborne Exposure Limit**		
			WPL (mg/m^3)	**STEL/VSL (mg/m^3)**	**GPL (mg/m^3)**
Bis(2-chloroethyl)sulfide	HD (Mustard)	505-60-2	4×10^{-4}	3×10^{-3}	2×10^{-5}
Dichloro-(2-chlorovinyl) arsine	L (Lewisite)	541-25-3	3×10^{-3}	3×10^{-3}	3×10^{-3}

Table 2: Permissible Exposure Limit for the Industrial Chemicals of Concern

Chemical Name	**Abbreviation**	**CAS Number**	**Permissible Exposure Limit (PEL)**
Carbonyl Dichloride	CG (Phosgene)	75-44-5	0.1 ppm / 0.4 mg/m^3
Trichloro(nitro)methane	PS (Chloropicrin)	76-02-2	0.1 ppm / 0.7 mg/m^3
Carbononitridic chloride	CK (Cyanogen Chloride)	506-77-4	0.3 ppm / 0.6 mg/m^3

4.1 Worker Population Limit (WPL)

The WPL is the maximum allowable 8-hour time-weighted average concentration that an unmasked worker could be exposed to for an 8 hour workday, 40 hours per week, for 30 years without adverse effect. There is no health significance from a single or short-term exposure at this concentration. Low level monitoring using either a near real time (NRT) monitor or an historical monitor is conducted if unmasked workers are present in an area where CWM contamination may be present.

4.2 Short Term Exposure Limit (STEL)

The STEL is the maximum concentration to which unprotected chemical workers may be exposed for up to 15 minutes. ECBC conducts near real time STEL monitoring using a sample collection time of less than

15 minutes. Therefore, near real time monitoring is technically conducted at the vapor screening limit (see Section 4.3) in areas where CWM may be present. This monitoring is designed as an early warning system to notify workers of possible CWM in the environment.

4.3 Vapor Screening Level (VSL)

The VSL is equivalent to the absolute STEL concentration, but it is independent of a designated sampling time and may be used for worker protection/notification and to define the level of item cleanliness.

4.4 General Population Limit (GPL)

The GPL is the maximum concentration to which the general population may be exposed 24 hours per day, 7days a week, for a 70-year lifetime.

5.0 GENERAL MONITORING APPROACH

EML personnel will conduct monitoring for a variety of purposes, as described below. A summary of monitoring locations is provided in Table 2.

5.1 First Entry Monitoring (FEM)

FEM is performed to ensure worker safety and to determine PPE requirements for workers entering the work space. A near-real time (NRT) MINICAMS® system will be available during operations to conduct monitoring of the work space before entry. FEM will be conducted at the inlet to the filtration system for each work space, and prior to entry into the Interim Holding Facility (IHF). A minimum of two MINICAMS® sampling cycles will be performed in accordance with EML IOP MT-2. Alarm confirmation at the IHF is not immediately required but can be performed after the NRT response indicates possible chemical agent contamination. If required, FEM may be conducted using DAAMS sampling in accordance with EML IOP MT-11.

5.2 Work Space Monitoring

Work space monitoring (NRT/confirmation/historical) will be performed at the inlet to the filtration system. Workers will wear varying levels of Personal Protective Equipment (PPE). Changes in PPE will be addressed in the work plan and/or the health and safety plan. Work space monitoring will serve to notify workers of CWM concentrations in the area.

NRT monitoring will use one or more Miniature Continuous Air Monitoring Systems (MINICAMS®) operated in accordance with EML IOP MT-2. Confirmation Monitoring, to validate or invalidate a positive MINICAMS® measurement will use Depot Area Air Monitoring Systems (DAAMS) tubes. DAAMS sampling will be in accordance with EML IOP MT-11 and analyses will be conducted in accordance with EML IOP MT-13. For this project, confirmation DAAMS tubes will be pulled after two consecutive MINICAMS alarms.

5.3 Historical Monitoring

Historical DAAMS samples are collected to provide low-level, long term sample collection and analysis to establish agent concentrations in areas where contamination is unlikely or workers are operating without personal protective equipment.

Historical monitoring will be performed to the WPL in each work space and the exhaust of each Chemical Agent Filtration System. Exact locations will be determined based on the layout of each work space (normally at the Pre-filter). Locations are typically named based on features of the work space.

Historical monitoring will be performed using DAAMS tubes in accordance with EML IOP MT-11 and MT-13. All samples will be analyzed and reported within 72 hours of the end of sample collection.

5.4 Decontamination Verification

Monitoring data will be used to verify the decontamination status of materials and equipment as required and in accordance with the guidance provided by the U.S. Army Pamphlet 385-61 (DA Pam 385-61). Materials will be handled based on their ultimate disposal. All items must meet containment requirements and the required time/ temperature constraints of 4 hours at a minimum of 70° F prior to headspace analysis.

Reusable items, specifically PPE, will be monitored to less than the WPL concentration, in accordance with EML IOP MT-11. These items will be labeled and handled as less than the WPL concentration.

Potentially contaminated items that will not be reused and will be disposed shall be monitored to the VSL in accordance with either EML IOP MT-2 (MINICAMS) or EML IOP MT-11 (DAAMS).

5.5 Personnel Decontamination Monitoring

A dedicated MINICAMS® unit will be available at the medical monitoring tent to provide CWM monitoring for possible chemical casualties. DAAMS will be used for NRT alarm confirmation. Workers that have been exposed or who have potentially been exposed to CWM will be monitored as outlined in appendix A. There is no monitoring for industrial compounds at the PDS.

5.6 Workspace Filter Units

Air filtration units will be used to ventilate each workspace. The mid bed locations of the filter unit will be monitored to identify any agent migration past the first carbon bed. Mid bed locations will be monitored on a rotating basis using a MINICAMS® configured with a stream selection system in accordance with EML IOP MT-2. Midbed locations for industrial monitoring will be tied together to a single sampling point. If three consecutive CWM or industrial compounds alarms occur at a mid bed location, NRT monitoring will be switched to the exhaust position. Historical DAAMS monitoring at the WPL will be conducted at the exhaust of each filter unit during each operational day.

5.7 Soil Sample Headspace Monitoring and Verification

Prior to transportation off-site for low-level extraction and laboratory analysis, headspace monitoring of soil samples will be completed in accordance with ECBC EML Internal Operating Procedures MT-02 or MT-11. Soil sample headspace monitoring can be accomplished by MINICAMS® or DAAMS.

6.0 SITE SPECIFIC MONITORING LOCATIONS

Table 3: Monitoring Locations and Descriptions

NRT Location No.	DAAMS Location	Location Description	MINICAMS	NRT Confirmation (STEL/VSL))	Historical Monitoring (WPL)	Comments/reason for monitoring
1 – HD/L 2 – CG/CK/PS	Pos A1 Pos A2	Pre-Filter, common duct	Yes	Yes	Yes	FEM and worker protection
3 – HD/L 4 – CG/CK/PS	Mid.1a Mid.1b Mid.1c Exh.1	Filter 1 – Midbeds 1, 2, 3, and Exhaust	Yes	Yes	WPL at exhaust during operations	Verify midbed integrity and environmental protection
5 – HD/L 6 – CG/CK/PS	Mid.2a Mid.2b Mid.2c Exh.2	Filter 2 – Midbeds 1, 2, 3, and Exhaust	Yes	Yes	WPL at exhaust during operations	Verify midbed integrity and environmental protection
7 – HD/L 8 – CG/CK/PS	Mid.3a Mid.3b Mid.3c Exh.3	Filter 3 – Midbeds 1, 2, 3, and Exhaust	Yes	Yes	WPL at exhaust during operations	Verify midbed integrity and environmental protection
9 – HD/L	PDS	Personnel Decontamination Station	Yes	Yes	No	Chemical casualty monitoring at the medical monitoring tent
10 – HD/L	XXX	Decontamination Verification	Yes	Yes	Yes	Headspace analysis of soils, scrap, PPE
11 – HD/L 12 – CG/CK/PS	IHF	Interim Holding Facility	Yes	Yes	No	FEM

7.0 Reporting Detections of Chemicals of Concern

7.1 MINICAMS® Alarms

MINICAMS® equipment is equipped with an alarm that is set to warn of potentially dangerous conditions. The alarm level for all agents except L is 0.7 STEL/VSL. The alarm level for L is 0.4 STEL/VSL. The MINICAMS® control and reporting software only allows a single alarm set point for each method. When monitoring for Lewisite the alarm set point must be set at 0.4 STEL/VSL. As a result, the MINICAMS® will alarm for the other chemicals of concern from the same instrument (typically HD) at the lower level of 0.4 STEL. However, the alarm level for HD remains at 0.7 STEL.

7.2 MINICAMS® Alarm Communication and Confirmation

MINICAMS® alarm results will be communicated to the command post. Actions taken regarding workers and site personnel will be dictated by the ECBC site safety representative/site supervisor. Three consecutive MINICAMS® alarms require DAAMS confirmation, in accordance with EML IOP MT-2, MT-11 and MT-13.

7.2.1 MINICAMS® Alarm – A single event when the MINICAMS® result exceeds the alarm set point. The command post (CP) is notified by the MINICAMS® operator. The operator reports the MINICAMS® reading in STEL/VSL units.

7.2.2 MINICAMS® Ringoff – Three consecutive alarms from a MINICAMS®. DAAMS confirmation is required for all chemical agent ringoffs.

7.2.3 Confirmed Ringoff – If DAAMS results confirm a chemical agent MINICAMS® ringoff, the event is considered confirmed. The concentration report for the event will be based on the MINICAMS® readings in accordance with ECBC and Army policy.

7.3 Reporting of DAAMS Sample Results

Confirmed detections of chemicals of concern from DAAMS samples are reported for any detection above the method detection limit. The specifics regarding DAAMS results are addressed in EML IOP MT-13.

7.4 Suspension of Monitoring/ Alarm confirmation

In cases where an area has been confirmed to contain agent vapors and appropriate safety measures have been implemented, reconfirmation (continued analysis of MINICAMS® confirmation samples) may be suspended at that location. The decision to suspend confirmation sampling will be based on guidance from the site safety representative and concurrence from EML/CBARR management or their designee.

8.0 DATA REPORTING

The ECBC EML shall report daily analytical results to site representatives in a written analytical report that will document the following information as applicable: (1) date of analyses (2) sampling location (3) analyst name (4) EML field sample identification number (5) client sample identification number and (6) results for each analysis, including units.

9.0 QUALITY CONTROL (QC)

9.1 Certification

9.1.1 Method Certification

Site specific method precision and accuracy studies will be performed before the start of operations, in accordance with the EML Laboratory and Monitoring Quality Control Plan (LMQCP, Revision 2, December 2011). Previous studies performed on site may fulfill this requirement. All methods used to support worker and environmental protection will meet ECBC EML method certification requirements, as described in the EML Laboratory and Monitoring Quality Control Plan (LMQCP, Revision 2, December 2011). Waste evaluation methods shall meet the requirements outlined in the site waste analysis plan. Documentation of successful method certification will be available upon request.

9.1.2 Operator Certification

All individuals performing monitoring activities will be certified in accordance with EML certification requirements as described in the EML LMQCP (Revision 2, December 2011). Documentation of successful certification will be available upon request.

9.1.3 Instrument Certification

All instruments used to generate monitoring data will meet instrument certification requirements described in the EML LMQCP (Revision 2, December 2011). Documentation of successful certification will be available upon request.

9.2 Calibration and Challenge

9.2.1 Initial Calibration

Calibration requirements for each monitoring system are found in the corresponding internal operating procedure (as shown in Table 4) and the EML LMQCP (Revision 2, December 2011).

Table 4: Calibration Requirements

Monitoring System	EML IOP Number	Frequency
MINICAMS®	MT-2	Daily
DAAMS Analysis	MT-13	As required

9.2.2 MINICAMS® Challenge

After successful initial calibration, all MINICAMS® will be challenged before operations begin, every 4-5 hours during operations, and at the end of the operational day.

9.2.3 DAAMS Analysis Calibration Verification

Each instrument used to analyze DAAMS samples must have a successful initial calibration. Each batch of samples must be bracketed by calibration verification samples that meet the acceptance criteria described in EML IOP MT-13.

9.3 Corrective Action

Corrective action will be initiated based on the results of routine internal QC checks. Corrective action will be initiated when potential or existing conditions are identified that may adversely affect data quality. Events that require corrective action include violation of approved analytical procedures, out-of-control conditions, and non-conformances as described in the EML LMQCP (Revision 2, December 2011). The need for corrective action must be documented and reported to the ECBC site supervisor. The corrective action may be immediate or long term. An immediate corrective action may be the recalculation of results, reanalysis of samples, or repeat of sample collection. A long term corrective action may require an increase in the number of QC samples, more frequent calibration and checks, or replacing monitoring equipment.

9.4 Data

During the project, ECBC will maintain control over all results and data generated from the analyses. All monitoring operations will be conducted in accordance with the EML LMQCP (Revision 2, December 2011) and EML IOPs. ECBC will incorporate the data generated into the Environmental Monitoring Laboratory 40-year data storage program, should access to additional information be required.

10.0 LIMITING CONDITIONS OF OPERATION

Operations during this project are governed by limiting conditions of operation (LCOs). Each day the site manager/designee will determine that all LCOs have been met. The monitoring LCOs are: sufficient number of certified operators, sufficient calibration and challenge standards available, all instruments actively supporting operations are calibrated and in control, a sufficient number of instruments are available to support operations, sufficient confirmation/historical monitoring equipment is available. Sufficient numbers of personnel and equipment will be determined by the site manager or EML designee.

Appendix A: Procedures for Near-Real-Time

Monitoring of Agent-Contaminated Workers

1. Purpose. This guidance provides monitoring procedures for workers that are contaminated or potentially contaminated with mustard (sulfur or nitrogen), Lewisite, or nerve agents.
2. Applicability. These procedures will be followed during activities where workers may potentially encounter chemical warfare agents on suspected non-stockpile Chemical Warfare Materiel (CWM) sites where Reference A applies.
3. References.
    a. Memorandum dated 1997, Subject: Interim Guidance on Biological Warfare Materiel (BWM) and Non-Stockpile Chemical Warfare Materiel (CWM) Response Activities.
    b. Memorandum dated June 10, 2003, Subject: Interim Guidance on Nerve and Mustard Agent Decontamination and Medical Services in Industrial Activities.
    c. Department of Army Pamphlet 50-6, Chemical Accident or Incident Response & Assistance Operations (CAIRA), dated 26 March 2003.
    d. Interim Guidance (Draft Army Regulation XXX), Chemical Warfare Materiel Responses and Related Activities, dated 1April2009.
4. Definitions.
    a. Exposed worker. An individual working in an agent environment who exhibits clinical signs or symptoms of agent exposure.
    b. Potentially exposed worker. A potentially exposed worker is an individual who works in an agent environment where:
        i. Levels of chemical warfare agent exceed the protective capability of the personal protective equipment (PPE) or
        ii. Levels of chemical warfare agent are above the exposure limit and there is a breach in the PPE, or
        iii. There is an indeterminate casualty from an agent environment.
5. Discussion.
    a. Hospital Evaluation. Any exposed or potentially exposed worker working in mustard, Lewisite or nerve agent environment is required by Army Regulation to be sent immediately to the supporting medical facility for a medical evaluation. Therefore, any exposed or potentially exposed worker on a non-stockpile site shall be sent to the nearest Health Clinic trained in chemical agent casualty care for evaluation. These workers shall not return to duty on a non-stockpile site until medically cleared.
    b. Monitoring. Army Regulation also requires, that prior to sending an exposed or potentially exposed worker to a medical facility, the worker must be decontaminated and quadrant-monitored with a low-level monitor to ensure complete decontamination.
    c. Traumatic Injury. At any time during the decontamination procedure, the site safety personnel in coordination with the on-site medical staff and the hospital may decide to transport the contaminated worker to the contract hospital. Lifesaving measures for traumatic injury have

priority over immediate decontamination, provided that medical personnel remain protected against the chemical agent. If the medical personnel are not properly protected against the chemical agent, at a minimum,

i. The person shall go through decontamination, and

ii. The Site Safety Officer shall notify the medical personnel (ambulance and hospital) of the extent of decontamination of the potentially contaminated workers and whether low-level monitoring was conducted.

6. Monitoring Procedures.

a. *Action Level*. Workers who are exposed or potentially exposed to chemical agent shall be decontaminated to below the agent alarm level before the worker is transported to the contracted hospital.

b. *Instrument.* The primary type of instrument for low-level monitoring of potentially contaminated personnel is a near real-time chemical agent monitor, the Miniature Continuous Air Monitoring System (MINICAMS®). Trained personnel shall maintain, calibrate, and operate the low level near real-time monitor. A dedicated MINICAMS will be used for this monitoring. It must be operational and stationed inside a monitoring vestibule prior to the start of intrusive operations on-site. Note: This MINICAMS may be used for other activities but only after intrusive operations have ceased.

c. *Monitoring Location*. The decontamination line shall include a monitoring chamber between the dirty side and the clean side. This chamber shall be large enough to contain a stretcher and one other worker. It shall contain a port and a stand for the MINICAMS probe. The monitoring chamber can remain open during non-emergency operations but shall be capable of being closed off when monitoring is required.

d. *Monitoring Procedures*. Properly protected site personnel shall enter the chamber with the decontaminated worker. Upon notification of the start of the MINICAMS sampling cycle, the site personnel shall pass the MINICAMS probe slowly and deliberately within one to two inches of the contaminated worker's body. One-fourth of the MINICAMS sampling cycle will be spent on each quadrant of a contaminated worker's body, with the MINICAMS operator communicating to the worker holding the probe when to progress to the next quadrant.

Quadrant 1: Face, Chest, and Belly

Quadrant 2: Pelvic Region and front of the Legs

Quadrant 3: Back and Shoulders

Quadrant 4: Back of the Legs, Feet, and Buttocks

The MINICAMS operator must remain in constant communication to ensure the entire body is screened within one MINICAMS sampling cycle.

i. If the MINICAMS result is less than the alarm level, the casualty shall be moved to the ambulance.
ii. If the MINICAMS result is greater than or equal to the alarm level, the casualty shall be re-decontaminated as long as the medical situation permits.
iii. **Note**: Lifesaving measures for a traumatic injury have priority over immediate decontamination, provided that rescuers/medical personnel remain protected against chemical agent.

Appendix B: Acronyms

AEL – Airborne Exposure Limit

AR – Army Regulation

CAFS – Chemical Agent Filtration System

CAS – Chemical Abstracts Service

CBARR – Chemical Biological Applications and Risk Reduction

CP – Command Post

CWM – Chemical Warfare Materiel

DAAMS – Depot Area Air Monitoring System

ECBC – Edgewood Chemical Biological Center

EML – Environmental Monitoring Laboratory

FEM – First Entry Monitoring

GPL – General Population Level

IHF – Interim Holding Facility

IOP – Internal Operating Procedure – Approved written monitoring and analysis procedures used by the Environmental Monitoring Laboratory during monitoring operations. ECBC EML IOPs will be located in analytical and monitoring work areas.

LCO – Limiting Conditions of Operations

LMQCP – Laboratory and Monitoring Quality Control Plan

MINICAMS® - Miniature Continuous Air Monitoring System

NRT – Near Real Time

PDS – Personnel Decontamination Station

PEL – Permissible Exposure Limit

PPE – Personal Protective Equipment

QC – Quality Control

QL – Quality Laboratory Sample – A quality control sample that has been spiked with a solution of dilute chemical agent in the laboratory but which has not been aspirated at a sampling site.

QP – Quality Plant – A quality control sample that has been spiked with a solution of dilute chemical agent and exposed to the sampling environment.

STEL – Short Term Exposure Limit

VSL – Vapor Screening Level

WPL – Worker Population Limit

EDGEWOOD CHEMICAL BIOLOGICAL CENTER

CHEMICAL BIOLOGICAL APPLICATIONS AND RISK REDUCTION BUSINESS UNIT (CBARR)

ENVIRONMENTAL MONITORING LABORATORY (EML)

SAMPLE ANALYSIS PLAN
FOR
CHEMICAL AGENTS

Spring Valley Formerly Used Defense Site
Site Wide Intrusive Remediation Actions and other Probability Assessments

October 2012
Revision 1

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TABLES

1.0 INTRODUCTION.

This document presents a soil and aqueous sample analysis plan for the Spring Valley intrusive and probability investigations for chemical warfare material (CWM).

1.1 PURPOSE.

The purpose of this plan is to illustrate the strategy used by U. S. Army Edgewood Chemical Biological Center (ECBC) to analyze soil and aqueous samples for the presence of chemical agents in support of the investigations at Spring Valley Formerly Used Defense Site (FUDS).

1.2 SCOPE.

This plan establishes the policies, objectives, procedures, and responsibilities for the execution of a sample analysis program for the Spring Valley FUDS investigations. This sample analysis plan applies to all facilities and operations at the ECBC Environmental Monitoring Laboratory (EML) in Edgewood, Maryland involving analysis of samples suspected of containing CWM contamination. Upon collection of a sample appropriate screening protocols shall be followed to allow for the shipment of samples to the ECBC EML laboratory at Edgewood. Aqueous samples are not screened prior to shipment. The ECBC laboratories shall conduct the appropriate analysis and report results to the client. All samples received at ECBC will be decontaminated if necessary and disposed of as hazardous waste. Samples contaminated with CWM will not be shipped to commercial laboratories for further analysis. If requested, the ECBC laboratories will then ship split samples that have been cleared to the laboratory Limit of Quantitation (LOQ) for the agents of interest to contracted commercial laboratories for further analysis.

1.3 OBJECTIVES.

The objectives of this plan are:

A. To illustrate the methods used for analysis of soil and aqueous samples performed at the ECBC EML laboratory in Edgewood, Maryland.

B. To perform environmental analysis of soils and aqueous samples for CWM for characterization and prior to release to the contractor laboratory.

2.0 RESPONSIBILITIES.

The ECBC EML will:

- Collect and retain all ECBC analytical data generated during this project.

- Provide technical expertise in support of sample collection and analysis for the project.

- Conduct analysis of soil and aqueous samples for CWM as listed in Section 3.0.

- Provide equipment capable of completing analyses utilizing the ECBC EML in Edgewood, MD.

- Provide trained and certified personnel to operate the laboratory and maintain certification data as part of the EML 40-year database.

- Provide trained and certified personnel to set-up, and calibrate equipment and analyze soil and aqueous samples for CWM.

- Perform sample analysis procedures as outlined in the Corps of Engineers Scope of Work and consistent with ECBC capabilities.

- If requested, prepare, package, and ship split samples to commercial contractor laboratory for further analysis.

- Provide all electronic analytical data to prime contractor project chemist for validation if requested.

3.0 SOIL AND AQUEOUS SAMPLE MONITORING.

The intent of the analyses is to characterize the samples to determine the presence of chemical agents. The results will also ensure that soils and aqueous samples may be safely shipped to off-site contractors for further analyses if required. Samples will be analyzed for the presence of the following compounds based on site requirements as indicated in Table 1.

Table 1: Compounds of Interest for Spring Valley

Category		**Agent Name**	**Abbreviation**	**Chemical Abstract Number (CAS)**
Sulfur Mustard	CA	Bis(2-chloroethyl) sulfide~	Sulfur Mustard, H, HD, HT, HQ	505-60-2
	ABP	1,4-dithiane	N/A	505-29-3
		1,4-oxathiane	1,4-thioxane	15980-15-1
		Thiodiglycol+	TDG	540-63-6
Lewisite	CA	Dichloro(2-chlorovinyl)arsine	Lewisite, L	541-25-3
	ABP	2-chlorovinyl arsenous acid *	CVAA	85090-33-1
		2-chlorovinyl arsenous oxide *	CVAO	3088-37-7

* CVAA and CVAO are reported as L.

+ TDG analysis will be conducted if H is not detected, and 1,4-dithiane and 1,4-thioxane are detected greater than the LOQ.

~HD, HS, HT, and H will be analyzed and reported as H.

The following address shall be utilized for the transfer or shipment of samples. ECBC shall receive samples during normal business hours Monday-Friday 0700-1700. Delivery of samples to ECBC on non-work days, i.e., weekends and holidays, shall be coordinated directly with ECBC.

Primary Address:
US Army Edgewood Chemical and Biological Center
Environmental Monitoring Laboratory
ATTN: RDCB-DPO-ML (John Schwarz/Building E3330 Room 184)
Aberdeen Proving Ground-Edgewood Area, Maryland 21010-5424
(410)-436-2150 FAX (410)-436-2969

Alternate Address for delivery of unknowns:
US Army Edgewood Chemical and Biological Center
Chemical Transfer Facility
ATTN: RDCB-DPO-CO (John Loss/Building E3832)
Aberdeen Proving Ground-Edgewood Area, Maryland 21010-5424
(410)-436-4202

3.1 SAMPLE CONTAINERS AND PRESERVATION TECHNIQUES

Table 2 presents the containers, preservation techniques, and holding times for the CWM samples collected for analysis.

Table 2: Sample Containers, Preservatives, and Holding Times

Parameter	Sample Container	Preservative	Holding Time
Chemical Agents (Soil)#	4 oz. wide mouth amber glass jar with Teflon-lined cap	Cool to 4°C	*Recommended
Chemical Agents (Aqueous)#	40 mL amber glass bottle with Teflon-lined cap	Cool to 4°C	*Recommended

*Recommended holding times for chemical agents is 3 days until extraction; and 7 days after extraction for analysis. Rapid turn-around times for chemical agents are required to not affect holding times of other analyses.

Only one sample container is required for analysis

3.2 ANALYTES OF CONCERN

3.2.1 Chemical Agents

The analytes of interest shown in Table 1 will be analyzed by the methods shown in Table 3, and reported to the Limit of Quantitation (LOQ). Analytical results between the Method Detection

Limit (MDL) and the LOQ will be reported with a J qualifier. All results will be reported to two significant figures. In some unique cases, the LOQ may be adjusted if the matrix or non-target compounds in the sample cause chromatographic interference or degrade instrument sensitivity.

Table 3: Analytical Methods and Reporting Limits (FY2013)

Analyte	**Method of Analysis**	**Laboratory Limits (Soil) (µg/kg)**		**Laboratory Limits (Aqueous) (µg/L)**	
		MDL	**LOQ**	**MDL**	**LOQ**
H	1	2.0	10	2.0	10
1,4-Thioxane	1	17	100	19	100
1,4-Dithiane	1	18	100	20	100
TDG	2	23	130	5.3	25
L	1	24	100	22	100

1. "Analysis of Chemical Warfare Agents and Breakdown Products in Extracts using a Gas Chromatograph/Mass Spectrometer System," IOP MT-08, Revision 8 or latest revision.
    a. Lower Calibration range
2. "Analysis of Chemical Agents and Degradation Products in Environmental Matrices using a Liquid Chromatrography / Triple Quadrupole Mass Spectrometer (LCQQQ) Analysis," IOP MT-57 Appendix V, Revision 4 or latest revision.

3.3 QUALITY CONTROL

3.3.1 Chemical Analysis

3.3.1.1 The instruments utilized for the analysis of the soil and aqueous samples will be subject to quality control (QC) in accordance with the EML Laboratory and Monitoring Quality Control Plan for Chemical Materials Agency (CMA) and Chemical Agent Standard Analytical Reference Material (CASARM) (Revision 2, December 2011), QC requirements specified in the Internal Operating Procedures (IOPs) shown above, and Department of Defense Quality Systems Manual for Environmental Laboratories (QSM , most current version), as appropriate. Table 4 contains the quality control requirements for these analyses.

Table 4. Quality Control Requirements

QC Sample	Frequency	Acceptance Limits	Corrective Action
Method Blank: DI water for liquid samples Clean solid (e.g., clean sand) for solid samples	1 per batch of 20 or fewer samples	Target analytes less than one-half the reporting limit.	Reanalyze all samples associated with unacceptable blank.
Laboratory Control Spike/ Laboratory Control Spike Duplicate (LCS/LCSD)	1 per batch of 20 or fewer samples	Average recovery and RPD within current laboratory control limits. Limits updated annually at a minimum.	Verify calculations. Re-inject sample to verify validity of analysis. If still non-compliant, re-extract the entire batch.
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	Conducted with specified samples or batch samples. Not applicable to wipe samples.	No limits applied. Not used to control laboratory operations.	Verify calculations. Correct if needed. If calculations are correct, note in narrative.
Surrogate	Spiked into every field sample and laboratory QC sample	Recovery within current laboratory control limits.	Verify calculations. Re-inject sample to verify the validity of analysis. If still non-compliant, re-extract the sample with MB, LCS, and LCSD.

3.3.1.2 The current laboratory control limits shown in Table 5 have been established during the initial method testing or annually, based on at least 30 data points. Where 30 data points are not available, default limits as described in the IOP or QSM are used. New limits are calculated and applied annually every November.

Table 5: Current Laboratory Control Limits FY2013

				Soils			**Aqueous**		
					LCS/LCSD and MS/MSD*			**LCS/LCSD and MS/MSD***	
Spiking Compound	**Method (see footnotes to Table 3)**	**Internal Std Area Count (% of ICAL Mid-Point)**	**ICV/CCV (% of expected)**	**Surrogate Recovery (%R)**	**%R**	**RPD**	**Surrogate Recovery (%R)**	**%R**	**RPD**
HCB (IS)	1	-50% to +100%							
BFB (Surr)	1			83-115		13%	83-117		15%
BFB (Surr) No IS	1			57-125			50-150		
H	1		80 – 120		73-127	≤ 28%		65-129	≤ 26%
1,4-Thioxane	1		80 – 120		73-129	≤ 23%		84-113	≤ 24%
1,4-Dithiane	1		80 – 120		75-128	≤ 24%		73-131	≤ 27%
TDG	3		80 – 120		60-131	≤ 30%		64-123	≤ 30%
L	1 (a)		75 – 125		37-165	≤ 45%		26-153	≤ 36%

* For MS and MSD, limits are only advisory. See Table 3.

3.3.1.3 A Matrix Spike/ Matrix Spike Duplicate (MS/MSD) sample must be extracted and analyzed with every preparatory batch (batch size not to exceed 20 samples). The client may specify which sample should be used; otherwise, laboratory personnel will select a sample.

3.3.1.4 A method blank and Laboratory Control Spike/Laboratory Control Spike Duplicate (LCS/LCSD) are analyzed with every preparatory batch (batch size not to exceed 20 samples).

3.3.1.5 The instrument is calibrated by analyzing solutions with all target analytes at multiple concentrations. The calibration is acceptable if the correlation coefficient (r^2) for the regression equation is greater than or equal to 0.990.

3.3.1.6 Calibration verification samples are standards that are recommended to be analyzed once every ten samples in any injection batch. At a minimum a verification standard must be run immediately after initial calibration, before samples are analyzed (if initial calibration is not required), and at the end of a sample sequence. These standards reveal whether the calibration of the instrument continues to be in control. The control limits are ±20 % for all target compounds (±25% for L). If the calibration check sample is greater than these limits, analysis must stop however previous samples may be reported according to the individual IOPs.

4.0 DATA REPORTING

ECBC shall report the results of each batch of soil and aqueous samples analyses in an Analytical Report that will document the following information; (1) Date of receipt, (2) Date of extraction, (3) Date of analysis (4) Field sample identification number, located on the chain-of-custody received, (5) Results for each analysis, including units (if applicable), and (6) Results of quality control samples. Additional data reporting shall be provided as described in the individual IOPs.

5.0 HISTORICAL RECORDS

EML shall maintain an electronic database for all soil and aqueous samples extracted and analyzed. ECBC personnel shall be responsible for certifying that operations are conducted according to this plan or the site-specific QC plan. ECBC will prepare an electronic data report of all data, as requested, in support of the project and forward copies of all analytical results to the client.

APPENDIX K
PMNSCM PLANS

This appendix is a place holder as all the information required is contained within the Site-Wide WP. Plans for the storage and transportation of RCWM are in Appendix K of the Site-Wide WP.

APPENDIX L
MEC TRANSPORTATION PLAN

This appendix is a place holder as all of the information required is contained within the Site-Wide WP. A description of the procedures used to transport MEC items not transported as potential RCWM is contained in Appendix L of the Site-Wide WP. MEC are not anticipated at this site; however, if RCWM transportation is required, Appendix L will be used as the transportation plan.

APPENDIX M
REMEDIAL DESIGN

FINAL

APPENDIX M - REMEDIAL DESIGN
FOR THE 4825 GLENBROOK ROAD WORK PLAN

**SPRING VALLEY, OPERABLE UNIT 3, DERP/FUDS,
WASHINGTON, D.C.
CONTRACT NO. W912DY-09-D-0062 TO 0006
FUDS MEC/CWM PROJECT NO. C03DC091801**

Prepared for:

**U.S. ENGINEERING AND SUPPORT CENTER,
HUNTSVILLE**

**U.S. ARMY CORPS OF ENGINEERS,
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Prepared by:

PARSONS
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JANUARY, 2013

APPENDIX M - REMEDIAL DESIGN

FOR

THE 4825 GLENBROOK ROAD WORK PLAN

SPRING VALLEY, OPERABLE UNIT 3,
DERP/FUDS, WASHINGTON, D.C.
CONTRACT NO. W912DY-09-D-00062 TO 0006
FUDS MEC/CWM PROJECT NO. C03DC091801

PREPARED FOR:

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Date: January, 2013

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ACRONYMS AND ABBREVIATIONS

Acronyms	Definition
ABPs	Agent Breakdown Product
AC	Air Conditioner
AEGL	Acute Exposure Guideline Level
$AsCl_3$	Arsenic Trichloride
ASZM-TEDA	Activated Carbon, Impregnated with Copper, Silver, Zinc, Molybdenum, and Triethlyenediamine
AU	American University
AUES	American University Experiment Station
bgs	below ground surface
CAFS	Chemical Agent Filtration System
CEHN-CX	Corps of Engineers Huntsville – Center of Expertise
CENAB	U.S. Army Corps of Engineers, Baltimore District
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CSS	Chemical Safety Submission
CWM	Chemical Warfare Materiel
DA	Chlorodiphenylarsine
DAAMS	Depot Area Air Monitoring System
dBA	A-weighted decibels
dB	Decibels
DD	Decision Document
DDESB	Department of Defense Explosives Safety Board
DERP	Defense Environmental Restoration Program
DMM	Discarded Military Munitions
DOD	Department of Defense
ECBC	Edgewood Chemical Biological Center
ECS	Engineering Control Structure
EDS	Explosives Destruction System
EZ	Exclusion Zone
FAA	Federal Aviation Administration
Ft	Foot/Feet
FUDS	Formerly Used Defense Site

H	Mustard Agent
HI	Hazard Index
HTW	Hazardous Toxic Waste
IAC	Industrial Acoustics
L	Lewisite
MACS	Modular Aluminum Containment Structure
MCE	Maximum Credible Event
MD	Munitions Debris
MDEH	Material Documented as an Explosive Hazard
MEC	Munitions and Explosives of Concern
MGFD	Munition with the Greatest Fragmentation Distance
mg/Kg	milligrams per Kilograms
MINICAMS	Miniature Chemical Agent Monitoring System
mm	Millimeter
MMRP	Military Munitions Response Program
MPDS	Multiple Power Distribution System
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
PAC	Protective Action Criteria
PDS	Personnel Decontamination Station
RA	Remedial Action
RAO	Remedial Action Objectives
RCWM	Recovered Chemical Warfare Materiel
RD	Remedial Design
RI	Remedial Investigation
SARA	Superfund Amendments and Reauthorization Act
SDOF	Single Degree of Freedom
SSS	Site Safety Submission
SSWP	Site Specific Work Plan
SVFUDS	Spring Valley Formerly Used Defense Site
TEEL	Temporary Emergency Exposure Limit
USACE	U.S. Army Corps of Engineers
USAESCH	U.S. Army Engineering and Support Center, Huntsville

UU/UE	Unrestricted Use/Unlimited Exposure
VCC	Vapor Containment Cover
VCS	Vapor Containment Structure

1. INTRODUCTION

1.0.0.1 The site at 4825 Glenbrook Road (Figures 1-1 and 1-2) is within the Spring Valley Formerly Used Defense Site (SVFUDS) project, which falls under the Defense Environmental Restoration Program/Formerly Used Defense Sites (DERP/FUDS) Program. The project was initiated by the United States Army Corps of Engineers (USACE) to address potential contamination associated with U.S. Army activities conducted at the American University Experiment Station (AUES) during World War I. This site was part of the AUES, which the U.S. Government established to research the testing, production, development, and effects of noxious gases, Chemical Warfare Materiel (CWM), antidotes, and protective masks. The U.S. Army is the lead federal agency under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) for FUDS, including SVFUDS, and USACE. The Army selected the remedial action in accordance with CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA) [42 U.S.C. 9601 et seq.], and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) [40 CFR Part 300].

1.0.0.2 The Remedial Design (RD) is Appendix M of the Site Specific Work Plan (SSWP) for RD/remedial action (RA) at 4825 Glenbrook Road. The RD was developed in accordance with Military Munitions Response Program (MMRP) EP-1110-1-4009, USEPA CERCLA RD/RA, and the Performance Work Statement (PWS) for the Remedial Action at 4825 Glenbrook Road. This document outlines the remediation approach and procedures that may be used for the RA activities at 4825 Glenbrook Road.

1.0.0.3 The Remedial Action Objectives (RAOs) for the 4825 Glenbrook Road property have been established in the Decision Document (DD) for 4825 Glenbrook Road (USACE 2012b). In accordance with the DD, these RAOs for 4825 Glenbrook Road include:

- Prevent direct contact with soil having non-carcinogenic Hazard Index (HI) exceeding 1 (HI in excess of 1 indicates the potential for non-cancer effects (USEPA 1989a))
- Prevent direct contact with soil having a cancer risk in excess of 1×10^{-4}
- Remove military munitions from the Site, allowing for unrestricted use/unlimited exposure (UU/UE) use of this property

1.0.0.4 The planned RA for the 4825 Glenbrook Road site is to remove the house and cleanup the property to residential standards, thereby allowing for unrestricted future use of the property. Remediation goal for the 4825 Glenbrook Road site is 20 milligrams per kilogram (mg/kg) of arsenic.

1.0.0.5 The scope of the RA at 4825 Glenbrook Road includes:

a) Demolition of the house;

b) Excavation to the depth of bedrock or competent saprolite to remove, assess, and dispose of CWM or HTW impacted soil and any potential recovered chemical warfare materiel (RCWM), munitions and explosive concern (MEC), laboratory waste, and other suspect AUES-related debris remaining at or in the immediate vicinity of the area; and

c) Mobilization and demobilization efforts for these tasks.

1.0.0.6 The proposed sequence of work for the remedial action effort includes the following:

a) House demolition;

b) Site preparation;

c) Low Probability test pits and trench investigation with utility re-route;

d) ECS and monitoring equipment set-up;

e) High probability areas F, D, and E intrusive operations;

f) Low probability areas A and B intrusive operations; and

g) Site restoration

1.0.0.7 The purpose of the RD is to select a suitable engineering control for the RA of the high probability areas (Figure 1-3) and discuss other approaches that will be used for the RA at 4825 Glenbrook Road. To select an appropriate control measure for the excavation activities, Parsons assessed the feasibility of three engineering control alternatives. These engineering controls are required to protect the site workers and the public in the unlikely event of an accidental release of chemical agent. Possible controls include evacuation of personnel from the vicinity of the operation or the use of an Engineering Control Structure (ECS) designed to contain a release of agent. The RA work will be conducted under the approved Chemical Safety Submission for this effort (USACE 2012c). The CSS approval letter is included in Attachment M-1.

1.0.0.8 Any ECS selected will be used in combination with a chemical agent filtration system (CAFS) to maintain negative pressure within the ECS. This system will cycle air through a series of filter beds capable of absorbing and adsorbing chemicals in the air, including agent vapors, prior to exhausting that air to the atmosphere. A discussion on the configuration of a CAFS unit is included in Section 2.1.2.5.

1.1. SITE DESCRIPTION

1.1.0.1 The 4825 Glenbrook Road property is within the SVFUDS boundary, located in the vicinity of the current grounds of American University (AU). Figure 1-1 shows the 4825 Glenbrook Road site location within SVFUDS. Figure 1-2 shows the site map.

1.1.0.2 The terrain at the remediation area is characterized by a sudden drop in elevation along a retaining wall, to the south of the house, at a distance 7 feet (ft) to 4 ft from east to west. The difference in elevation from the top of the retaining wall is 8 ft. In addition from east to west, towards Glenbrook Road, the landscape slopes approximately 15 to 20 ft. Significant site preparation will be required prior to siting an ECS. Preparation work will include the demolition of the house to the basement level, removal of soil from the hillside of the backyard east of the retaining wall and the south side yard of 4825 Glenbrook Road. The basement walls where there is adjoining soil, basement slabs, the front porch, and the rear patio will not be addressed during the preparation activities and will remain to be addressed during the high probability excavation activities. These areas will require some temporary sloping/grading to be performed as discussed in Section 4 of this Appendix. The southern property line is currently delineated by a fence and part of the fence will be removed as required to ensure the ECS covers the required high probability area footprint. Figures 1-4 through 1-7 are photographs that show the site from different directions of the high probability areas. The elevation difference from east to west is the factor that limits the length of an ECS.

1.2. SITE HISTORY, PREVIOUS INVESTIGATIONS, AND SITE CHARACTERIZATION

1.2.0.1 The 4825 Glenbrook Road property located in northwest Washington, D.C. is a part of the former AUES. During World War I, the U.S. Government established the AUES to investigate the testing, production, and effects of noxious gases, antidotes, and protective masks. The AUES was located on the grounds of the current AU and used additional portions of property in the vicinity to conduct the research and development of CWM, including mustard agent (H) and lewisite (L), as well as adamsite, irritants, and smokes. Immediately after the war, these activities were transferred to other locations; the site was restored and returned to private owners.

1.2.0.2 Many investigations have been conducted over the years to characterize soil contamination and determine whether MEC, CWM, and AUES-related items from historic operations associated with the AUES, may be present. Detailed descriptions of these investigations are discussed in the Remedial Investigation (RI) report for 4825 Glenbrook Road (USACE 2011). Previous investigations associated with investigations of AUES-related debris are discussed in this section.

1.2.1 Test Pit Investigation - 2001

1.2.1.1 On May 21, 2001, the excavation of numerous test pits began at 4825 Glenbrook Road. Twenty-three test pits and two trenches were excavated at the property in accordance with Site Safety Submission (SSS), (USACE 1999). A Vapor Containment Structure (VCS) was used as an ECS during the investigation of Test Pit 23 after MEC was uncovered. All the other test pits and trenches were investigated under a tent. Air monitoring during the excavation was performed by the Edgewood Chemical Biological Center (ECBC) air monitoring team.

1.2.1.2 Trench 01 was excavated along the property line between the 4825 and 4801 Glenbrook Road properties to locate potential burial trenches. Trench 01 measured approximately 150 ft in length and approximately 3 ft in width. The depths to saprolite in Trench 01 varied between 2 ft to 8 ft.

1.2.1.3 Trench 02 was excavated on the driveway at 4825 Glenbrook Road to investigate the source of the arsenic concentrations detected in soil boring samples collected from the driveway. Trench 02 measured approximately 40 ft in length and approximately 10 ft in width. A drainage pipe was encountered at a depth of 5 ft below ground surface (bgs). Trench 02 area was excavated to 6 ft bgs during the arsenic removal in 2009.

1.2.1.4 All the test pits were excavated to a depth of approximately 6 ft below the historic 1918 ground surface or the maximum depth achievable by powered equipment. The maximum depth reached during the test pits investigation was 12 ft. There were no significant findings in any of the test pits except for Test Pit 23.

1.2.1.5 During the investigation of Test Pit 23, a total of 18 RCWM-related items and 406 MEC-related items were recovered. All MEC and RCWM items were placed in the Interim Holding Facility at the Federal Property. MEC items were subsequently safely demilitarized in accordance with Site-Wide CSS (USACE 2002). RCWM were subsequently safely demilitarized in accordance with (USACE 2003). Items were observed under a retaining wall in close proximity to the house foundation. The portion of the test pit at 4801 Glenbrook Road was closed and a separation wall was constructed between the two properties to facilitate backfill and closure activities.

1.2.1.6 The 4801 Glenbrook Road portion was cleared and closed; however, items remained in the north and northwest portion of Test Pit 23 at the 4825 Glenbrook Road site. At that time, the 4825 Glenbrook portion of Test Pit 23 was temporarily backfilled pending resolution of right-of-entry issues and a review of technical approaches. After entry issues were resolved, excavation resumed and the items were removed.

1.2.2 Burial Pit 3 and Burial Pit 3 Extensions Investigations - October 2007 – March 2009

1.2.2.1 In October 2007, the higher probability investigation recommenced at Burial Pit 3, formerly called Test Pit 23, at 4825 Glenbrook Road under a CSS (USACE 2007b) and a Site Specific Work Plan (USACE 2007a). The primary goal of this higher probability intrusive investigation was to remove all potentially AUES-related material from the suspect Burial Pit 3 disposal area. All intrusive operations were conducted inside a negative pressure ECS and air monitoring for chemical agent was conducted by ECBC. During this period, eight grids of the original 50 ft by 16 ft proposed excavation were excavated and cleared of debris.

1.2.2.2 The excavation was extended to the east due to evidence found during the Burial Pit 3 investigation indicating that AUES-related items remained in the soil. The ECS was extended to the east by addition of 11 ft by 16 ft structure that was connected to the original structure. Investigation of east extension of Burial Pit 3 was conducted between 28 April, 2008 and 24 July, 2008.

1.2.2.3 A south extension was added after the first east extension to clear the anomalies on the 4801 Glenbrook property, adjacent to the Pit 3 ECS. The ECS dimensions were 16 ft wide, 34 ft long and 16 ft high on the hillside and 12 ft high on the Glenbrook Road side. 19 single-item anomalies and one exploratory trench were excavated and no AUES-related items were found. Work began on October 20, 2008 and completed on October 28, 2008.

1.2.2.4 Based on the investigation findings within the east extension, the ECS was further extended on the east to resolve detected anomalies present on the east. It was further extended by addition of 24 ft by 16 ft structure that was connected to the east extension original structure. No MEC or RCWM items were found during the investigation. Investigation of the 2nd east extension of Burial Pit 3 was conducted between January 12, 2009 and March 12, 2009.

1.2.2.5 During the investigation of Burial Pit 3 and Burial Pit 3 extensions (October 2007 – March 2009), a total of twenty-two MEC, six CWM and 80 munitions debris (MD) items were recovered. These items were identified as 75millimiter (mm) projectiles, 2-inch and 3-inch pipes with end caps, 4.7-inch projectiles, and intact glass container. The 22 MEC items included 75mm projectiles and a 4.7-inch projectile. CWM included one intact glass vial analyzed by ECBC to contain CWM, chlorodiphenylarsine (DA or Clark 1, a CA respiratory irritant), and the item was subsequently destroyed by ECBC. Five 75mm projectiles were also categorized as CWM and later destroyed in the Explosive Destruction System (EDS).

1.2.3 High Probability Test Pits (120, 134 and 138) Investigation - November 2009 – April 2010

1.2.3.1 Forty-one low probability[1] test pits were completely investigated between March and August 2009. Suspected AUES-related glassware debris was uncovered from one test pit (TP 117) at 6 ft bgs. This debris was headspaced and cleared headspace analysis. Little or no cultural debris were found in the remaining test pits. Seven low probability test pits were not investigated. TP 120 and TP 138 were initially investigated as low probability test pits and were investigated later as high probability[2] test pits due to detections of agent/Agent Breakdown Products (ABPs).

1.2.3.2 Test Pits 120, 134, and 138 were investigated as high probability test pits between November 2009 and April 2010. During the investigation of these three high probability test pits, thirty-seven CWM, two MEC, three MD items and 105 scrap items were recovered during the investigation of TPs 120, 134 and 138. Twenty-six of the 37 suspect CWM items were analyzed and destructed by ECBC. Agent/ABPs and industrial chemicals such as chloroacetophenone, diphenylchloroarsine, and arsenic trichloride ($AsCl_3$) were detected in these containers. Among the CWM items recovered from TP 134, a pressure cylinder and eight scrap items were later decontaminated, cleared for headspace, and incinerated at licensed incineration facilities. Two CWM items from TP 138 also were decontaminated, cleared for headspace, and incinerated at licensed incineration facilities. MEC and MD items recovered were demilitarized and disposed at a metal smelter. Agent/ABPs impacted soil excavated during the investigation was placed in drums and disposed at Veolia Incineration facility in Port Arthur, TX. Metals

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[1] Low probability areas are defined as areas where there is a low probability that AUES-related debris may be encountered.

[2] High probability areas are defined as areas where there is a high probability that AUES-related debris may be encountered.

detected in agent/ABP-cleared grab samples that exceeded the accepted comparison levels included aluminum, thallium, arsenic, iron, and magnesium. Grab sample results show that soil exceeding the SV arsenic remedial goal of 20 mg/kg still remain in this area. The investigation was ceased due to detection of $AsCl_3$ in a vapor and solid samples. The site was rendered safe by backfilling and further RA to be conducted under this effort.

1.2.4 Geotechnical Soil Boring - August 2010

The six geotechnical borings advanced inside the basement of the 4825 Glenbrook Road house encountered saprolite at depths between 8 inches and 14 inches in all borings. Refusal was encountered in two locations (GS-01 and GS-02) near the backyard of the house at depths of 12 inches and 13.5 inches bgs, respectively. Water was encountered in the other four borings (GS-03 through GS-06) at depths between 84.5 inches to 98 inches bgs. Soil encountered beneath the house appeared to be native soil. Neither suspected AUES-related debris nor cultural debris was encountered during the investigation. Analytical results of the six agent cleared soil samples show no exceedances detected in GS-01 and GS-02. Metals, including aluminum and vanadium, were detected at concentrations exceeding the accepted comparison levels in GS-03. Aluminum concentrations exceeded the comparison level in GS-04 through GS-06.

1.2.5 Backyard Soil Sampling - August 2010

The backyard soil sampling consisted of 15 sample locations performed for agent/ABP confirmation. Results show that lewisite was detected in two samples (SW-4825GB-MM-2 and SW-4825GB-PP-2) collected at 3 ft bgs near the back porch. Analytical results of two soil samples cleared for agent/ABPs show that metals, including aluminum, manganese, and vanadium, were detected at concentrations exceeding the accepted comparison levels.

1.2.6 Sewer Line Restoration - 2011

While constructing a permanent sewer line and manhole in 2011, a 75mm projectile and an intact AUES glass flask with a dirt or cork plug containing a small quantity of brown solids were found in an area adjacent to an area previously excavated in 2001. The 75mm projectile was determined to be an MD item. The glass flask was determined to be CWM glassware because agent/ABP was detected in the glass flask.

1.2.7 Summary of Site Investigations

A total of 97 MEC items, 62 CWM items including 39 CWM glassware and 23 CWM munitions, 417 MD items, and 142 scrap items were recovered from the investigation activities performed at 4825 Glenbrook Road. Items recovered from each investigation activity are listed in the Table 1.1.

Table 1.1 Recovered CWM and Munitions-Related Items Summary at 4825 Glenbrook Road

Investigation Area	CWM Glassware	CWM Munitions	Total CWM items	MEC	MD	Scrap	Investigation Timeline
TP 23	0	18	18	73	333	No Record	2000-2001
Burial Pit 3 and East Extension	1	5	6	22	80	37	2007-2009
TP 138	2	0	2	0	0	10	2009
TP 120	5	0	5	0	0	21	2009-2010
TP 134	30	0	30	1	4	74	2009-2010
Sewer Line	1	0	1	0	1	0	2010
Total:	**39**	**23**	**62**	**96**	**418**	**142**	

Note: The preliminary assessment of one MEC item found during high probability investigation near TP 134 was later determined to be an MD item.

1.3. EXCAVATION BOUNDARIES OF HIGH PROBABLITY AREAS FOR THE SELECTED REMEDIAL ACTION REMEDY

1.3.0.1 The excavation boundaries of low and high probability areas for the selected remedial action remedy in the DD (USACE 2012b) are illustrated in Figure 1-3. Low probability areas include Areas A, B, and C. High probability areas include Areas D, E, and F.

1.3.0.2 Among the low probability areas, Area A represents the backyard, 10 ft behind the current retaining wall, representing a realistic practical extent of possible redistribution of burial pit contents during property development. Area B represents the flat of the driveway. Area C includes the area investigated as Burial Pit 3 and its associated extensions, and based on the extensive work performed previously, no further action is proposed there.

1.3.0.3 Among the high probability areas, Area D is the flat terrain between the backyard retaining wall and the house. Area F is the front yard down to Glenbrook Road. Area E represents the house and the soil beneath the house. High probability areas are the focus of the remedial design.

1.4. MUNITION WITH THE GREATEST FRAGMENTATION DISTANCE (MGFD) AND MAXIMUM CREDIBLE EVENT (MCE)

1.4.1 MGFD

1.4.1.1 There is no MGFD selected for the RA at 4825 Glenbrook Road as the potential for encountering MEC items in the high and low probability areas identified for the remedial action is unlikely based on the MEC/CWM probability assessment (USACE 2012a). As there is no MGFD associated with the remedial action, blast and fragmentation mitigation will not be required for this RA.

1.4.2 MCE

1.4.2.1 The MCE is used for contingency planning and is the maximum release of a chemical agent from a munition, bulk container, or process that could occur as a result of an unintended, unplanned, or accidental incident. The event must be realistic with a reasonable probability of occurrence.

1.4.2.2 Based on an evaluation conducted by USAESCH, the MCE identified for remedial actions at 4825 Glenbrook Road was originally proposed to be the evaporative release of lewisite from a 1-liter container. Lewisite was selected because it was one of the most frequently detected chemical agent during previous investigations at the site and one of the most probable chemical agents expected to be encountered at the site (the other being mustard agent). However, due to detection of $AsCl_3$ in one glass container, the MCE was re-evaluated to confirm that the MCE distance proposed using 1 liter of lewisite adequately covers the release of other industrial compounds. The MCE hazard distance under the ECS will be limited to the confines of the ECS.

1.4.2.3 The AEGL-2 hazard distance for the evaporative release of lewisite from a 1-liter container is 28 meter (92 feet). The Department of Energy (DOE) Temporary Emergency Exposure Limit (TEEL) was used for $AsCl_3$ because AEGL-2 defined by U.S. Environmental Protection Agency (USEPA) is not available and TEEL is the DOE temporary value until a chemical is reviewed and approved through the AEGL process. Considering the interim nature of the TEEL values, the hazard distance of release from 1 liter of $AsCl_3$ was evaluated using the more stringent TEEL-1 instead of the TEEL-2 value to protect the general population although TEEL-2 has the same toxicological endpoints as AEGL-2. The TEEL-1 distance for the evaporative release of $AsCl_3$ from a 1-liter container is 59 meter (194 feet). Hence, as a conservative approach, the TEEL-1 hazard distance of 59 meters is selected as the MCE. Figure 1-8 shows the MCE-related hazard distance for the PPP for this RA. The D2SV models for $AsCl_3$, phosgene oxime, and HCl are included in Attachment M-2.

1.4.3 Exclusion Zone

Since there is no MGFD, the exclusion zone (EZ) for the RA will be based on the MCE hazard distance. Therefore, for planning purposes, the EZ distance for this investigation will be 194 ft, unless an ECS is used. If an ECS is used, the EZ will be reduced to within the limits of the ECS based on the capability of the ECS to contain the chemical agent. Table 1.2 provides guidance on input parameters for air monitoring in the EZ that is to be used by the field team with the D2SV Model during operational air monitoring for this site:

Table 1.2 Input Parameters for D2SV Model during Operational Air Monitoring at 4825 Glenbrook Road

Criteria	Input Value	Reason/Explanation*
1	0	For novice level
2	Edgewood Area (EWA)	As is used throughout all sites on the Spring Valley FUDS
3	Actual season the work is being done	
5	NON	As MCE is 1 liter non-munitions container
6	LL	As Arsenic Trichloride is our MCE for this site
7	LT1	For 1 liter of agent as a source
8	EVP	As an evaporative release of 1 Liter of Arsenic Trichloride is the MCE selected for this site
9	Actual stability if known; D (neutral) otherwise to be conservative	Other stability values that may be used are A- very stable, B- unstable, C- slightly unstable, D – neutral, E – slightly stable, and F - stable
12	Ambient temperature	
17	Gravel, Loose Earth (GRA)	For surface code
18	60	For minutes the agent is allowed to evaporate
ALL OTHER INPUT	NDI 2 or 3	As this input does not affect the plume distances
ALL OTHER INPUT	ALL.	

Note – Wind speed does not necessarily increase the EZ distance. Depending on agent, terrain and stability, it may shorten EZ distance.

1.5. ORGANIZATION OF THE REMEDIAL DESIGN – ENGINEERING CONTROL EVALUATION DOCUMENT

The report is organized into four sections. Section 1 contains the introduction; Section 2 describes the engineering control alternatives and makes a recommendation for the engineering controls to be used; Section 3 identifies the selected alternative; and Section 4 presents a summary of the evaluation. Additional information on the recommended option is presented in the attachments.

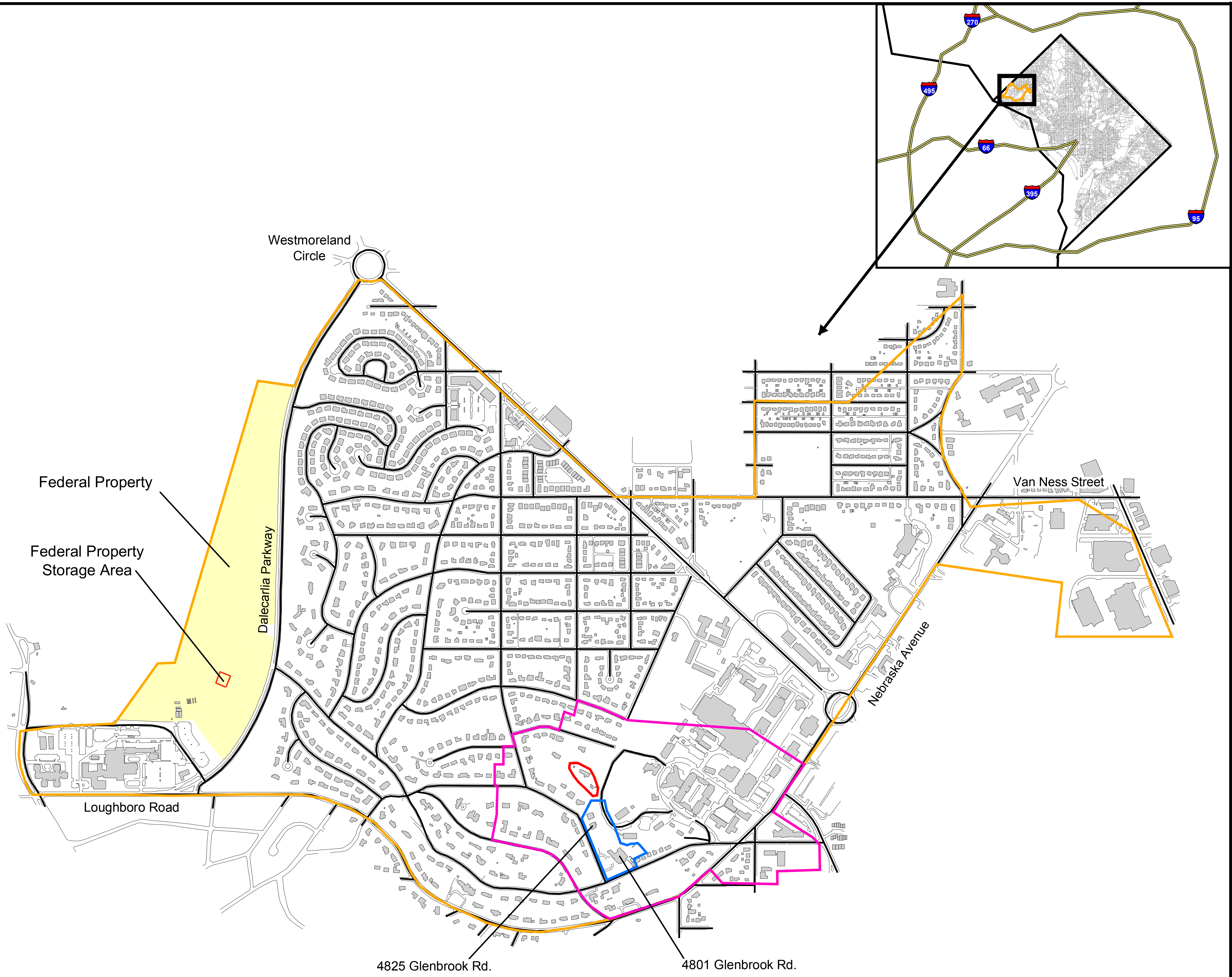

Figure 1-1
Spring Valley FUDS Location and Operable Units

Spring Valley
Washington, D.C.

Legend

▨ Buildings
╱ Road
🟨 Federal Property
╱ Federal Property Storage Area

Operable Unit
🟥 OU-2
🟦 OU-3
🟪 OU-4
🟧 OU-5

Notes:

1. OU-1 encompasses all of the areas depicted as OU-2, 3, 4, and 5.
2. OU-4 and OU-5 do not include the smaller operable units shown within their boundaries (e.g., OU-4 does not include the areas shown as OU-2 and OU-3).

1,200 600 0 1,200 Feet

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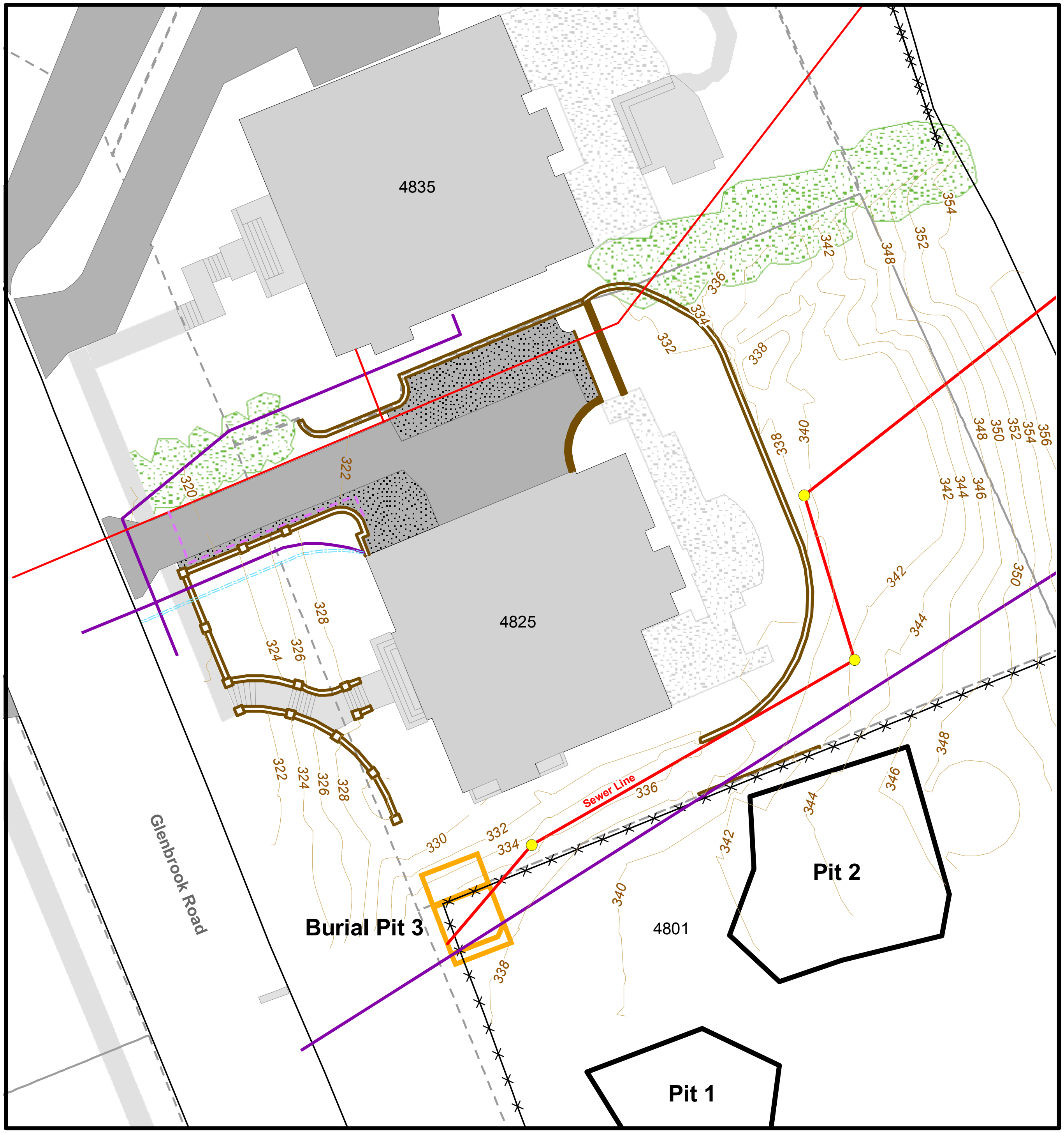

Figure 1-2
Site Map
4825 Glenbrook Road

Spring Valley
Washington, D.C.

Legend

- ▬ Pits 1 & 2
- ▭ Test Pit 23 (Burial Pit 3)
- ⌐ ¬ Parcels
- ▨ Buildings
- ▨ Driveway
- ▨ Gravel Surface
- ▨ Sidewalk
- ▨ Deck/Porch
- 🟩 Shrubbery
- ×—× Property Fence
- — Retaining Wall
- ● Manhole
- — Sewer Line
- — Water Line
- — Gas Line
- - - Electric Line
- ⋀ Elevation Contours

30 15 0 30
Feet
1 inch equals 30 feet

Scale: 1:360
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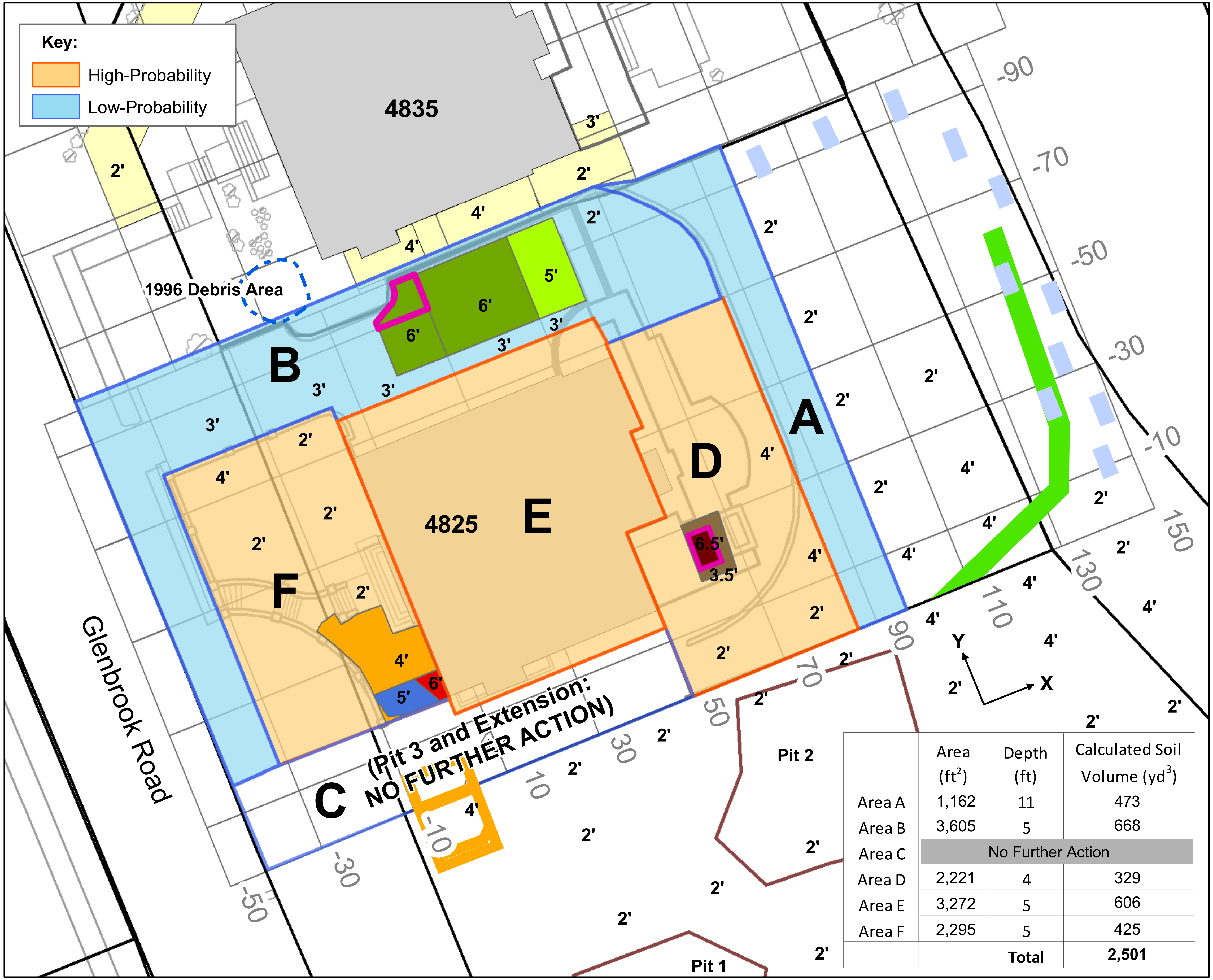
Figure 1-3
Proposed Remedial Action
4825 Glenbrook Road

Spring Valley
Washington, D.C.



	Area (ft^2)	Depth (ft)	Calculated Soil Volume (yd^3)
Area A	1,162	11	473
Area B	3,605	5	668
Area C	No Further Action		
Area D	2,221	4	329
Area E	3,272	5	606
Area F	2,295	5	425
		Total	2,501

Legend

- ⬜ Buildings
- ☐ Property Boundaries
- ☐ 20' Grid
- — Pits 1 and 2
- ☐ Test Pit 23 (Burial Pit 3)
- ☐ Arsenic Exceedance to be Further Excavated
- 🟩 Trench for Rerouted Sewer Line

Additional Low Probability Investigation

- 🟦 Test Pits

Arsenic Soil

- 🟩 Arsenic Grid Previously Removed [5'] (2009)
- 🟩 Arsenic Grid Previously Removed [6'] (2009)

Soil Excavation

- 🟫 Excavation Depth [3.5'] (2009)
- 🟧 Excavation Depth [4'] (2010)
- 🟦 Excavation Depth [5'] (2010)
- 🟥 Excavation Depth [6'] (2010)
- 🟥 Excavation Depth [6.5'] (2009)
- ⬚ 1996 APEX Tree Removal (Debris Area) Perimeter
- 🟨 Previously Excavated Arsenic: Adjacent Properties

Note:
Excavation depths shown from previous arsenic removal.

0 10 20 40 Feet
1 inch = 20 feet

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Figure 1-4 Site photo taken from the northeast corner of the house from the backyard below the retaining wall looking at the high probability Area D.

Figure 1-5 Site photo taken from the southeast side of the property looking west on the back yard at high probability Area D.

Figure 1-6 Site photo taken from the northwest corner of the property looking east up toward the high probability Area F.

Figure 1-7 Site photo taken from the southwest corner

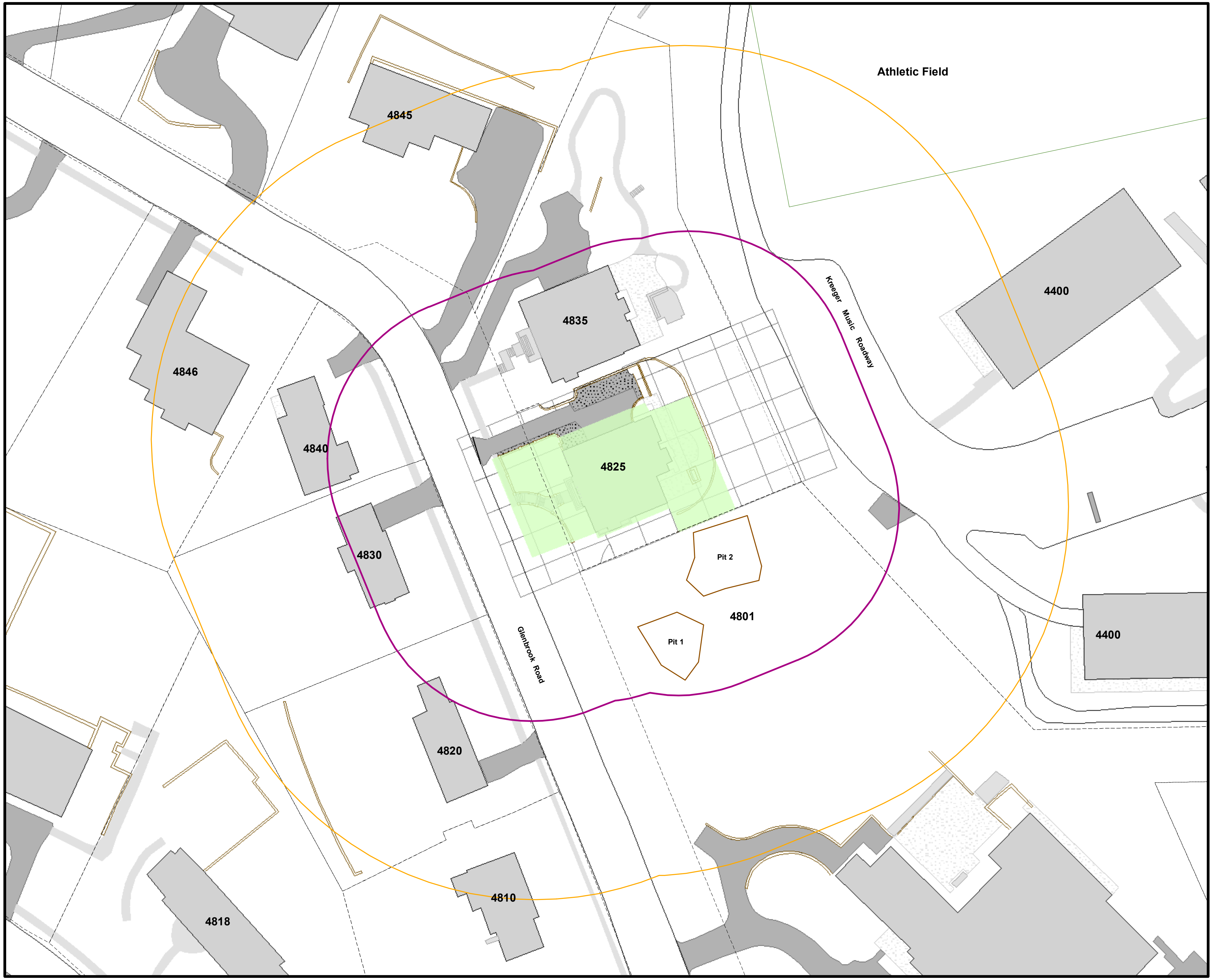

Figure 1-8
MCE Hazard Distance
High Probability Excavation
4825 Glenbrook Road

Spring Valley
Washington, D.C.

Legend

- ▨ Buildings
- ▨ Deck/Porch
- ▨ Sidewalk
- ▤ Stairs
- ▨ Driveway
- ▨ Gravel Surface
- — Retaining Wall
- ☐ Property Boundary
- ☐ 20' Grid
- — Pits 1 & 2
- 🟩 High Probability Excavation Area
- ☐ 1 Liter Lewisite: 29 Meters (AEGL-2)
- ☐ 1 Liter $AsCl_3$ (MCE): 59 Meters/194 Feet (TEEL-1)

0 25 50 100 Feet

1 inch = 60 feet

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2. ENGINEERING CONTROL ALTERNATIVES

2.1. IDENTIFICATION OF ALTERNATIVES

2.1.0.1 Alternatives were identified that would contain the MCE for this RA effort. At previous investigations at 4825 Glenbrook Road, Modular Aluminum Containment Structures (MACS) were used in conjunction with Vapor Containment Cover (VCC) (a fabric cover to contain vapor) to contain the MGFD. For this SSWP, however, no MGFD has been identified, only an MCE of arsenic trichloride release. Therefore, the MACS option will not be considered in the alternatives evaluation.

2.1.0.2 Based on the MCE and unique site constraints for this RA, the following basic alternatives and configuration options were considered in addition to evaluating the option of evacuation:

- Evacuation - This would involve members of the public and unprotected site workers being withdrawn to a location outside the EZ. For this alternative, the EZ would be the TEEL-1 distance of the MCE, which is 194 ft.

- ECS Option 1 – Tent with CAFS: Various configurations of tent ECS have been approved by the government for use with chemical agent hazards at the SVFUDS as it will maintain negative pressure. It has been successfully used at a number of sites including the initial 2001 Test Pits investigations at 4825 Glenbrook Road (a 30 ft by 30 ft tent), the AU Lot 18 investigation (a 60 ft by 100 ft Rubb tent structure), and the 2009-2010 high probability test pits investigation at 4825 Glenbrook Road. This ECS is capable of containing chemical agent hazards, it is not designed to contain blast and fragment hazards.

- ECS Option 2 – Vapor Containment Structure (VCS) (constructed of metal) with CAFS: The VCS has been approved by the government for use with the 75 mm MkII chemical round as it will sustain minimal damage and maintain negative pressure. It has been successfully used at a number of sites including 2000-2001 Burial Pits 1 and 2 investigations at 4801 Glenbrook Road and the 2002 high probability test pits TP 23 investigation at 4825 Glenbrook Road. This ECS is capable of containing blast, fragment, and chemical agent hazards.

2.1.0.3 Each alternative was evaluated against four basic criteria:

- *Whether or not the proposed alternative will control/contain the MCE*. If the controls will contain a release of agent resulting from the MCE, then the EZ associated with the MCE will be confined to within the limits of those controls.

- *Whether or not the proposed alternative will require the evacuation of any local residents*. If the required EZ for the RA encompasses any occupied local residences, those residences will need to be evacuated during excavation activities. Based on previous discussions with the Spring Valley Partners, evacuation is not typically a preferred alternative when other options are feasible.

- *Whether or not the proposed alternative can be implemented within the topographical and space constraints of the project site.* As described in Section 1, the site at 4825 Glenbrook Road presents various space constraints for the planned excavation activities. In addition to space constraints, there are terrain (slope) issues that will impact excavation activities. Any engineering controls used will need to be of an appropriate size and adaptable to the site terrain in order to be implemented for this investigation.

2.1.0.4 Table 2.1 below summarizes the evaluation of the three suggested alternatives. Each evaluation is explained further in the following paragraphs.

Table 2.1 Evaluation of ECS Alternatives

Alternatives	**Controls MCE?**	**Does Not Require Evacuation?**	**Accommodates Site Constraints?**	**Reference to previous use at OU-3**
Evacuation	✓	X	✓	✓ (Small Disposal Area)
Tent with CAFS (ECS Option 1)	✓	✓	✓	✓(High Probability Test Pits 2009-2010)
VCS with CAFS (ECS Option 2)	✓	✓	X	✓ (Burial Pit 3 Investigations)

✓ - Alternative meets the criteria x – Alternative does not meet the criteria

2.1.1 Evacuation

2.1.1.1 The EZ for this alternative will be 59 meter (194 feet) for the MCE and, consequently, this scenario will require evacuation of several surrounding properties for the duration of the RA estimated to be approximately 120 days. Due to the duration of evacuation, this alternative is not recommended for the investigation at 4825 Glenbrook Road.

2.1.2 Tent with CAFS (ECS Option 1)

2.1.2.1 Several configurations of tent ECS have been successfully used at a number of sites at SVFUDS, including previous investigations at TP23, and TPs 120, 134, and 138 at 4825 Glenbrook Road and at the nearby AU Lot 18. For the previous investigations at Lot 18, the tent was placed over the investigation area and moved over time to clear the entire area of Lot 18. The tent previously used at Lot 18 was 100 ft wide by 60 ft long. The tent previously used at TP

138 was 24 ft wide by 16 ft long by 14 ft high and the tent previously used at TPs 120 and 134 was 38 ft wide by 24 ft long by 14 ft high.

2.1.2.2 The tent ECS under consideration is a commercial tent typically made of reinforced vinyl material manufactured by Rubb Inc. of Sanford, Maine and generally referred to as Rubb. It is large enough to accommodate mechanized equipment, such as the mini-excavator. The typical tent comprises a metal frame that rests on four limbs with no specific foundation members. To anchor this tent, the corners would be tied down with ropes and stakes. Sand bags and concrete blocks or jersey barriers would be used around the limbs for additional support. In addition sand bags would be used to hold down side wall skirts and where openings occur due to uneven terrain to help create the negative pressure environment inside the tent maintained by the CAFS. The type of tent under consideration is suitable for short-term projects (six months or less) and may be impacted by weather events, such as thunderstorms, or heavy snow. The Rubb structure has a structural loading rate of 25 pounds per square foot (psf) ground snow load and 90 mile per hour (mph) winds with 3 second gusts. The Rubb is designed to meet with IDC - 2000 Code.

2.1.2.3 A personnel door and a roll up door will be the accesses to this tent through overlapping flaps on the side of the structure. The flaps can be rolled up for equipment access or pulled aside for personnel access. Once erected, all but one of the flaps would be sealed. Figure 2-1 shows a typical example of the ECS tent at Spring Valley.

2.1.2.4 The tent ECS structure used for previous high probability investigations at SVFUDS will be reused and will be modified to meet the new requirements (*i.e*.. larger footprint coverage) for 4825 Glenbrook Road RA. A detailed tent design drawing provided by Rubb manufacturer is included in Attachment M-3. Additional installation drawings will be provided prior to installation.

2.1.2.5 The CAFS unit includes pre-filter, HEPA filter, carbon ASZM-TEDA filter, carbon ASZM-TEDA filter, and HEPA filter. ASZM-TEDA is activated carbon, impregnated with copper, silver, zinc, molybdenum, and triethlyenediamine. This military carbon ASZM-TEDA was used in the sorbent to provide broad spectrum vapor filtration protection and degrade the hazard including nerve agent, blister agent, phosgene (choking agent), cyanogen chloride (blood agent), hydrogen cyanide (blood agent), and arsine (blood agent) (http://www.cdc.gov/niosh/docs/2003-136/2003-136g.html). The arsenic trichloride filtration performance with the impregnated carbon ASZMT study performed by ECBC (ECBC 2011) indicates that carbon ASZM-TEDA is also effective for arsenic trichloride. The configuration of the CAFS unit is illustrated on a diagram included in Attachment M-4. Air monitoring will be performed at the pre-filter, mid-bed, and CAFS exhaust locations as specified in Table D1.8.1 of Appendix D.

2.1.3 VCS with CAFS (ECS Option 2)

The VCS has been approved by the government for containment of the MCE and mitigation of MGFD for previous investigations at 4825 Glenbrook Road when MEC was expected to be encountered. The VCS has been successfully used at a number of sites at SVFUDS, including the previous investigation of Test Pit 23. For the previous investigation, the VCS was placed on both the 4825 and the 4801 Glenbrook Road properties. Figure 2-2 shows a typical example of the VCS at Spring Valley. However, for this RA, the VCS cannot be placed on the 4825 Glenbrook Road sloped front yard or in the limited space of the backyard as the VCS is more suitable for flat terrains. Since the VCS can only be built in modules of a fixed size (30 ft wide by 20 ft long by 17 ft high) and it cannot be adjusted to meet the limited space at the site and a steep slope constraint, the VCS is not a feasible ECS option for this RA.

2.2. RECOMMENDED ALTERNATIVE

Based on the evaluation conducted in this chapter, the engineering control alternative recommended for use during the RA at 4825 Glenbrook Road is ECS Option 1 – Tent with CAFS. The ECS tent fits the site constraints and contains the MCE selected for 4825 Glenbrook Road while the VCS is unable to fit the site constraints and evacuation is not a preferred choice. In addition, the ECS tent was previously used to effectively perform the high probability test pits (TPs 120, 134 and 138) investigation.

Figure 2-1 Tent at Spring Valley

Figure 2-2 VCS at Spring Valley

3. PROPOSED ECS CONFIGURATION

3.0.0.1 As discussed in the previous section, the tent with CAFS alternative is recommended engineering control method for the remedial action of the high probability areas including Areas D, E, and F at 4825 Glenbrook Road (Figure 1-3). Considering the site layout, a tent (Rubb manufactured structure) with CAFS attached to contain chemical agent vapors will be utilized to implement the recommended alternative. The total size of the structure will be 60 ft wide by 84 ft long by 17 ft tall, and will be assembled from two and half 60 ft by 33 ft modular sections.

3.0.0.2 The proposed front yard tent location (first location) will cover the high probability areas (Area F, the area in front of the house, and Area E, and the front part of the house). The proposed second backyard tent location will cover the high probability areas Area E including the remaining back part of the house, and Area D including the backyard and the backyard retaining wall area. The proposed third tent location will cover the high probability Area E, the back part of the house to the edge of the back porch. Figure 3-1 shows the three tent locations.

3.0.0.3 The retaining wall within the high probability Area D including the front retaining wall footer will be removed under the high probability operation. However, the rest of the backyard retaining wall and the back retaining wall footer within Area A are proposed to be removed under the low probability operation as described in Section 4.3. The Rubb structure will first be constructed in the first tent location located at the front yard of the property. The structure will then be re-located by crane to the second location after RA is complete at the first location, and then be relocated to the backyard third location after RA is complete at the second location again by crane. The final determinations of the measurements will be made in the field to fit the site constraints. Personnel decontamination station (PDS), medical monitoring tent, and MINICAMS trailer located on the basement slab will be relocated after the completion of the first tent location and situated in the front yard for the second and the third tent locations. Three CAFS units and MINICAMS will be located on a flat surface on the hillside. The backup generator, MPDS, cascade system will be located on the AU parking lot next to the commend post and trailer. The proposed site layout for the high probability excavation and the MCE distance for each ECS location are illustrated in Figure 3-1.

3.1. ECS CONFIGURATION

3.1.1 ECS Layout Overview

3.1.1.1 The ECS consisting of a Rubb tent is the same tent structure used for Lot 18 investigation with different dimensions. The Rubb tent will be installed to cover the entire high probability areas at 4825 Glenbrook Road in two moves (*i.e.*, three locations). The three locations provide more room inside the ECS to allow for slope stability during excavation. Figure 3-2 (provided at the end of the section) shows the proposed ECS layout for the preferred configurations.

3.1.1.2 The Rubb tent consists of steel framework and poly vinyl chloride (PVC) coated polyester fabric. The tent can be customized in strength and fabric lengths as needed. It is modular, with each piece being configured as an approximately 33-foot by 30-foot section approximately 27 feet high at the apex and 17 feet high at the sidewall. The total size of the structure used for the investigation at 4825 Glenbrook Road will be 60 feet wide by 84 feet long by 17 feet tall, and will be assembled from two and half 60-foot by 33-foot modular sections. Figure 2-1 is a typical layout of a Rubb tent previously used at Spring Valley. The structure is held together on a metal foundation, with a 16-foot opening for the access way of rolloffs and two personnel doors. A combination of ballast weights and concrete blocks will be used to support and stabilize the structure. Additional sand bags would be used to hold the bottom skirts in place to provide a negative pressure environment. Although the Rubb tent has been used for short-term projects, the manufacturer estimates the structure could last for 15 years with some limitations. Previous use by Parsons indicates the structure holds up well in high wind and snowy conditions, when used over an extended period.

3.1.1.3 The Rubb structure allows the use of a large excavator. An added advantage of this structure is that its modular structure is designed to allow two shelters to be linked together to create an even larger workspace. For the 4825 Glenbrook Road RA, two and half Rubb modules will be linked together to cover the high probability areas. In addition, the Rubb tent is manufactured to be moved intact. Once constructed, the tent can be moved intact with a crane. A 120 ton all terrain crane (or similar, larger crane) will be used for the lift operation. The crane will be located partially on the Glenbrook Road near Burial Pit 3 for the first ECS location, and located in the driveway entrance for the second and third ECS locations. A lift plan is included in the Appendix D – Accident Prevention Plan.

3.1.1.4 Some site preparation work will be necessary prior to the construction of the tent. Anomaly avoidance will be performed during site preparation work using a Schonstedt by qualified UXO personnel if preparation work involves excavating in area not previously cleared. Previously cleared areas will not require anomaly avoidance. The CAFS location in the backyard above the retaining wall will require the slope to be cut as described in Section 4 of this appendix. The proposed grading plan for ECBC equipment setup as it relates to ECS placement is illustrated in Figure 3-3. In addition, several areas around the sides and front of the house will need to be cribbed to provide a flat surface for essential stations. Following the tent frame completion, the tent fabric will be placed around the tent structure. The fabric will be attached securely to the ground surface with sand bags and cement blocks/jersey barriers to provide a strong and secure structure that will help maintain negative pressure for the area under the tent. The specific Rubb design is included in Attachment M-3.

3.1.1.5 Access to the ECS is provided by lace-up and zipper doors. Three exits are proposed for each ECS location (Figure 3-1): two personnel entrances/exits and an opening on the left corner in the front of the ECS for removing drums or rolloffs. An access vestibule (approximately 4 ft by 6 ft) will be constructed adjacent to a personnel door. The front yard tent will be located approximately 5 ft east of the steps retaining wall from the Glenbrook Road and partially cover the driveway and the front footprint of the house. An excavator will be moved inside the tent from the driveway and staged on the basement slab before the tent is erected for ease of access. The ECS can tolerate approximately 2 ft of elevation difference between the front sidewall I-beam and the back sidewall I-beam. To set up the three ECS locations (Figure 3-

2), cribbing with wood timber, or Speed Shore will be used as necessary to ensure the stability of the Rubb structure. Benching and sloping will also be performed as needed. The three tent locations (Figure 3-2) will overlap to ensure the high probability areas will be fully excavated.

3.1.2 ECS Layout Details

3.1.2.1 The RA for the high probability areas will start in the front yard at the first ECS tent location. The slab of the basement floor will be available to be used as the staging area for equipment as the house demolition of activities will conduct prior to ECS set-up. The ECS will rest on an I-beam forming part of the base of the structure. This I-beam sits directly on the ground surface and helps distribute the weight of the ECS. During the initial setup the I-beam on the front side of the ECS will sit on ground near the edge of Area F; along the 4825 Glenbrook Road curb. The rear ECS "I" beam will be situated on the remaining basement floor of 4825 Glenbrook Road. Detailed cross sections of the front and back I-beams for the 1st ECS location are illustrated in Figures 3-4 and 3-5, respectively. The elevations of various structures are illustrated on these cross-sections. Figure 3-4 shows the layout of the front side I-beam. Section A shows a profile of the front left corner of the ECS at ground level as if viewing from the street at 4825 Glenbrook Road. Section B on Figure 3-4 is a cross section from Glenbrook Road to the front within the front of the ECS looking north toward the 4835 property. There is an elevation difference between the front yard (319 ft AMSL) and the top of the basement slab (322 ft AMSL), where the I-beams will rest. As there is an elevation difference, approximately 2 to 3 ft of cribbing with wood timber or speed shoring is needed for the front I-beam to keep the ECS level. Figure 3-5 shows the layout and cross sections of the rear right side ECS. Soldier piles and lagging will be installed outside the south gable end of the first and third ECS locations, as shown on Figure 3-4 (partially) and Figure 3-5. A cut will be made in the structure wall and window well so the ECS I-beam can rest across the top of the basement slab. Field crews will also need to cut a small section out of the backfill area of Burial Pit 3 to make room for the ECS "I" beam. The area adjacent to the window well was cleared during previous Burial Pit 3 investigation. Section A in Figure 3-5 is the profile of the rear south corner of the ECS "I" beam, looking toward the backyard. The ECS I-beam, the area to be excavated within ECS, residence wall, window well, ECS gable end, soldier pile, and the existing 8 inch PVC sewer line are illustrated in this cross-section. Section B is the profile from just outside of the south gable end of the ECS looking north toward the 4835 Glenbrook Road property boundary. The location of the cut in the window well is illustrated in this cross-section, along with the location of the chimney and Test Pit 135.

3.1.2.2 The second ECS footprint is located further rearward, toward the backyard retaining wall of 4825 Glenbrook Road. The rear ECS I-beam will sit on an excavated portion of property just behind the retaining wall. The front ECS I-beam will rest on a supporting structure constructed with Speed Shore boxes that are filled with sand, or other compacted fill material as illustrated in Figure 3-7. Detailed cross sections of the front and rear I-beams for the 2nd ECS location are also illustrated in Figures 3-6 and 3-7, respectively. Soldier piles and lagging will be installed prior to the set up of the second ECS along a portion of the 4801 Glenbrook Road property and a portion of the area behind the retaining wall. Figure 3-6 also illustrates some of the detail associated with the back rear side of the ECS structure. Section A shows the location of the soldier piles in profile along the property boundary and depicts the change in elevation as you move from north to south across the property. Section B shows the placement of the rear ECS I-beam in the excavated soil behind the rear retaining wall. It depicts a 1:1 slope to the east to which is used for soil stabilization and it shows the soldier piling to the west which is designed to retain the soil wall inside the ECS structure. Figure 3-7 shows the layout of the front ECS I-beam for the second ECS footprint. Cribbing will be established in the basement area along the front ECS I-beam and a portion of the gable side I-beam on the driveway. Section A is a profile of the gable side cribbing with speed shoring box full of sand or other compacted fill material. Ballast will be used to anchor the I-beam to the speed shoring. In addition to ballast (not shown), Detail 1 on Figure 3-7 shows how the ECS structure will be secured to the soldier piles in identified locations. This anchor will be used to supplement the use of ballast to help prevent structure uplift during a wind event.

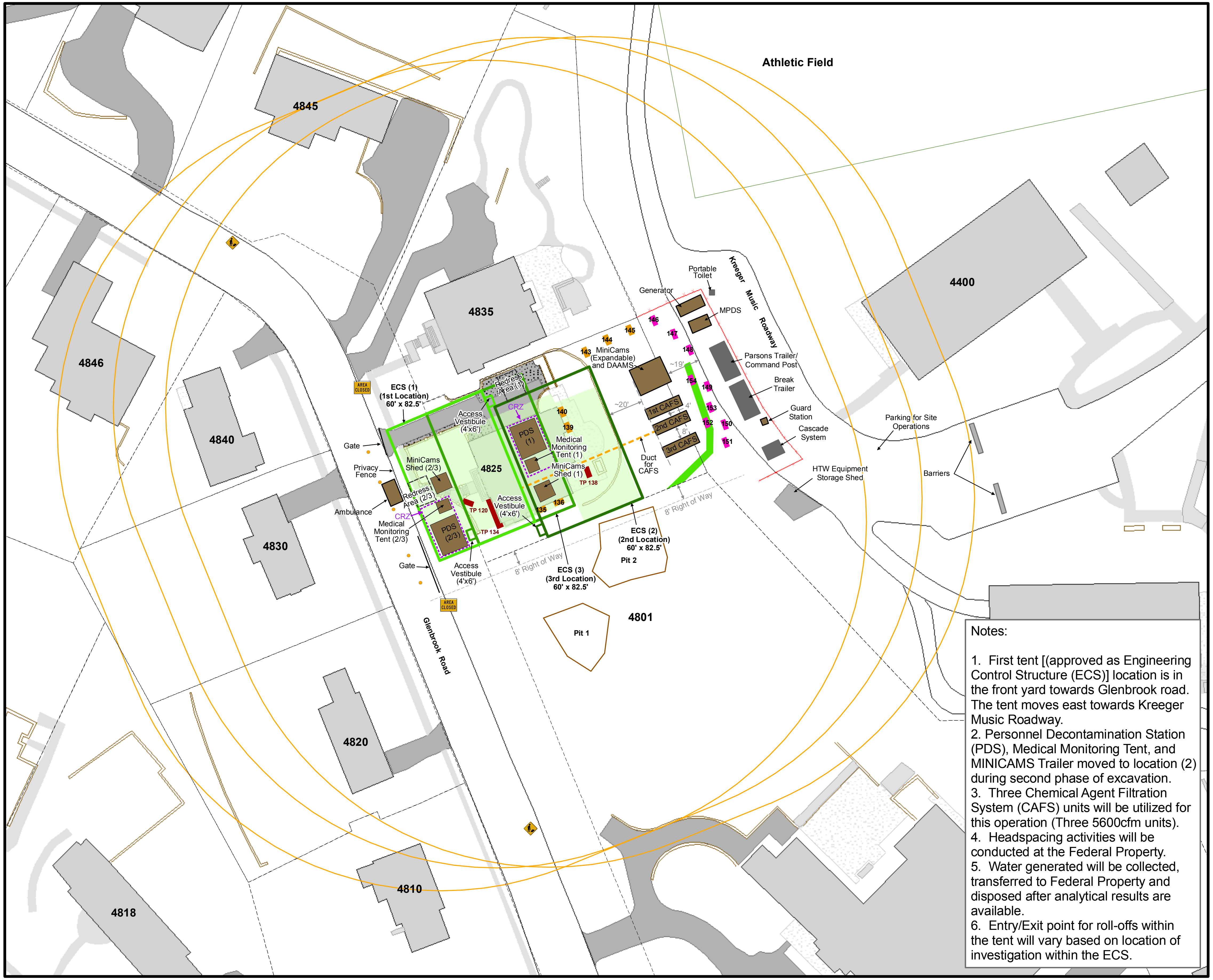
3.1.2.3 The third ECS location is shifted rearward about 23-1/2 feet from the first ECS location. Soldier piling on the right gable end used for the first location will remain in place and will be used again for the third ECS location as illustrated on Figure 3-2. The front ECS I-beam will be situated near the front porch in the front yard in an area that will have been excavated and temporarily backfilled during the first ECS location. The approximate overlap between initial setup and the third tent location is illustrated in Figure 3-4. The rear ECS I-beam will be situated on the basement slab in the back of the house footprint. This location is illustrated in Figure 3-7.

3.1.2.4 As discussed previously soldier piles and lagging will be installed in several locations on the 4825 Glenbrook Road property to ensure slope stability during the RA. Figure 3-2 illustrates these locations. Soldier piles will be installed just outside a portion of the right gable end of the ECS structure for the initial ECS footprint (in the front yard). These soldier piles will remain in place and utilized during the final excavation under the third ECS footprint. Soldier piles will also be installed along a portion of the property line adjacent to 4801 Glenbrook Road and across a portion of the 4825 Glenbrook road back yard, just inside the rear ECS for the work performed under the second ECS footprint. This second ECS footprint is located toward the rear of the property as illustrated in Figure 3-2. Detailed discussions on slope stability and soldier pile design are presented in Section 4.

3.1.2.5 The three tent move configuration is recommended because it meets the site-specific requirements and covers the entire high probability area for the RA. These activities will not block the road way beyond the 20 ft of curbside lane in front of 4825 Glenbrook Road allowed under the public space permit.

Figure 3-1
Proposed Site Layout
High Probability Excavation
4825 Glenbrook Road

Spring Valley
Washington, D.C.



Notes:

1. First tent [(approved as Engineering Control Structure (ECS)] location is in the front yard towards Glenbrook road. The tent moves east towards Kreeger Music Roadway.
2. Personnel Decontamination Station (PDS), Medical Monitoring Tent, and MINICAMS Trailer moved to location (2) during second phase of excavation.
3. Three Chemical Agent Filtration System (CAFS) units will be utilized for this operation (Three 5600cfm units).
4. Headspacing activities will be conducted at the Federal Property.
5. Water generated will be collected, transferred to Federal Property and disposed after analytical results are available.
6. Entry/Exit point for roll-offs within the tent will vary based on location of investigation within the ECS.

Legend

- ▨ Buildings
- ▨ Deck/Porch
- ▨ Sidewalk
- ▨ Stairs
- ▨ Driveway
- ▨ Gravel Surface
- — Retaining Wall
- ⌐ ¬ Property Boundary
- ×—× Privacy Fence; 4801 Privacy Fence
- ×—× Property Fence
- — Pits 1 & 2
- ▨ High-Probability Area
- 🟥 High ProbabilityTest Pits
- 🟧 Remaining Low Probability Test Pits

Additional Low Probability Investigation

- ▨ Test Pits
- ☐ 1 Liter AsCl$_3$(MCE): 59 Meters/194 Feet (TEEL-1)
- 🟩 Trench for Rerouted Sewer Line
- ▨ Supporting Structures/Equipment
- ☐ ECS and Exclusion Zone
- ☐ CRZ
- ◆ Excavation Ahead Sign
- AREA CLOSED Sidewalk Closed Sign
- ● 36" High Reflective Cones

0 30 60 120 Feet

1 inch = 60 feet

Scale:	1:480
Created By:	Parsons
File:	20120803 4825 Glenbrook Rd TEEL-1.mxd
Date:	1/31/2012
Figure Number:	3-1
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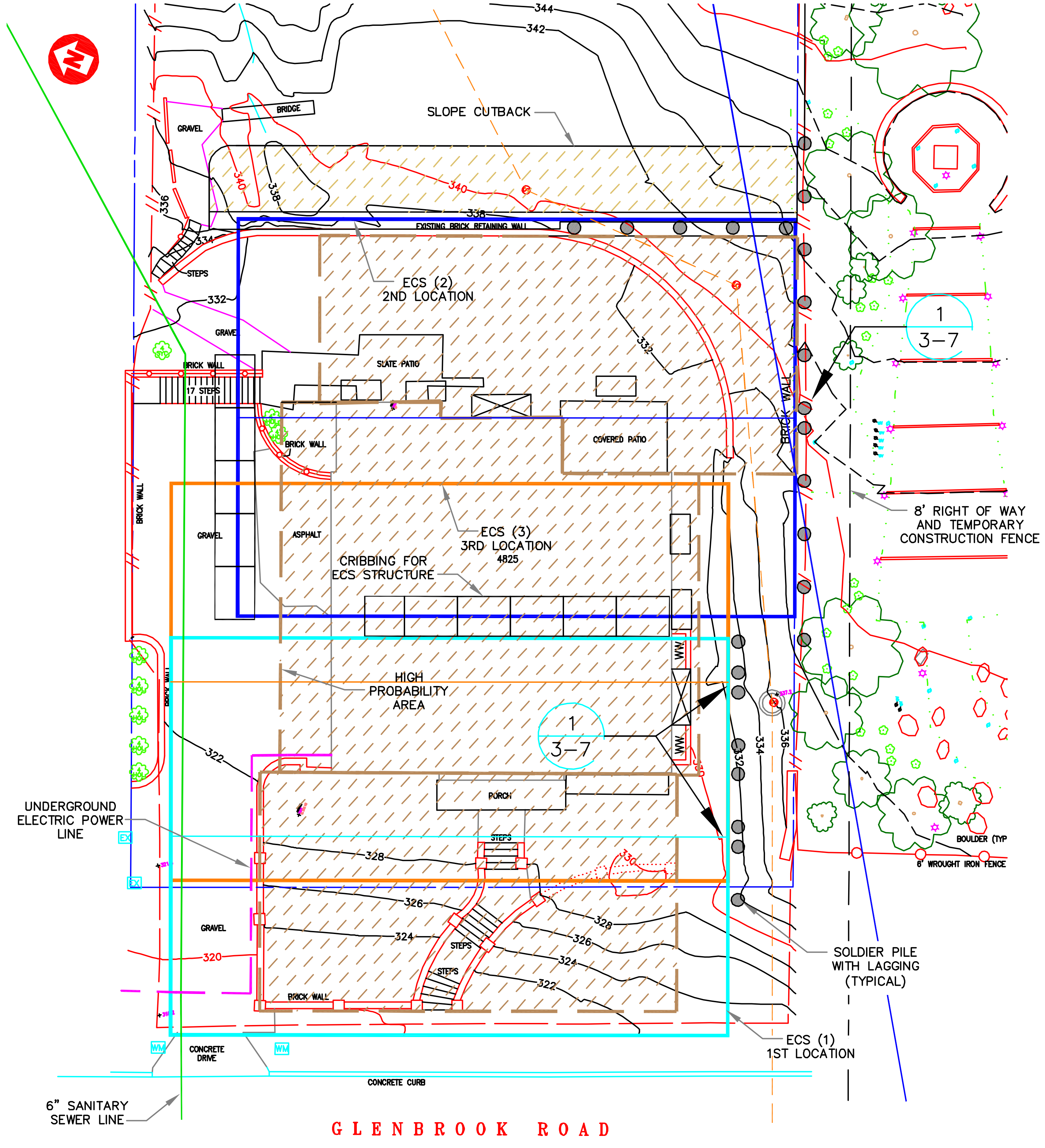
PARSONS

N W E S



PLAN VIEW
SCALE: 1"=20'

LEGEND

⊘	SEWER MANHOLE
GT	STORM DRAIN GRATE
CO	CLEAN OUT
WW	WINDOW WELL
WM	WATER METER
EX	ELECTRIC BOX
——//——	WOOD FENCE
——x——	CHAIN LINK FENCE
—— ——	TEMPORARY CHAIN LINK FENCE
—o—o—o—	HAND RAIL
◌	SPRINKLER HEAD
32 TRE	TREE WITH SIZE

SCALE: 1" = 20'
Approximate Scale in Feet

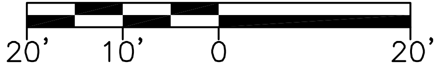
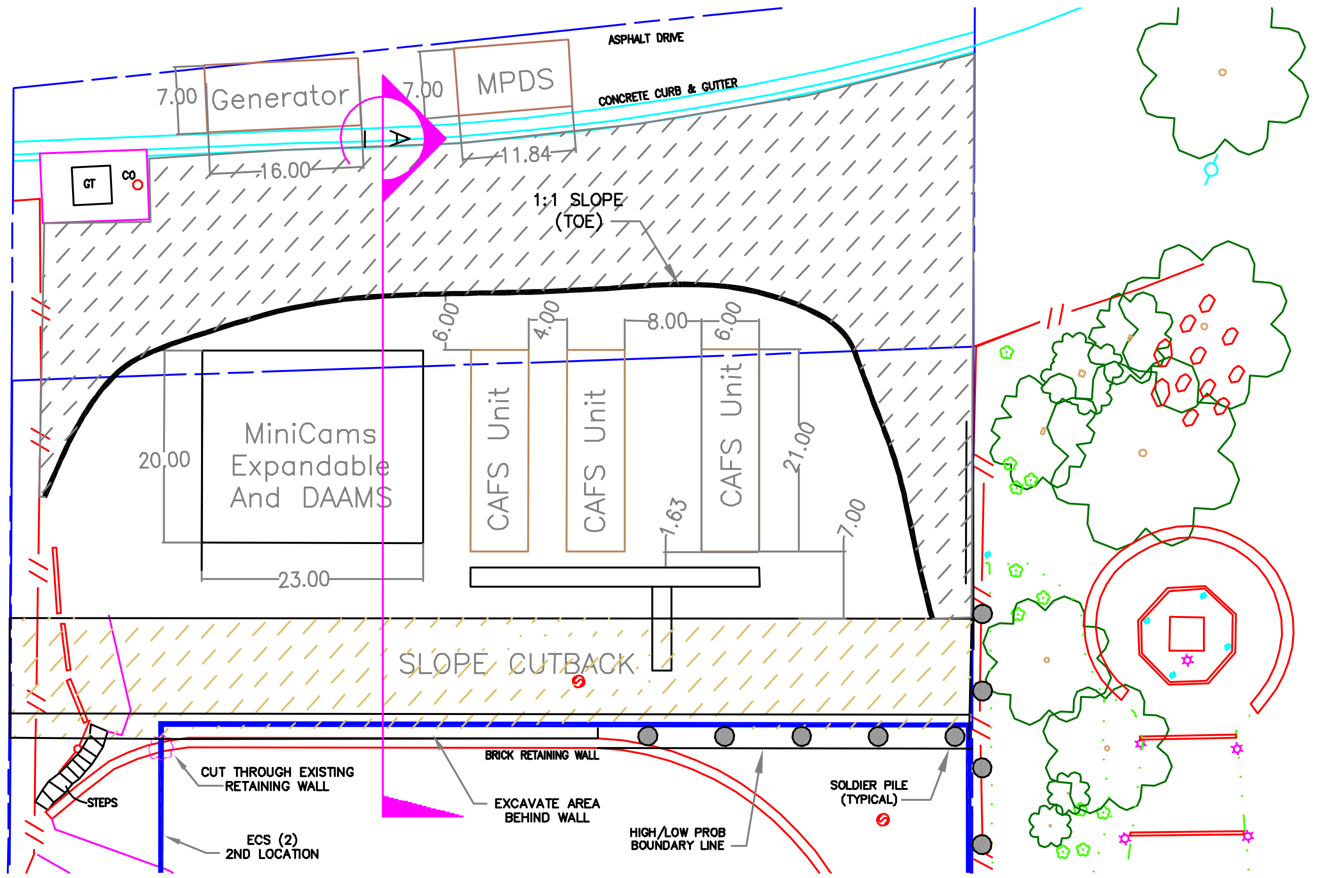
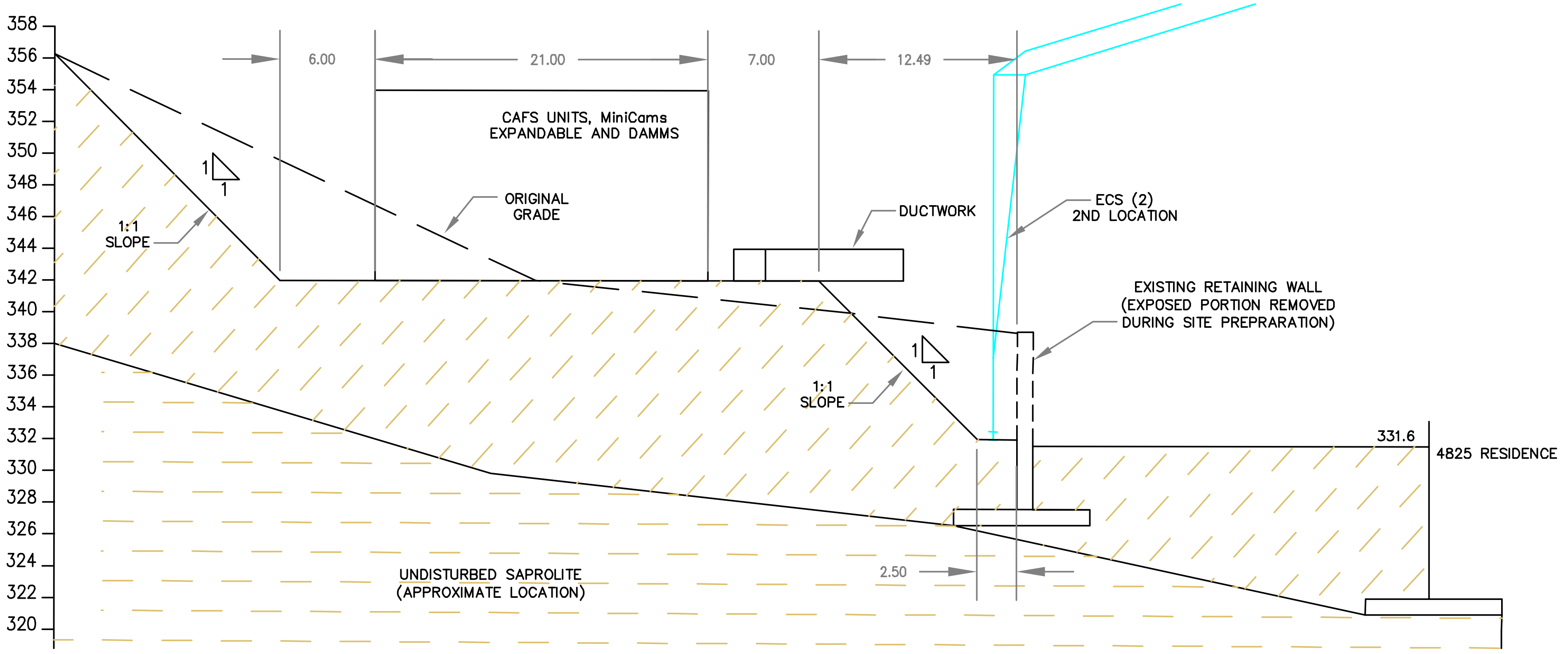


FIGURE 3–2
PROPOSED ECS LAYOUT
HIGH PROBABILITY
EXCAVATION
4825 GLENBROOK ROAD

SPRING VALLEY
WASHINGTON D.C.



PLAN VIEW
1"=20'



A
SECTION
SCALE: 1"=10'

LEGEND

Ⓢ	SEWER MANHOLE
GT	STORM DRAIN GRATE
CO	CLEAN OUT
WW	WINDOW WELL
WM	WATER METER
EX	ELECTRIC BOX
—//—	WOOD FENCE
—X—	CHAIN LINK FENCE
— —	TEMPORARY CHAIN LINK FENCE
—o—o—o—	HAND RAIL
○	SPRINKLER HEAD
32" TRE	TREE WITH SIZE

NOTE:

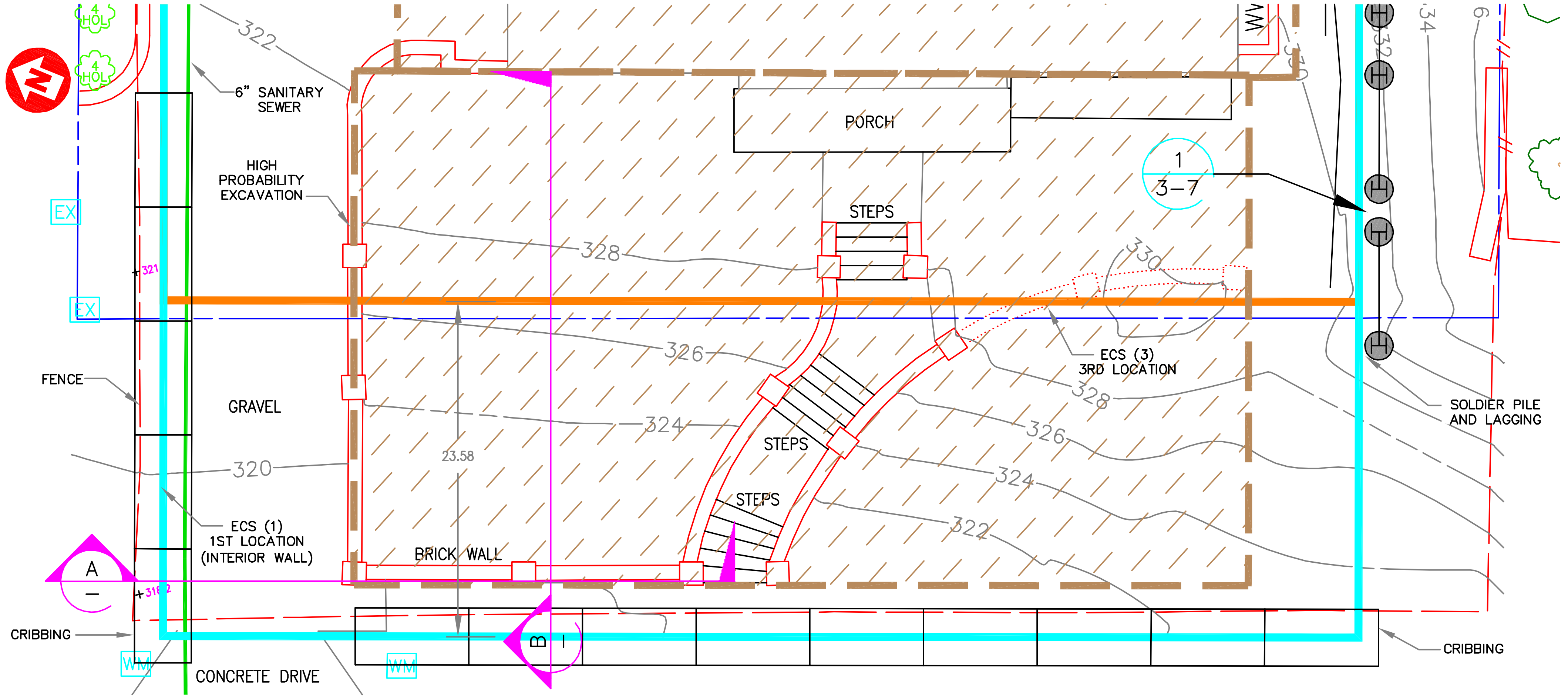
1. SOUTH SIDE OF ECS STRUCTURE (NOT SHOWN) WILL NEED CRIBBING TO ACHIEVE FOOTER/I–BEAM PLACEMENT AT 332 FEET ELEVATION.
2. EXISTING RETAINING WALL WILL BE PARTIALLY DEMOLISHED IN SMALL PORTIONS FROM THE TOP DOWN, (IN CONJUNCTION WITH THE BACK YARD SLOPING) DURING SITE PREPARATION FOR THE HIGH PROBABILITY EXCAVATION.
3. THE WALL WILL BE REMOVED TO THE EXISTING GROUND SURFACE ELEVATION AT FRONT FACE OF THE WALL.
4. THE REMAINDER OF THE WALL AND TOE OF THE FOOTER WILL BE REMOVED UNDER THE ECS STRUCTURE DURING THE HIGH PROBABILITY EXCAVATION.
5. THE HEEL OF THE FOOTER WILL BE REMOVED UNDER THE LOW PROBABILITY EXCAVATION; WHICH EXTENDS 10 FEET BEHIND THE WALL AND TO UNDISTURBED SAPROLITE.

SCALE: 1" = 10'
Approximate Scale in Feet
10' 5' 0 10'

SCALE: 1" = 20'
Approximate Scale in Feet
20' 10' 0 20'

FIGURE 3–3
GRADING PLAN FOR
EQUIPMENT SETUP
4825 GLENBROOK ROAD

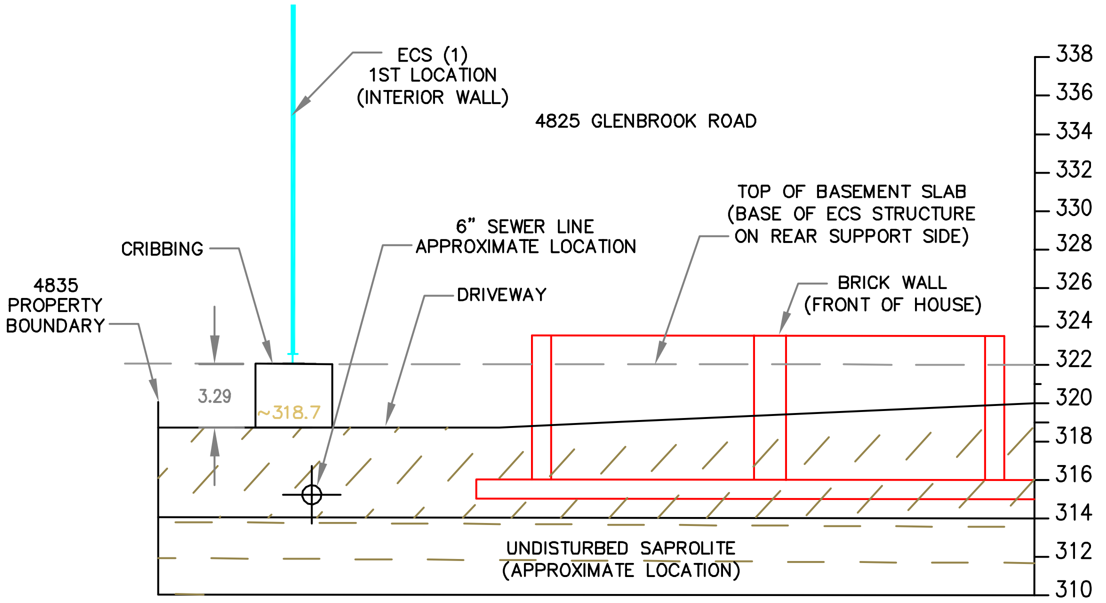
SPRING VALLEY
WASHINGTON D.C.



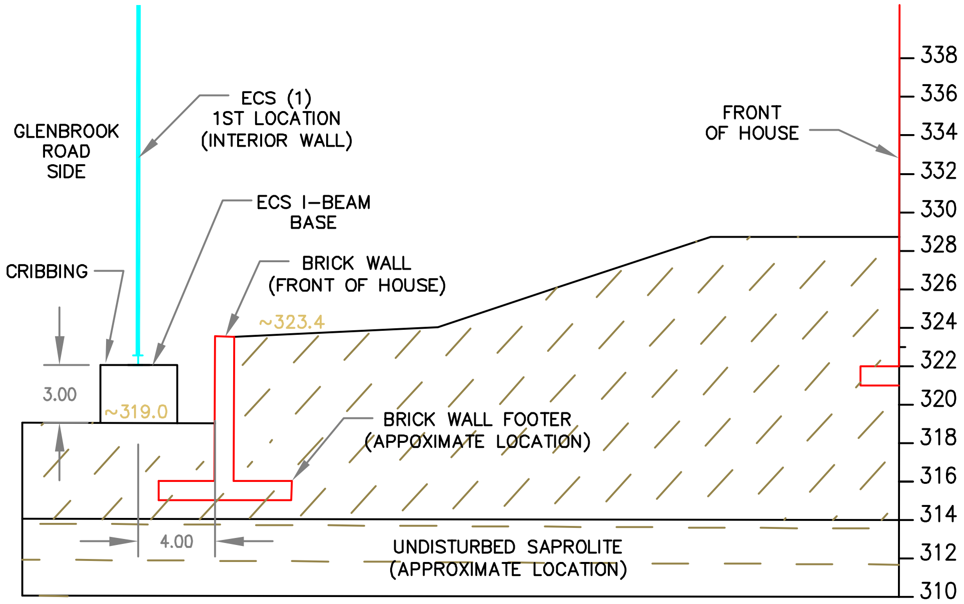
PARTIAL PLAN VIEW
SCALE: 1"=10'

LEGEND

Ⓢ	SEWER MANHOLE
GT	STORM DRAIN GRATE
CO	CLEAN OUT
WW	WINDOW WELL
WM	WATER METER
EX	ELECTRIC BOX
—//—	WOOD FENCE
—x—	CHAIN LINK FENCE
——	TEMPORARY CHAIN LINK FENCE
—o—o—	HAND RAIL
✿	SPRINKLER HEAD
32" TRE	TREE WITH SIZE



A
—
SECTION
SCALE: 1"=10'



B
—
SECTION
SCALE: 1"=10'

SCALE: 1" = 10'
Approximate Scale in Feet

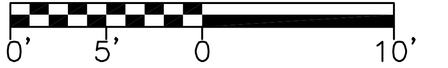
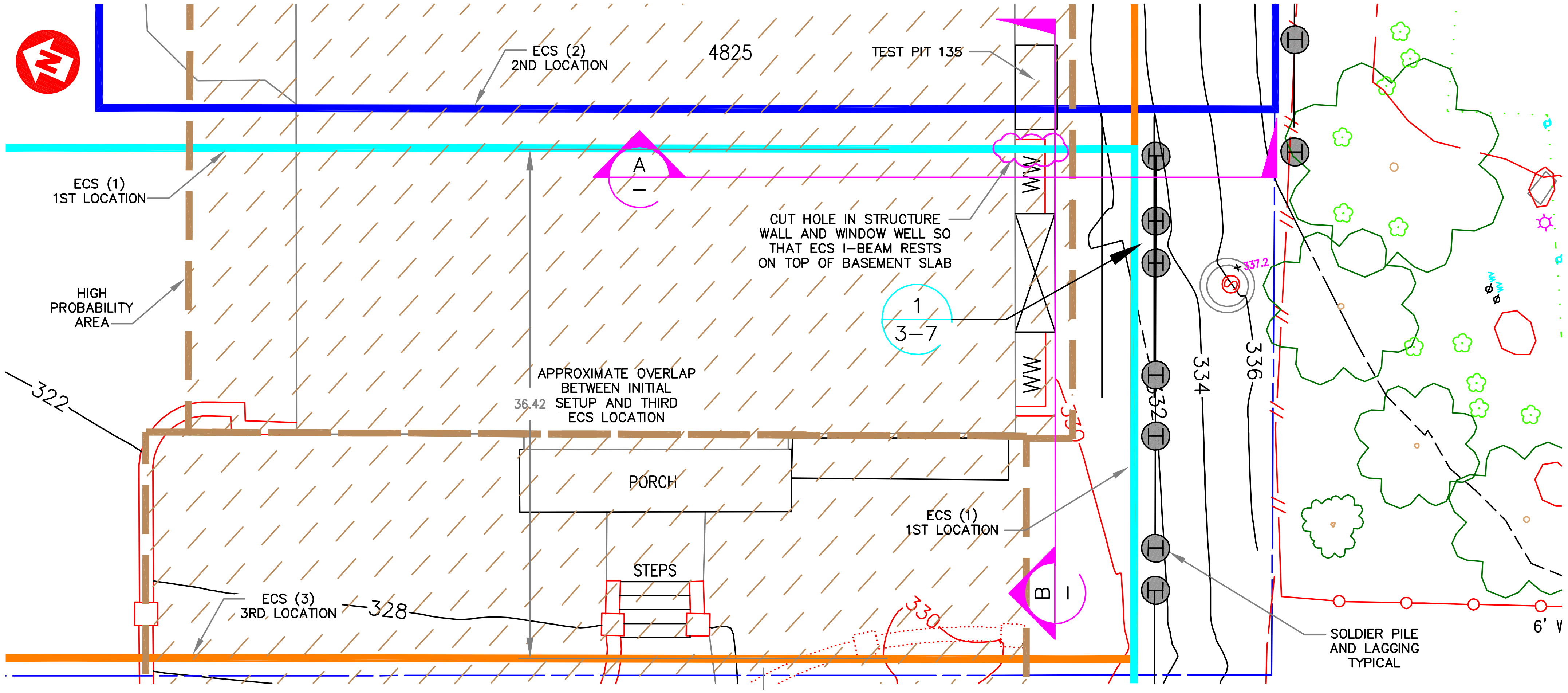


FIGURE 3–4
PLAN AND SECTIONS OF
FRONT YARD EXCAVATION
(FRONT I–BEAM)
4825 GLENBROOK ROAD

SPRING VALLEY
WASHINGTON D.C.



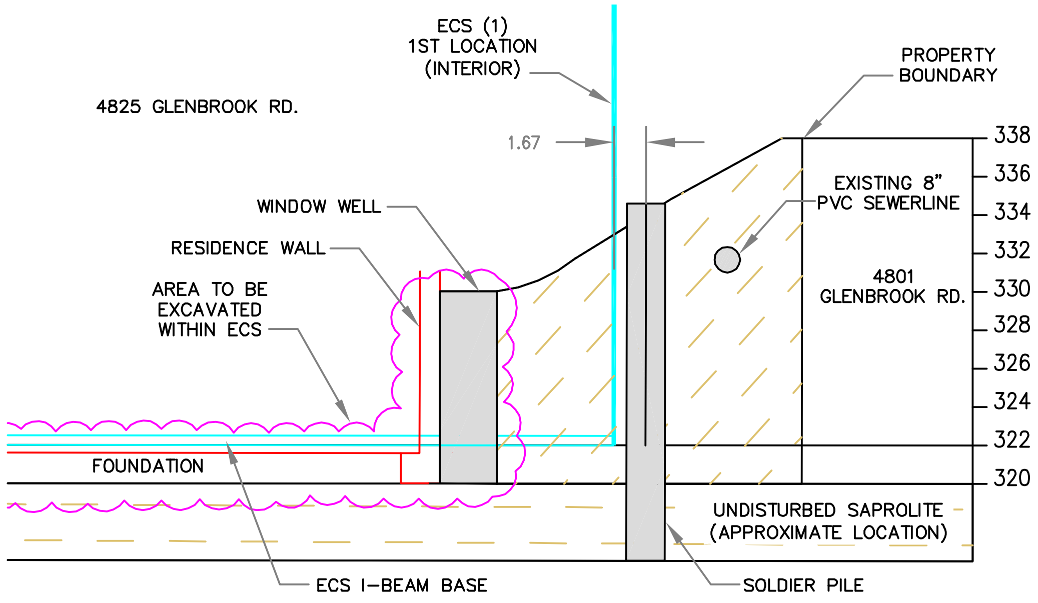
PARTIAL PLAN VIEW
SCALE: 1"=10'

LEGEND

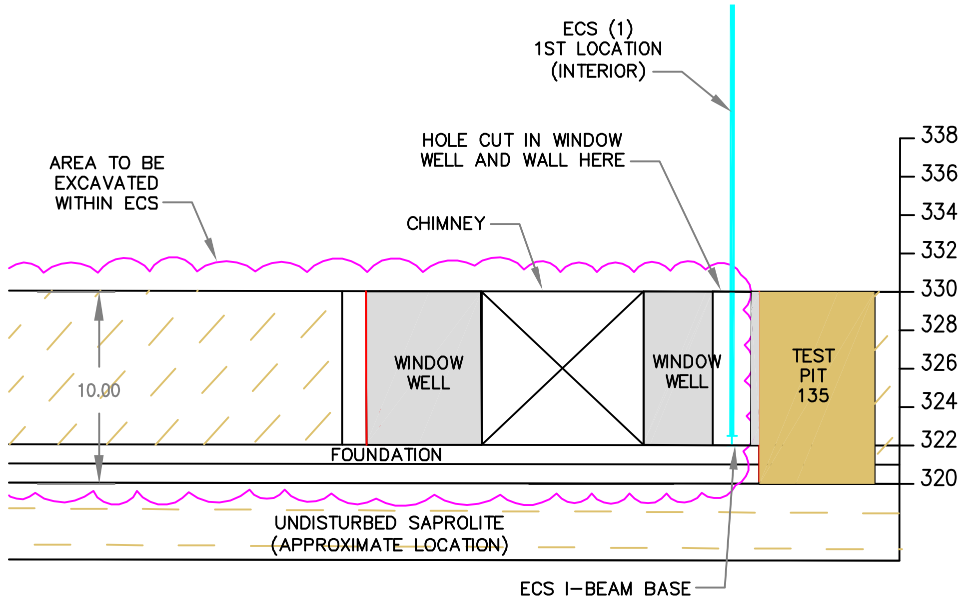
Ⓢ	SEWER MANHOLE
GT	STORM DRAIN GRATE
CO	CLEAN OUT
WW	WINDOW WELL
WM	WATER METER
EX	ELECTRIC BOX
—//—	WOOD FENCE
—x—	CHAIN LINK FENCE
— —	TEMPORARY CHAIN LINK FENCE
—o—o—	HAND RAIL
○	SPRINKLER HEAD
32" TRE	TREE WITH SIZE

NOTE:

1. A HOLE MUST BE CUT IN RESIDENCE WALL AND WINDOW WELL TO ALLOW THE ECS I-BEAM TO REST ON TOP OF THE BASEMENT SLAB



A
–
SECTION
SCALE: 1"=10'



B
–
SECTION
SCALE: 1"=10'

SCALE: 1" = 10'
Approximate Scale in Feet

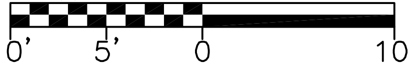
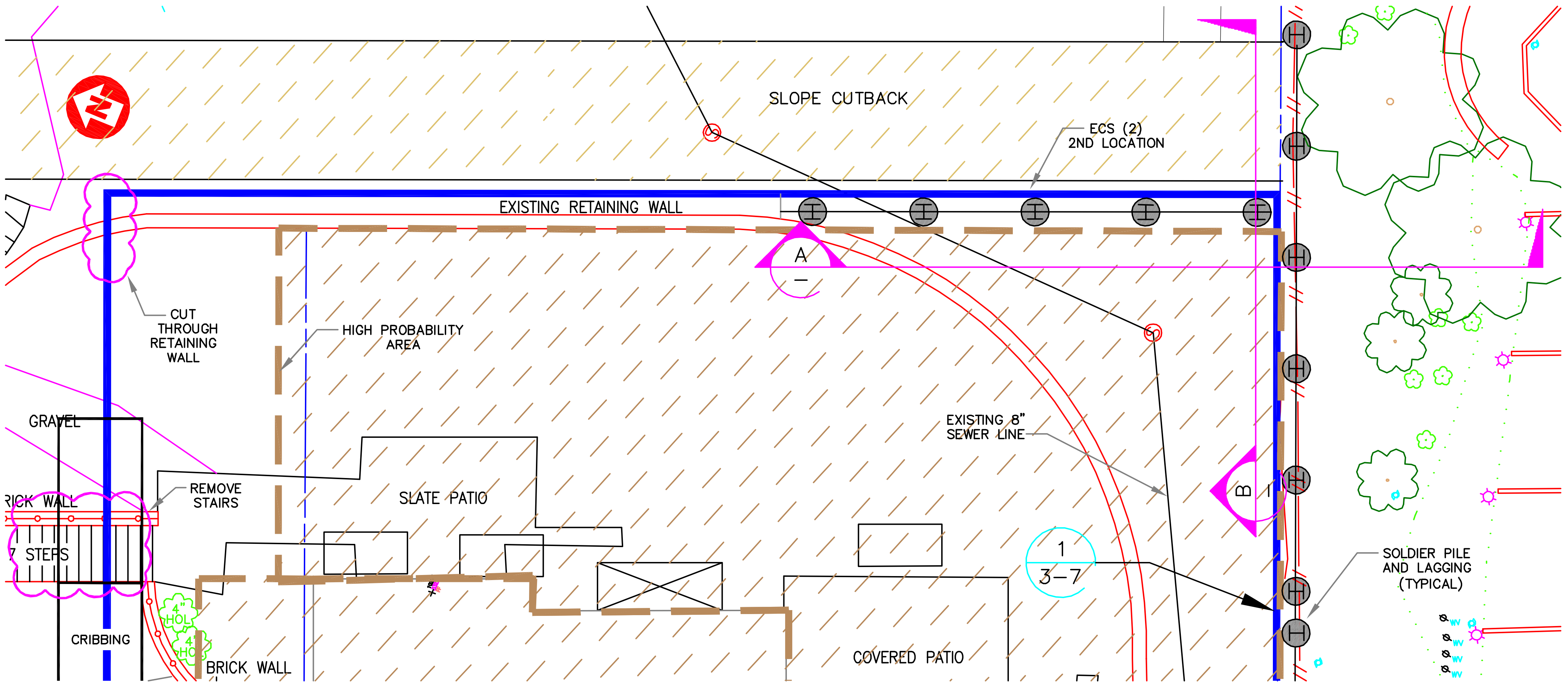


FIGURE 3-5
PLAN AND SECTIONS OF
FRONT YARD EXCAVATION
(BACK I-BEAM)
4825 GLENBROOK ROAD

SPRING VALLEY
WASHINGTON D.C.



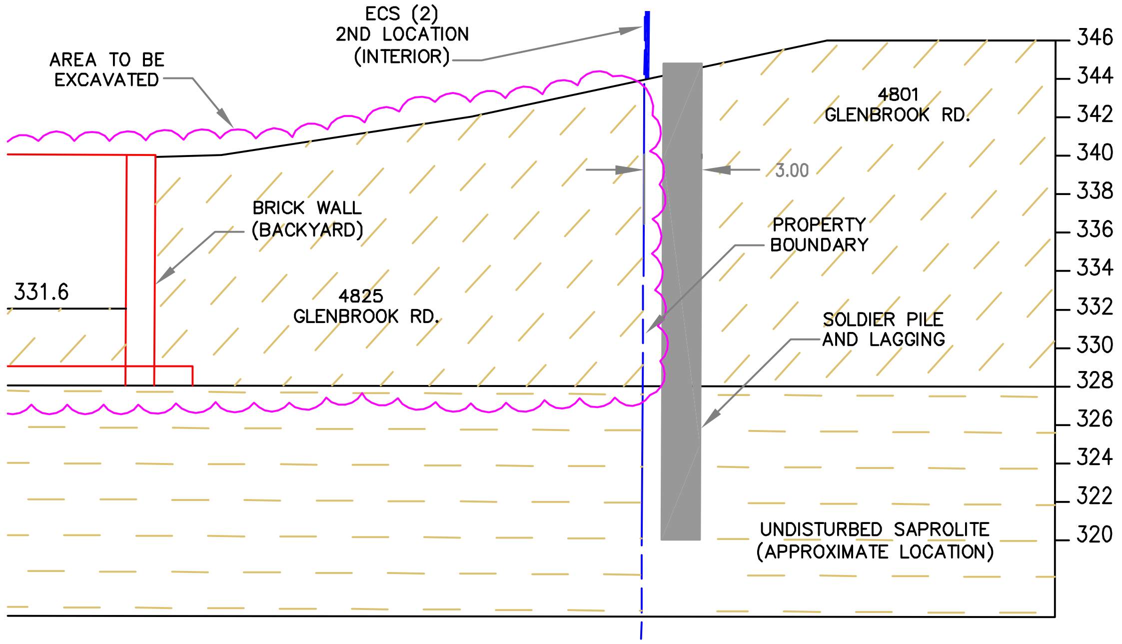
PARTIAL PLAN VIEW
SCALE: 1"=10'

LEGEND

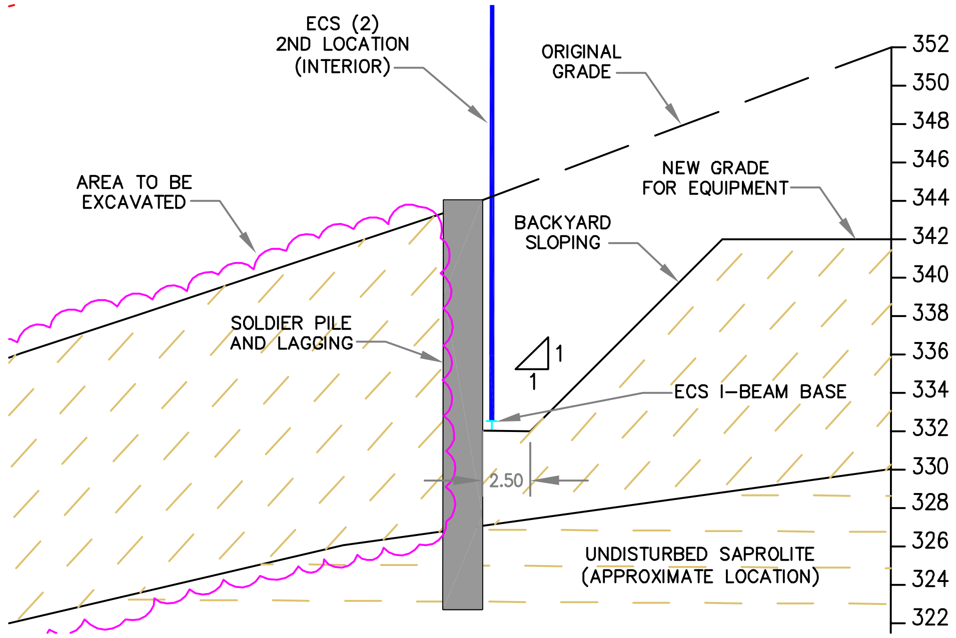
Ⓢ	SEWER MANHOLE
GT	STORM DRAIN GRATE
CO	CLEAN OUT
WW	WINDOW WELL
WM	WATER METER
EX	ELECTRIC BOX
—//—	WOOD FENCE
—x—	CHAIN LINK FENCE
— —	TEMPORARY CHAIN LINK FENCE
—o—o—o—	HAND RAIL
○	SPRINKLER HEAD
32" TRE	TREE WITH SIZE

NOTE:

1. DETAIL 1 ON FIGURE 3–7 (CALLED OUT HERE) SHOWS HOW THE ECS STRUCTURE CAN BE SECURED TO SOLDIER PILES TO HELP PREVENT STRUCTURE UPLIFT DURING A WIND EVENT.



A
–
SECTION
SCALE: 1"=10'

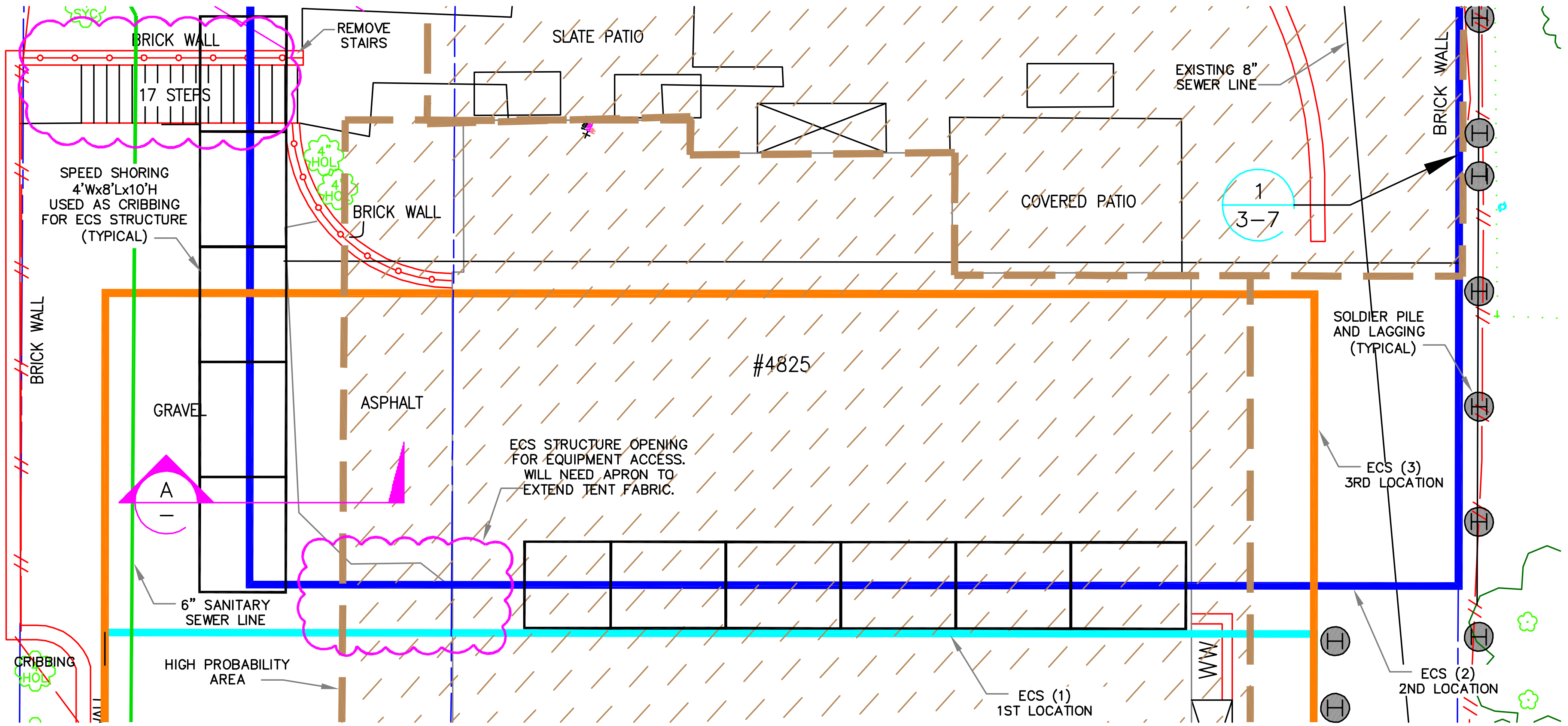


B
–
SECTION
SCALE: 1"=10'

SCALE: 1" = 10'
Approximate Scale in Feet
10' 5' 0 10'

FIGURE 3–6
PLAN AND SECTIONS OF
BACK YARD EXCAVATION
4825 GLENBROOK ROAD

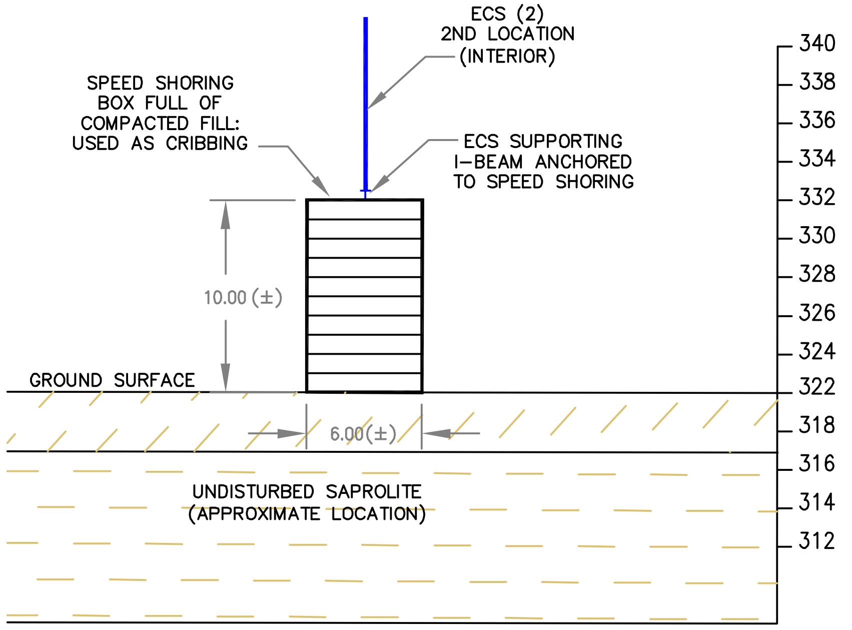
SPRING VALLEY
WASHINGTON D.C.



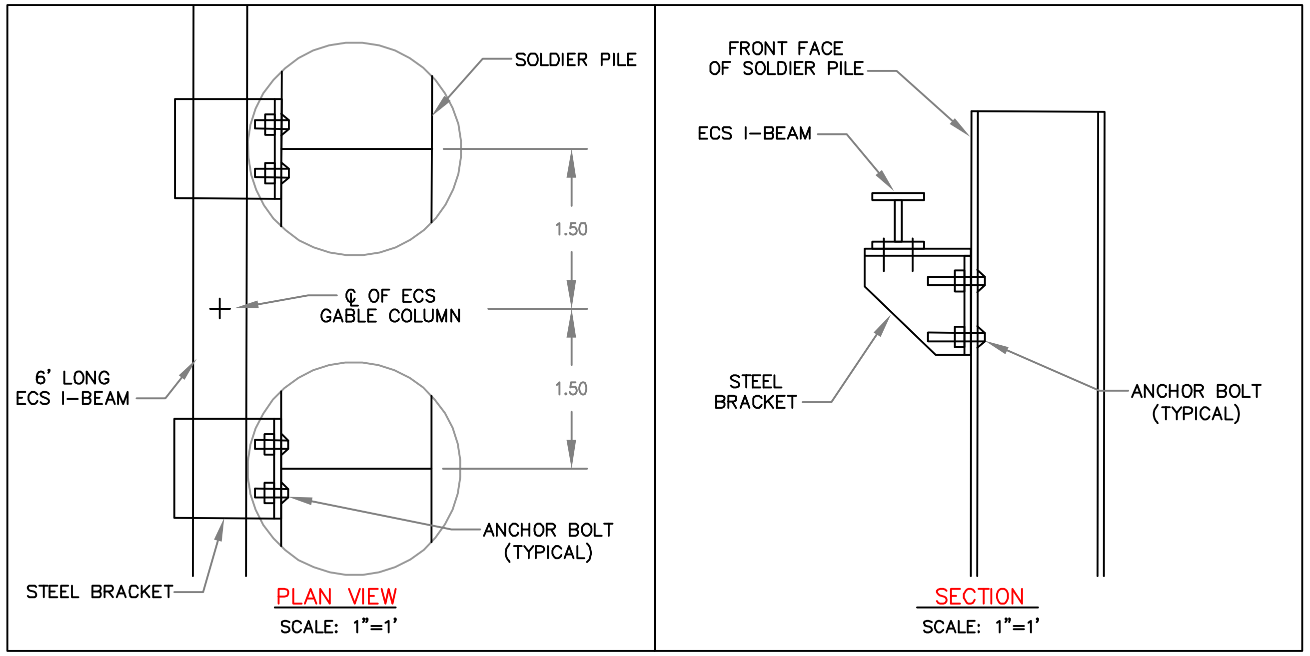
PARTIAL PLAN VIEW
SCALE: 1"=10'

LEGEND

Ⓢ	SEWER MANHOLE
GT	STORM DRAIN GRATE
CO	CLEAN OUT
WW	WINDOW WELL
WM	WATER METER
EX	ELECTRIC BOX
—//—	WOOD FENCE
—X—	CHAIN LINK FENCE
— —	TEMPORARY CHAIN LINK FENCE
—o—o—	HAND RAIL
○	SPRINKLER HEAD
32" TRE	TREE WITH SIZE



A
–
SECTION
SCALE: 1"=10'



PLAN VIEW
SCALE: 1"=1'

SECTION
SCALE: 1"=1'

1
–
DETAIL
SCALE: 1"=1'

SCALE: 1" = 10'

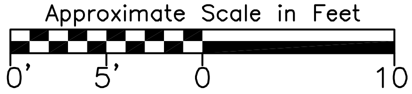


FIGURE 3–7
PLAN AND SECTION OF
BACK YARD CRIBBING
4825 GLENBROOK ROAD

SPRING VALLEY
WASHINGTON D.C.

4. SLOPE STABILITY FOR ECS

To ensure the safety and stability of the ECS tent to perform excavation activities, the slope in the vicinity of the excavation needs to be stabilized to prevent the collapse of the side walls. Based on the proposed configurations of ECS and current topography of the site in relation to the adjacent properties, slopes at property lines adjacent to 4801 Glenbrook Road and 4835 Glenbrook Road and the backyard retaining wall area need to be stabilized prior to setting up the ECS. Anomaly avoidance will be performed by qualified UXO personnel using a Schonstedt during these activities.

4.1. SLOPE STABILITY FOR PROPERTY LINE BETWEEN 4825 GLENBROOK ROAD AND 4801 GLENBROOK ROAD

4.1.0.1 The owner of the 4801 Glenbrook Road property granted access to an 8-foot wide strip on the property along the property line bordering the 4825 Glenbrook Road property. Parsons had a 20 ft strip of property surveyed on the west side of 4801 Glenbrook Road to obtain topography (2’ contour lines) and located man-made structures including the irrigation. The surveyors identified and field-marked two sprinkler heads within 8 ft of the 4801/4825 Glenbrook Road property boundary. No other man-made structures were identified within this 8 ft strip. Figure 4-1 illustrates these surveyed features.

4.1.0.2 The elevations of the two properties vary from 340 ft above mean sea level (AMSL) along the 4801 Glenbrook Road 8 ft easement to 330 ft AMSL near the 4825 Glenbrook Road property. The deepest anticipated excavation will be approximately 9 ft below basement slab. For the excavation of Area D, the south side of the 2nd ECS will be placed adjacent to the property boundary. An I-beam in the back sidewall of the ECS will be in a trench (Area A, behind the retaining wall) perpendicular to the property line. The south gable side of the 2nd ECS location will be placed on the property line.

4.1.0.3 Five options were evaluated to stabilize the slope along the property line between 4825 Glenbrook Road and 4801 Glenbrook Road. The first option evaluated was to cut the slope starting at the top of the slope elevation using 7 ft of the 8 ft access easement within an approximately 50 ft long area, parallel to the property boundary. This is illustrated in Figure 4-1 and would be required for the slope stability for the first ECS move. The area would be sloped 1:1 towards the 4825 Glenbrook Road residence. The sloped area would be covered with plastic sheets or other material and methods (such as netting and seeding) to prevent erosion. Since the excavation depth near TP-134 is anticipated to be approximately 9 ft beneath the basement, temporary measures, including but not limited to seeding, and the use of shock-crete or gunite would be implemented on the slope as conditions required. This would be done under the direction of a geotechnical engineer with the concurrence of USACE geotechnical engineer. Daily inspections would be conducted under the supervision of a geotechnical engineer during intrusive activities to ensure the implemented measures do not suffer any large area failure. This option is the cheapest and easiest option for the anticipated duration of project activities. While field experience at 4825 Glenbrook Road suggests that the 1:1 sloping should be sufficient to support the remedial action activities in the area, it’s not conclusive that this option will provide sufficient support of slope because of the tight proximity to adjacent property boundaries. Therefore, this option is not recommended.

4.1.0.4 The second option evaluated was to slope (1:1.35) 7 ft south of the 4825/4801 Glenbrook Road property line towards the 4825 Glenbrook Road residence (Figure 4-2). When the excavation is below the footer of the house, speed shore type trench excavation support system would be utilized. This option is feasible if intrusive operations are not performed within the ECS. To perform an excavation in Level B PPE within a trenched area inside the ECS is not viable due to safety concerns arising from confined space entry and longer duration of manual excavation and concrete removal. Therefore, this option is not recommended.

4.1.0.5 The third option evaluated was to use sheet piles or soldier piles with tie backs. This option requires sheet piles to be vibrated into place, but would require tie-backs into the 4801 Glenbrook Road property. Additionally, a much larger easement would be needed within the 4801 Glenbrook Road property if this option were to be selected. Current access is limited to 8 feet onto the 4801 Glenbrook Road property, which would not be a sufficient distance for installing the required tie-backs. Therefore, this option is not recommended.

4.1.0.6 The fourth option evaluated was to use sheet piles with support from 4825 Glenbrook Road. This option added constraints to the already limited space available for support activities for the RA. In addition, this option is more expensive and is expected to generate excessive noise during installation of the sheet piles. Therefore, this option is not recommended.

4.1.0.7 The fifth option evaluated was to use soldier piles and lagging. Soldier piles and lagging is an earth retention technique that retains soil, using vertical steel piles with horizontal lagging. Typically, these soldier piles (H-piles) are augured, drilled, or driven into the ground with a drill rig at regular intervals along the planned excavation perimeter. Lagging consisting of wood, steel or precast concrete panels inserted into pile “flanges” as the excavation proceeds. Lagging effectively resists the load of the retained soil and transfers it to the piles. The walls can be designed as cantilever walls, or receive additional lateral support from anchors or bracing. This technique has been used to provide support for many excavations in urban areas where limited space is available. It provides sufficient support to prevent soil from caving into the excavation within the 1st ECS without additional constraints to the limited space availability at 4825 Glenbrook Road. Soldier pile and lagging will be installed adjacent to the house for a length of approximately 30 ft for the front ECS location as illustrated in Figure 3-2. Soldier pile and lagging will also be installed along the property line for a length of approximately 75 ft for the back ECS location (2nd ECS move) as illustrated in Figure 4-2. Although it is more expensive (the average cost per square foot of soldier pile walls is approximately $75) than the first option, it provides more reliable support under limited space conditions. Therefore, this option is recommended. The design of the soldier piles and lagging provided by the soldier pile subcontractor is included in Attachment M-5.

4.1.0.8 Prior to removal of the existing wooden fence along the 4801/4825 Glenbrook Road boundary, all sprinkler heads will be located and flagged and photo documentation of existing vegetation within the 8 ft access area will be performed. A temporary green screen fence will be installed 8 ft into the 4801 Glenbrook Road property.

4.2. SLOPE STABILITY FOR PROPERTY LINE BETWEEN 4825 GLENBROOK ROAD AND 4835 GLENBROOK ROAD

4.2.0.1 The retaining wall along the property line between 4825 Glenbrook Road and 4835 Glenbrook Road will be removed as part of the RA.

4.2.0.2 Prior to the removal of the retaining wall, five AC units at 4835 Glenbrook Road will be temporarily relocated approximately 38 ft to the side and back of 4825 Glenbrook Road property. This will prevent any undermining of units during the wall removal. A 10 ft high pressure treated temporary wooden fence will be installed at the 4825 and 4835 Glenbrook Road property boundary. The temporary AC location and the fence design are included in Attachment M-6.

4.2.0.3 Parsons performed an evaluation to determine the impacts to the house integrity at 4835 Glenbrook Road as a result of removal of the retaining wall next to the 4835 Glenbrook Road residence. Figures 4-4 and 4-5 are cross-sections of the interface between 4825 and 4835 Glenbrook Road. The evaluation results illustrate the following:

- Distance between 4835 Glenbrook Road subsurface foundation and anticipated retaining wall footer at 4825 Glenbrook Road may be as small as 2 ft. Therefore, installing sheet piles, soldier piles or other walls (for slope stability) requiring vibratory installation are not advised at this location, to avoid any potential structural damage to the residence.

- 4835 Glenbrook Road basement slab is approximately the same elevation as the bottom of the 4825 Glenbrook Road retaining wall. Therefore, removal of retaining wall and adjacent soil will not cause uplift stress on 4835 Glenbrook Road basement slab.

- Sloping method is sufficient to perform the excavation if bedrock within the driveway is 5 ft as encountered during Trench 2 excavation to shallower than 7 ft. This depth would permit a 2:1 slope. This scenario is anticipated based on previous excavation in the area.

- If the bedrock in the driveway is deeper than 7 feet, the area will be excavated in increments and speed shoring will be used to stabilize the soil. This scenario is unlikely based on previous excavation in the area.

4.2.0.4 The area in front of the backyard retaining wall shall be excavated in increments of no more than 6 ft length at a time once the excavation reaches below the depth of the retaining wall. The 6 ft determination was based on Parsons structural engineer’s experience in similar projects and their professional judgment. A speed shoring type trench excavation support system shall be utilized to advance and protected the open trench. The shoring trench shall be pushed down as the excavation progress. The speed shoring shall be placed directly against the toe of the retaining wall and strutted to prevent movement of the footing. Existing speed shoring stored at the Federal Property with typical dimensions of 2 ft width and 6 ft length may be used incrementally to construct the desired trench boxes along the 4825 Glenbrook Road property boundary near the retaining wall as required. Backfilling and compaction may be performed after excavation of each trench area is completed. Access along the property line is required to perform activities associated with slope stability.

4.3. SLOPE STABILITY FOR BACKYARD RETAINING WALL

4.3.0.1 Site preparation will be performed on the backyard hillside of the 4825 Glenbrook Road property to create a level surface for setting up the RA support equipment. The equipment includes a Miniature Chemical Agent Monitoring System (MINICAMS)/ Depot Area Air Monitoring System (DAAMS), three CAFS units, a generator, and a Multiple Power Distribution System (MPDS). The backup generator and MPDS will be placed on AU parking lot. The MINICAMS and three CAFS units will be behind the retaining wall while the top portion of the retaining wall is being removed prior to excavation of Area D. A minimum distance of 10 ft will be maintained from the retaining wall near the backyard patio to ensure the weights of the CAFS supporting equipments are not overloading the retaining wall. The MINICAMS and the CAFS units will be placed approximately 20 ft away from the retaining wall on specially designed mats to evenly distribute its weight and help protect against slope destabilization issues. The soil directly behind the retaining wall will be excavated down to approximately 332 ft AMSL in order to place the I-beam of the ECS for the second tent location. This excavation will be sloped 1:1 toward the back of the property to maintain slope stability. The equipment will be setback from the top of this slope (approximately 7 feet) to minimize pressure on this slope. Once the high probability excavation is complete and prior to the start of the low probability excavation effort, the CAFS units will be removed from the site and the MINICAMS will be relocated to an alternate location suitable for maintaining slope stability.

4.3.0.2 Based on previous test pit investigations for TPs 95, 96, 99 and 142, saprolite was encountered at depths between 0.58 ft and 2 ft below ground surface. Therefore, excavation in the nearby area adjacent to the retaining wall is also expected to be relatively shallow (approximately 2 to 4 ft). Figure 2-1 of the work plan shows the location of these test pits.

4.3.0.3 The exposed portion of the retaining wall (above the backyard ground surface) will be removed under the low probability protocols prior to setting up the back ECS tent location. The back footer (heel) of the retaining wall will be excavated later during the completion of the Area A excavation; also under low probability protocols. The retaining wall will be removed using an excavator with an attachment to break the wall into pieces while excavating Area A. Parsons will remove the exposed portion and the heel footer of the backyard retaining wall during the low probability operation for the following reasons: 1) CA/ABP was not detected in the backyard samples along the retaining wall; and 2) no significant findings were discovered from the investigation of test pits along the retaining wall. However, the toe of the footer and the portion below the backyard ground surface, and the portion of the retaining wall inside Area D will be removed under the ECS structure during the high probability excavation operation.

4.3.0.4 After completion of the high probability excavation, the remaining portion of Area A will be excavated. The excavation will start from the north property line adjacent to 4835 Glenbrook Road and move south toward the 4801 Glenbrook Road property line. If the excavation is deeper than 4 ft, speed shoring and/or, trench boxes will be installed to maintain slope stability. After the completion of the area immediate adjacent to 4835 Glenbrook Road property line, geo fabric will be placed in the sidewall against the non-excavated areas. Backfill and compaction will be performed after the excavation area is complete. For the rest of Area A, 1:1 slope will be maintained throughout the excavation to maintain slope stability.

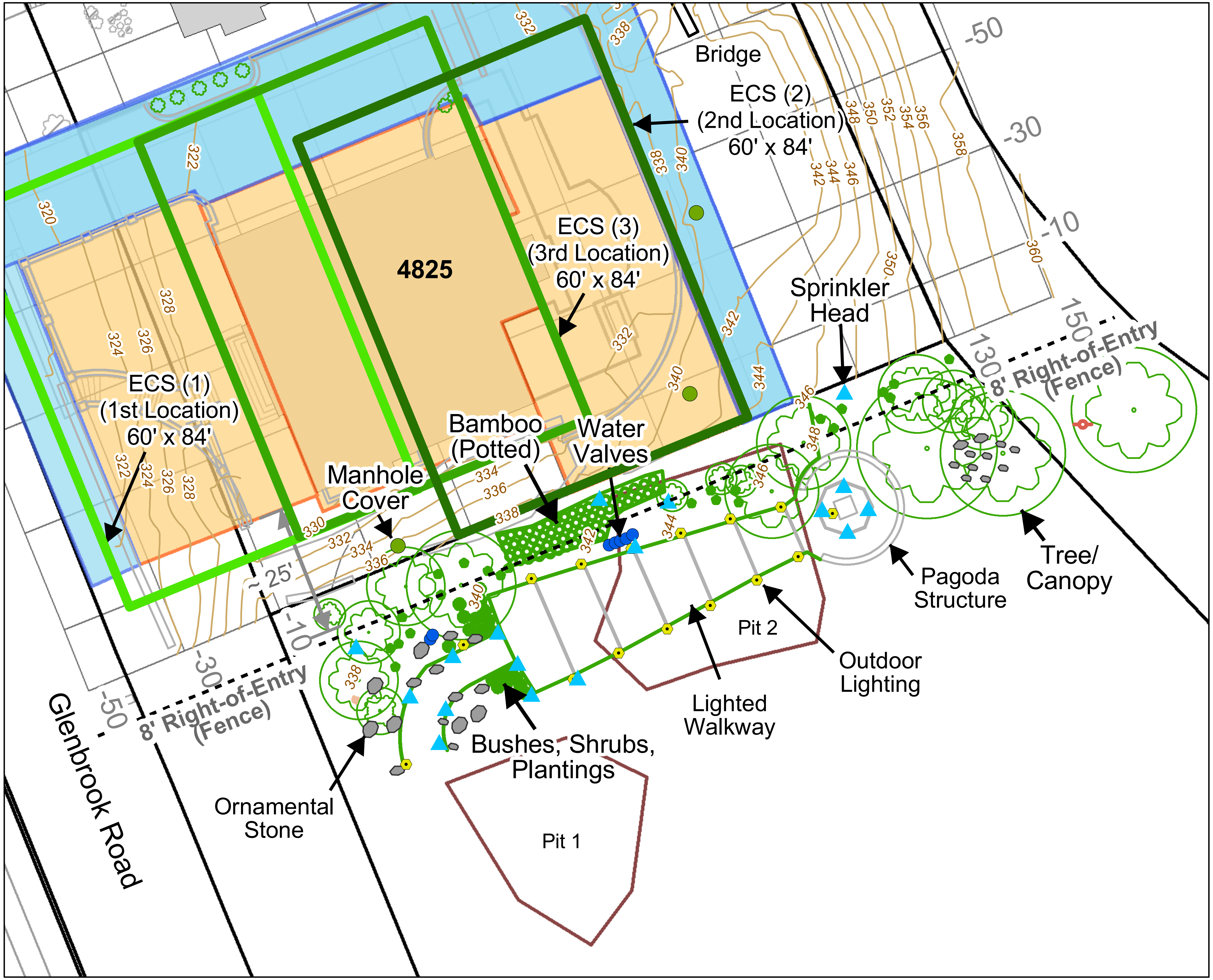


Figure 4-1
Existing Site Conditions
Along 4801 Glenbrook Easement
4825 Glenbrook Road

Spring Valley
Washington, D.C.

Legend

▨	Buildings
☐	Property Boundaries
☐	20' Grid
—	Pits 1 and 2 (POI-24R)

Excavation Area

🟧	High-Probability
🟦	Low-Probability
🟩	ECS Location
—	Elevation Contours
▲	Sprinkler Head
●	Water Valve
⊙	Outdoor Lighting
○	Tree/Canopy/Landscape
●	Bush/Shrub/Planting
⬬	Ornamental Rock/Stone

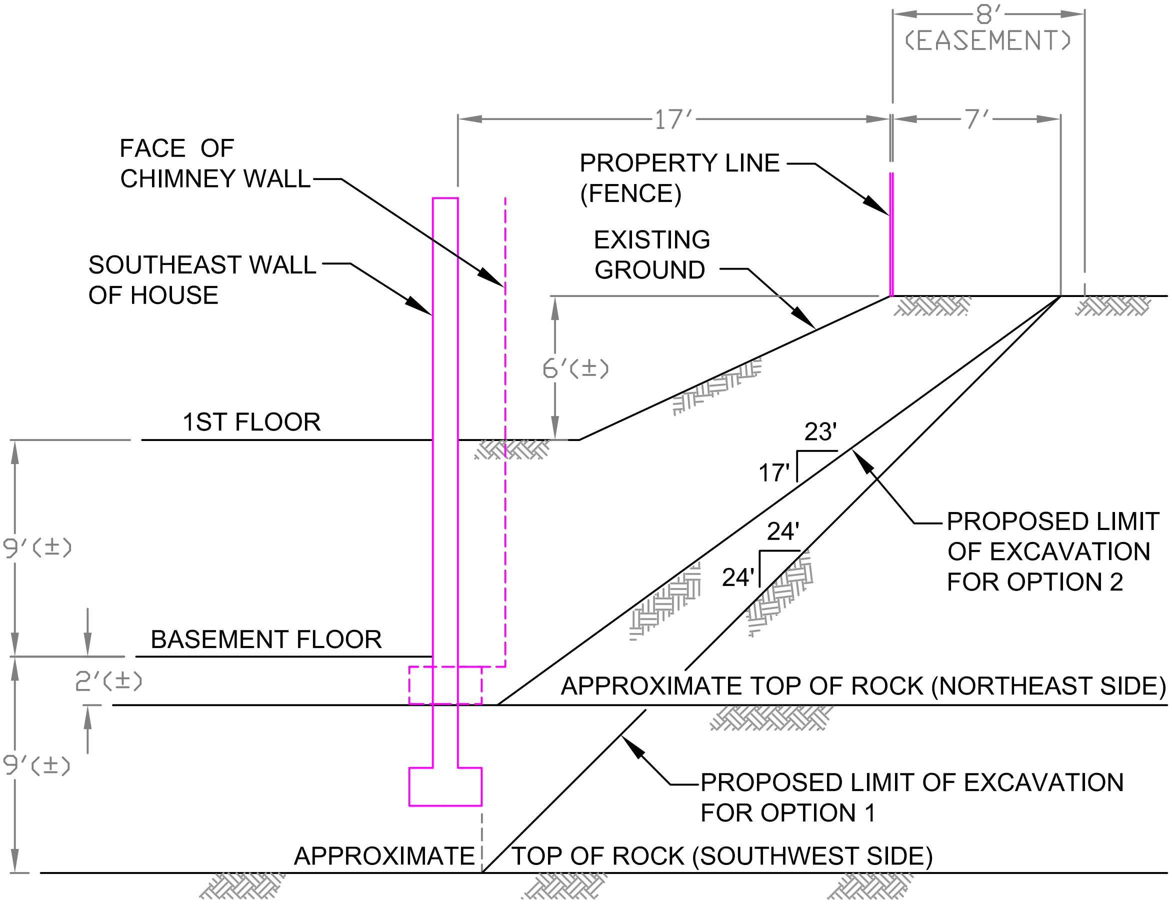
0 10 20 40 Feet

1 inch = 20 feet

Scale:	1:235
Created By:	Parsons
File:	20120809 4825 Glenbrook Road Hi-Prob Site Conditions.mxd
Date:	8/9/2012
Figure Number:	4-1
Page Number:	-

PARSONS

FIGURE 4-2
4825 GLENBROOK ROAD SLOPING OPTIONS 1 AND 2



SECTION LOOKING NORTHEAST

NOT TO SCALE

NOTES:

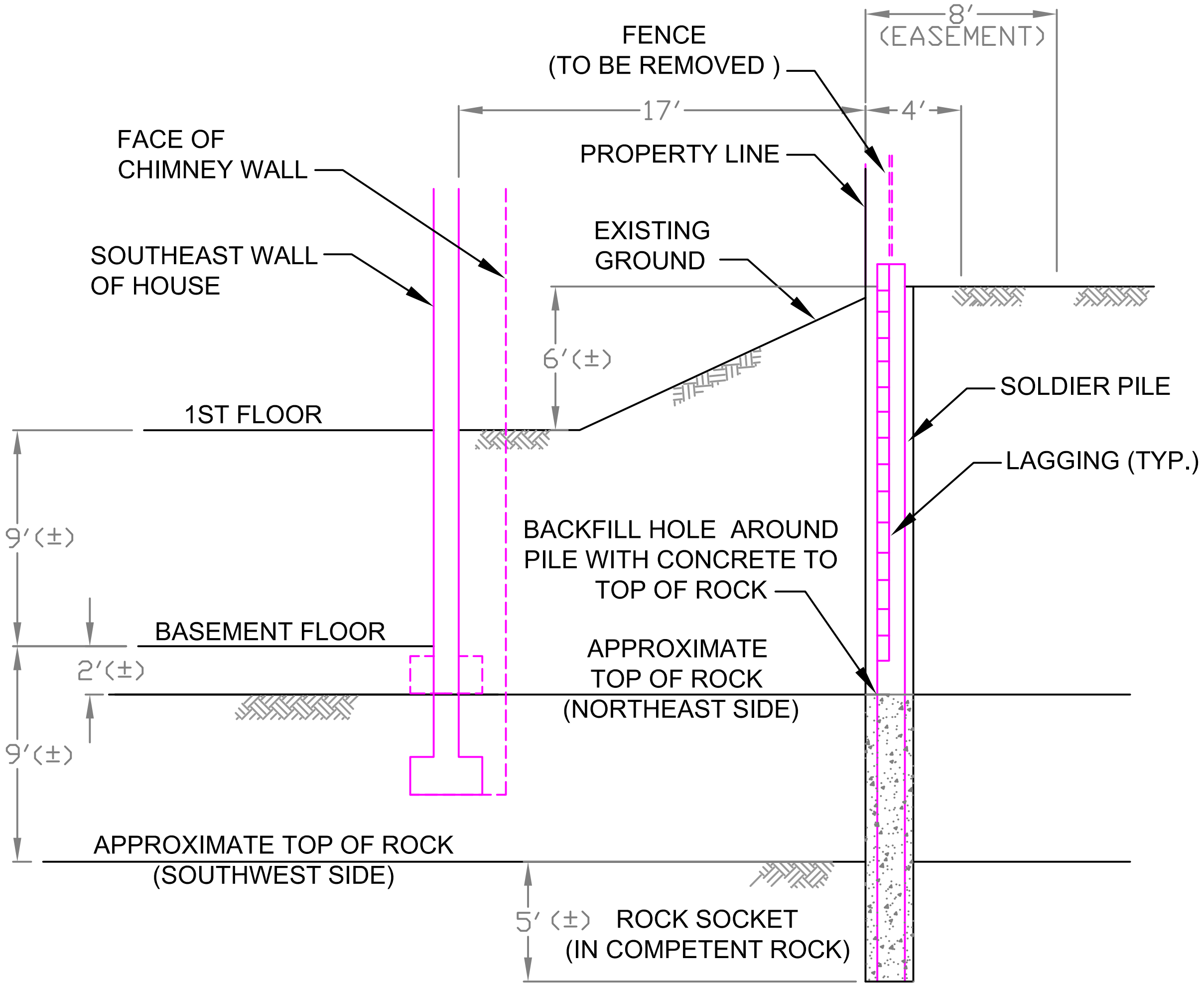
1. SLOPE (IN SECTION) WILL BE OBTAINED BY CUTTING EXISTING GROUND BACK TO THE 7 FOOT OF EASEMENT AND PULLING THIS SOIL DOWN TOWARD THE BASE OF HOUSE TO BUTTRESS THE SLOPE (AS SHOWN IN DRAWING).

2. THE BUTTRESS WILL BE A FIELD CONTOUR DECISION AND SHALL BE APPROVED BY THE PARSONS GEOTECHNICAL ENGINEER.

3. PROPOSED LIMITS OF EXCAVATION FOR BOTH OPTION 1 AND 2 SHALL BE COVERED WITH PLASTIC SHEETS, OR OTHER EROSION CONTROL MATERIAL.

PARSONS

FIGURE 4-3
4825 GLENBROOK ROAD CROSS SECTION OF SOLDIER PILE



SECTION LOOKING NORTHEAST

NOT TO SCALE

NOTES:

1. DIMENSIONS SHOWN ARE APPROXIMATE AND MAY VARY.

2. THE CONTRACTOR WILL BE RESPONSIBLE FOR THE DESIGN OF THE SOLDIER PILE AND LAGGING.

PARSONS

SOLDIER_PILE_SECTION_2.DWG

Figure 4-4
Topographical Plan and Cross-Section

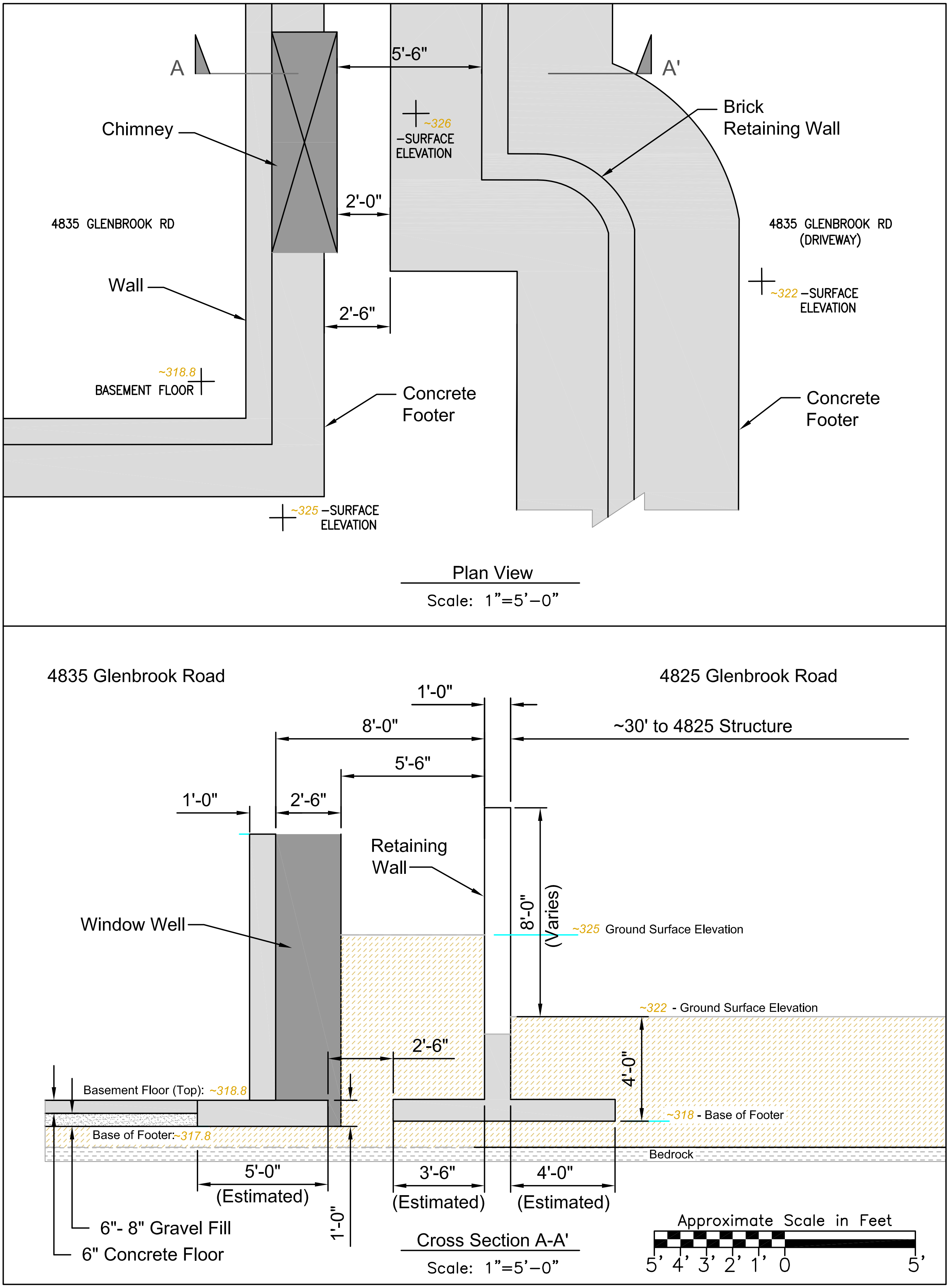
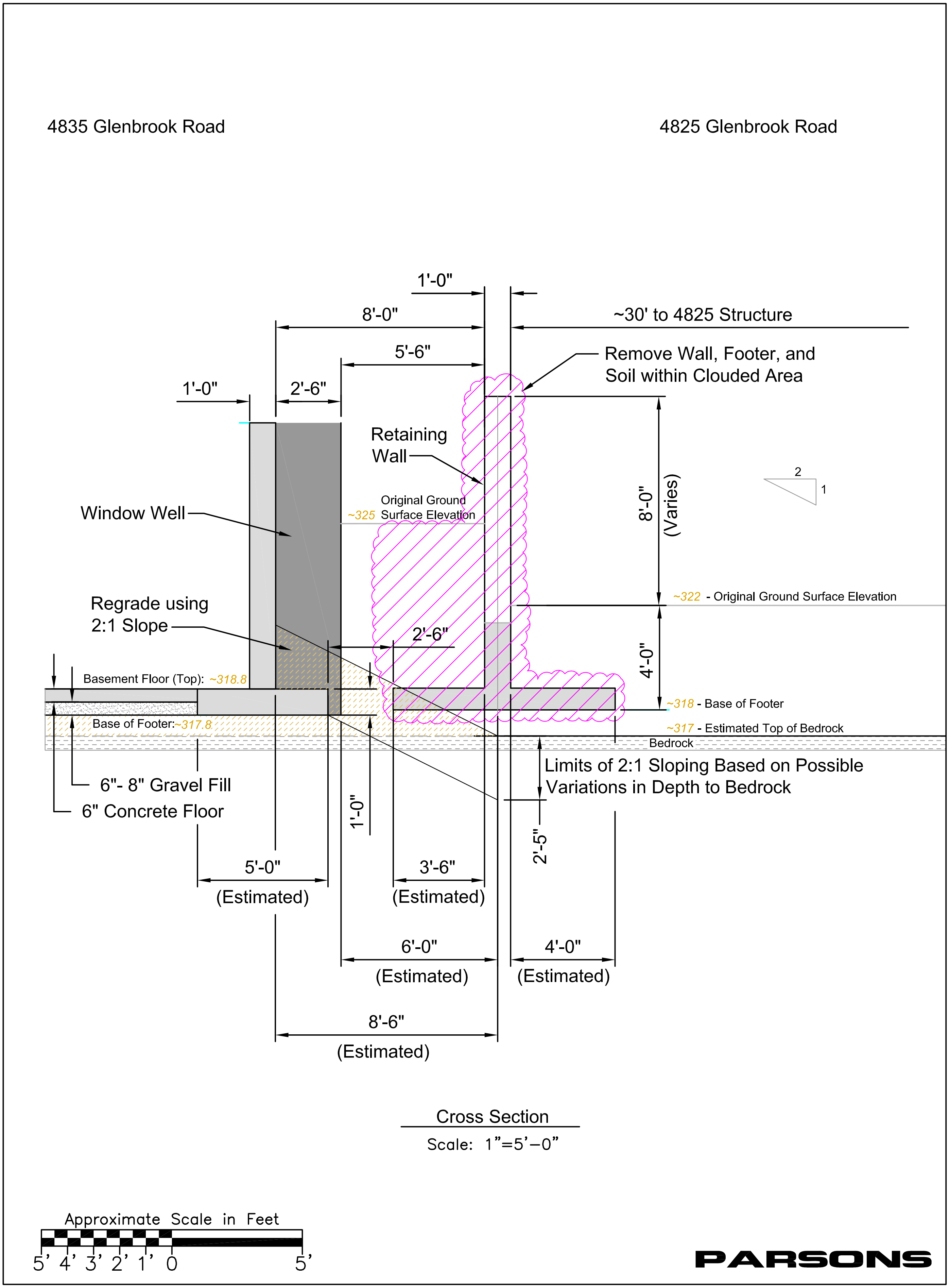


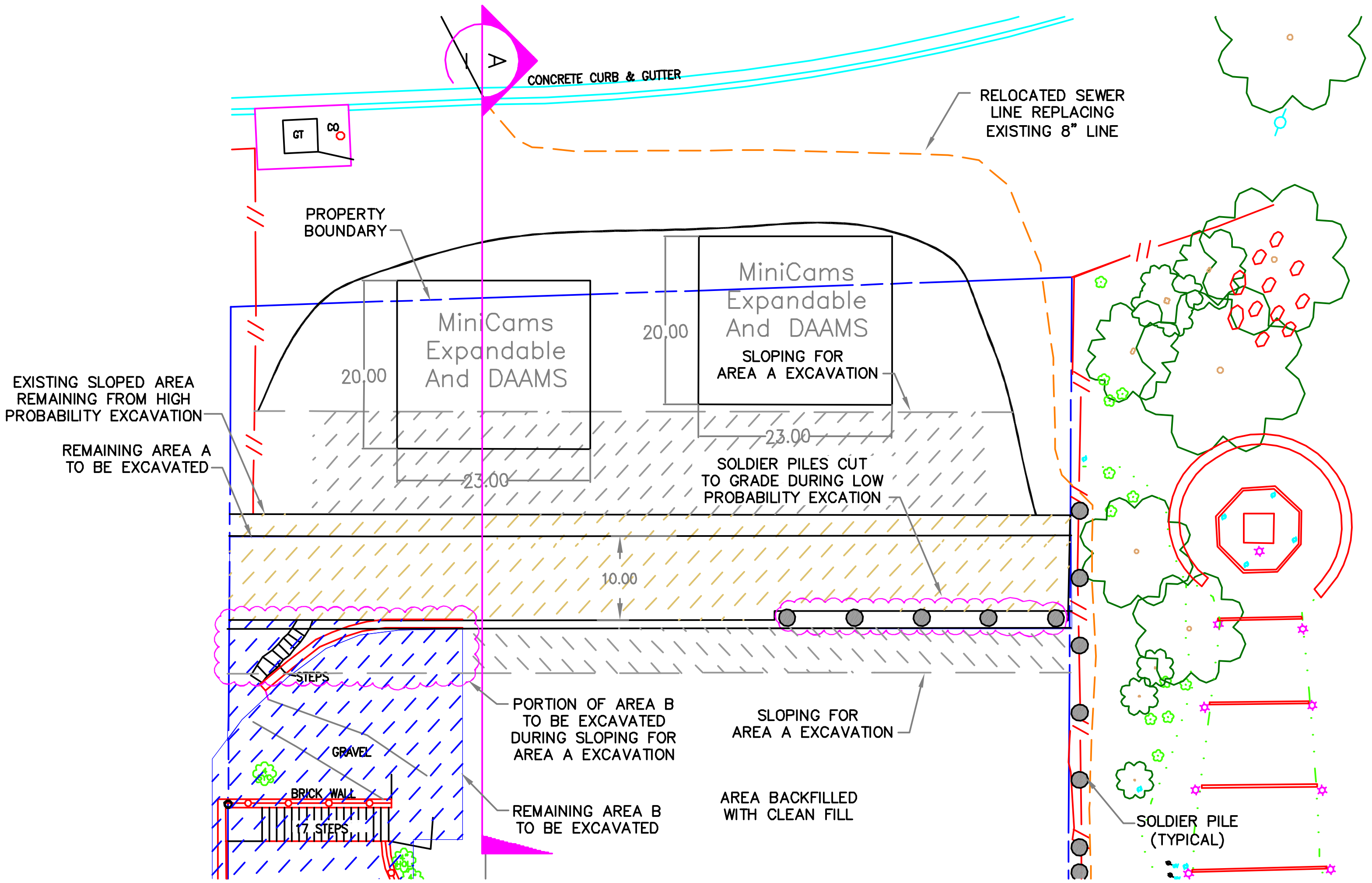
Figure 4-4 Slab and Wall Profile.dwg

Figure 4-5
Sloping Cross-Section



PARSONS

Figure 4-5 Slab and Wall Excavation.dwg



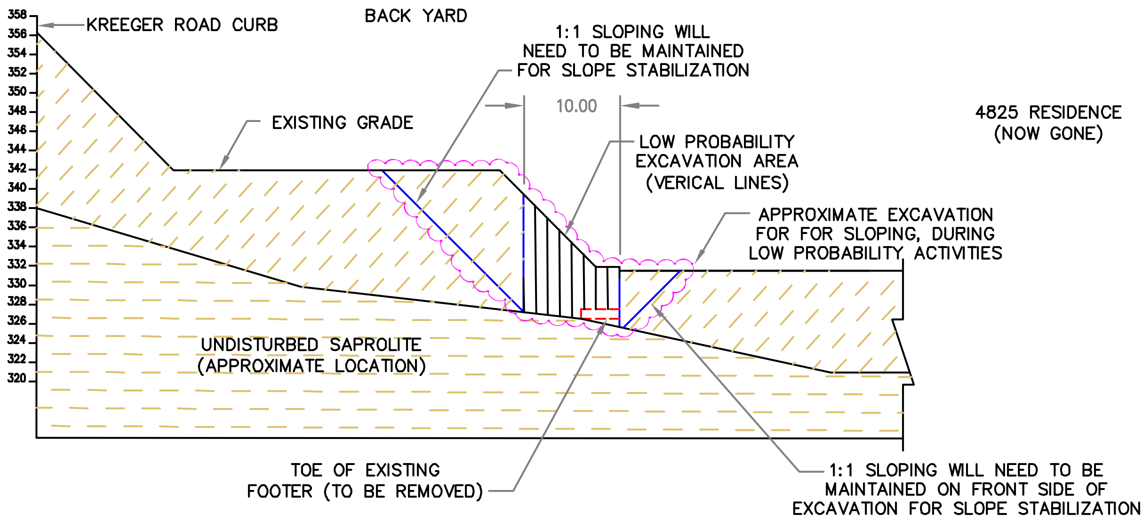
PLAN VIEW
1"=20'

LEGEND	
Ⓢ	SEWER MANHOLE
GT	STORM DRAIN GRATE
CO	CLEAN OUT
WW	WINDOW WELL
WM	WATER METER
EX	ELECTRIC BOX
—//—	WOOD FENCE
—x—	CHAIN LINK FENCE
— —	TEMPORARY CHAIN LINK FENCE
—o—o—o—	HAND RAIL
○	SPRINKLER HEAD
32" TRE	TREE WITH SIZE

NOTE:

1. LOCATION OF 1:1 SLOPING IN CROSS SECTION IS APPROXIMATE AND WILL VARY ACCORDING TO ACTUAL DEPTH OF UNDISTURBED SAPROLITE (DETERMINED IN THE FIELD).

2. LOW PROBABILITY EXCAVATION NEAR NORTH AND SOUTH PROPERTY BOUNDARIES WILL BE DONE WITH SPEED SHORING, OR TRENCH BOXES TO ELIMINATE THE NEED FOR ADDITIONAL SOLDIER PILES AND/OR SLOPING TOWARD THESE PROPERTY BOUNDARIES.



A
—
SECTION
SCALE: 1"=20'

SCALE: 1" = 20'
Approximate Scale in Feet

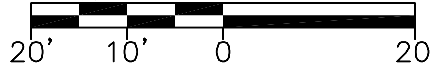


FIGURE 4–6
BACK YARD LOW
PROBABILITY EXCAVATION
4825 GLENBROOK ROAD

SPRING VALLEY
WASHINGTON D.C.

5. NOISE CONTROL

5.1. NOISE STUDY

A noise study was performed in accordance with the noise study work plan, which is included in Attachment M-7. The noise study was conducted to evaluate noise levels from the CAFS units and associated emergency generators proposed to be located at 4825 Glenbrook Road during the remedial action and to identify possible noise control measures to reduce the noise levels at the two adjacent properties, 4835 Glenbrook Road and 4801 Glenbrook Road. The primary goal was to evaluate options to reduce noise levels to not more than the District of Columbia's regulatory limit of 55 A-weighted decibels (dBA) or preferably 5 decibels (dB) above the lowest night time hourly average noise levels at the property lines of these adjacent residences. Achieving noise level of 5 dB above the lowest nighttime noise level is not a regulatory requirement. The District of Columbia's noise regulations indicate that the source sound level is measured at the property line of the property on which the noise source is located; however, due to the solid wood walls at the property lines, areas behind the property walls at the receiving sites were considered for the evaluation purposes. The noise study was based on a conservative scenario that the CAFS will be running during the day and at night to represent the worst case scenario.

5.2. BASELINE NOISE LEVELS FROM 4825 GLENBROOK ROAD PROPERTY AND CAFS UNITS

Parsons' personnel conducted continuous noise level measurements in February of 2012 for a total of 80 hours at 4825 Glenbrook Road. These measurements were used to establish the lowest existing night time noise levels. Measurement results indicated that the lowest average hourly night time noise level in the backyard of 4825 Glenbrook Road was 38 dBA. Therefore, the secondary goal is for the CAFS unit noise to not exceed 43 dBA at the nearest residential property lines. Additional noise measurements were completed at ECBC facilities in Aberdeen, Maryland around the fan of each CAFS unit as well as the emergency backup generator. Measurement results also were used to calibrate the computer noise model.

5.3. NOISE STUDY RESULTS

A computer noise model was developed using SoundPLAN 7.0 to analyze possible noise impacts and control measures. Results of the model analysis indicated that the noise level with three CAFS units running close to the property line of 4835 Glenbrook Road, without noise control, would achieve the goal of 55 dBA near the property line. Noise reduction provided by the existing property wall was considered in the calculation. Furthermore, the noise level at the property line of 4835 Glenbrook Road could be reduced to 44 dBA with the use of acoustic enclosures at each fan and further reduced to as low as 40 dBA with the use of acoustic enclosures and silencers at the outlet of each fan. However, without any noise mitigation, the noise level near the property line of 4801 Glenbrook Road would be 78 dBA, which could be reduced to 63 dBA with a sound wall curtain, reduced to 59 dBA with acoustical enclosures for the CAFS unit fans, or reduced to as low as 54 dBA with acoustical enclosures and silencers depending on which silencer is used at the outlet of each fan. In only the case with acoustic enclosures and silencers manufactured by Industrial Acoustics (IAC) could the noise level at the property line of 4801 Glenbrook Road achieve the 55 dBA goal near the property line. The backup generator will be running for short time once a week; therefore, noise control measures for the backup generator were not the main objective.

5.4. NOISE REDUCTION APPROACH

Three CAFS units will be used to support the filtration of each tent. The recommended noise control measure is the use of acoustical enclosures and IAC silencers, or equivalent, at an anticipated cost of $38,000 for each fan or a total of $114,000 for materials and installation. Noise reduction design will be included in this section in the draft final version of this document. Detailed noise reduction design will be included in Attachment M-7.

5.5. NOISE MONITORING

Noise levels will be monitored around the boundary of the work area and measures required to keep noise levels in compliance during site activities (below the DCMR required noise level of 60dBA at the property line) will be implemented. If CAFS units are running at night, the DCMR required noise level of 55dBA at the property line will be implemented.

6. SUMMARY

6.0.0.1 Following this assessment of engineering control alternatives, an ECS comprising a tent with CAFS is recommended for the remedial action for the high probability areas including Areas D, E, and F at 4825 Glenbrook Road.

6.0.0.2 This ECS alternative provides containment of the MCE, and because of its flexible construction, it can meet the specific space and terrain constraints at 4825 Glenbrook Road.

7. REFERENCE

ECBC, 2011. Arsenic trichloride filtration performance with the impregnated carbon ASZMT. June 2011.

USACE 2002 Site-Wide Chemical Safety Submission, Spring Valley FUDS, Washington, D.C. 2002, Prepared by Parsons.

USACE 2003 Annex E to the Chemical Safety Submission, Explosive Destruction System Operations. Spring Valley FUDS, Washington, D.C. May 2003

USACE 2007a Site Specific Work Plan for the Investigation of Burial Pit 3 4825 Glenbrook Road. Spring Valley FUDS, Operable Unit 3, Washington, D.C. July 2007

USACE 2007b Chemical Safety Submission Spring Valley Formerly Used Defense Site, Revision 1A. Spring Valley FUDS, Operable Unit 3, Washington, D.C. October 2007

USACE, 2011. Remedial Investigation Report for 4825 Glenbrook Road. Spring Valley FUDS, Operable Unit 3, Washington, D.C. July 29.

USACE, 2012a. MEC/CWM Probability Assessment, Intrusive Remedial Action at 4825 Glenbrook Road Spring Valley FUDS, Washington, D.C. June 15

USACE, 2012b. Final Decision Document for 4825 Glenbrook Road Spring Valley FUDS, Operable Unit 3, Washington, D.C. June.

USACE, 2012c. Chemical Safety Submission for Remedial Action at 4825 Glenbrook Road, SVFUDS Spring Valley, Washington D.C. Prepared by Parsons.

ATTACHMENT M-1
CEHNC-CX CSS APPROVAL

DEPARTMENT OF THE ARMY
US ARMY DEFENSE AMMUNITION CENTER
1 C TREE ROAD
MCALESTER OK 74501-9053

REPLY TO
ATTENTION OF

JMAC-EST 27 November 2012

MEMORANDUM FOR US Army Corps of Engineers, Environmental and Munitions Center of Expertise, CEHNC-CX-EMM, P.O. Box 1600, Huntsville, AL 35807-4301

SUBJECT: DDESB Approval, Chemical Safety Submission (CSS) 4825 Glenbrook Road Remedial Design/Remedial Actions Spring Valley (FUDS) Site, Operable Unit (OU-3), dated 24 Oct 2012, Revision 3.3

1. References:

a. Memorandum, CEHNC-EMM, 30 October 2012, subject: Chemical Safety Submission (CSS) 4825 Glenbrook Road Remedial Design/Remedial Actions Spring Valley (FUDS) Site, Operable Unit (OU-3), dated 24 Oct 2012, Revision 3.3.

b. DoD 6055.09-M, Ammunition and Explosives Safety Standards, 29 Feb 08, administratively reissued August 4, 2010.

c. Memorandum, DDESB-PE, dated 27 November 2012, subject: DDESB Final Approval for 4825 Glenbrook Road Remedial Design/Remedial Actions Spring Valley (FUDS) Site, Operable Unit (OU-3), dated 24 Oct 2012, Revision 3.3 (Encl).

2. The subject Chemical Safety Submission, transmitted by reference 1.a, has been reviewed in accordance with reference 1.b. Reference 1.c provides Department of Defense Explosives Safety Board (DDESB) final approval. This approval will be made part of the administrative record for the site.

3. As required by DoD 6055.09-M, V7.E4.3.1.1.7, submit an after action report (AAR) to our office for review and forwarding to DDESB after this approved Removal Action is complete.

4. The POC is Charlotte Curtis, JMAC-EST, DSN 956-8742, commercial (918) 420-8742, email charlotte.g.curtis.civ@mail.mil.

CHARLOTTE G. CURTIS
MEC Team Action Officer
Explosives Safety Knowledge, MEC and
Chemical Division
US Army Technical Center for Explosives
Safety

CF (w/encl):
Office of the Director of Army Safety (DACS-SF/Mr. Patton and Mr. Walker), 223 23rd Street, Crystal Plaza 5, Suite 980, Arlington, VA 22202
Office of the Deputy Assistant Secretary of the Army for Environment, Safety, and Occupational Health, Special Assistant for Munitions, (DASA-DESOH/Mr. King), 110 Army Pentagon, Washington, DC 20310-0110
U.S. Army Corps of Engineers (CESO/Ms Roberts), 20 Massachusetts Avenue, NW, Washington, DC 20314-1000

DEPARTMENT OF DEFENSE EXPLOSIVES SAFETY BOARD
4800 Mark Center Drive, Suite 16E12
Alexandria, Virginia 22350-22350

DDESB-PE

NOV 27 2012

MEMORANDUM FOR DIRECTOR, U.S. ARMY DEFENSE AMMUNITION CENTER
ATTN: JMAC-ESM

SUBJECT: DDESB Final Approval for 4825 Glenbrook Road Remedial Design/Remedial Actions Spring Valley (FUDS) Site, Operable Unit (OU-3), dated 24 Oct 2012, Revision 3.3

References: (a) JMAC-ESM Memorandum of 20 November 2012, Subject: Chemical Safety Submission (CSS) 4825 Glenbrook Road Remedial Design/Remedial Actions Spring Valley (FUDS) Site, Operable Unit (OU-3), dated 24 Oct 2012, Revision 3.3

(b) DoD 6055.09-M, DoD Ammunition and Explosives Safety Standards, date varies by volume

(c) DDESB-PE Memorandum dated 03 July, 2007, Subject: Engineering Controls Evaluation for 4825 Glenbrook Road, Spring Valley Formerly Used Defense Site (FUDS), Washington, DC, Modular Aluminum Containment Structure (MACS) Engineering Controls, 10 November 2006, Revised Configuration

(d) DDESB-PE Memorandum dated 26 October, 2007, Subject: DDESB Final Approval of Request for Approval, Chemical Safety Submission (CSS) for the Spring Valley Formerly Used Defense Site (FUDS), Washington, DC, March 2007

The Department of Defense Explosives Safety Board (DDESB) Staff has reviewed the subject site safety submission, forwarded by reference (a), with respect to explosives safety criteria in reference (b). Based on the information provided in reference (a), a final safety approval is granted for demolishing of the existing structure and necessary remedial excavation of non-explosives chemical warfare material (CWM) at 4825 Glenbrook Road, Spring Valley DC. The following pertains to this approval:

a. This DDESB final approval is granted to conduct remedial excavation in areas D, E and F (high probabilities to find CWM) at the subject location. Areas A and B are considered low probabilities to find CWM.

b. This approval can be used to extend excavation and recovery of CWM at Areas A and B, should the need arise, provided implementation of all conditions applied at Areas D-F.

c. Remediation of Area C (currently Test Pit (TP) 3, and formerly TP 23) had been previously approved by reference (c) and the operation was concluded in 2009.

d. The maximum credible event is the evaporative release of one liter of lewisite. Reference (a) is not expecting to find explosively configured munitions at the above areas.

e. The excavation operation will be conducted inside a negative pressure Engineering Control Structure (ECS); therefore, the chemical arc is limited to within the ECS.

f. The public access exclusion distance is limited to within the ECS.

g. The recovered CWM will be stored in multiple round containers in an interim holding facility approved by reference (d).

h. A new chemical safety submission (CSS) is required if explosively configured munitions are discovered at any area covered by this approval. The new CSS must address mitigation of the fragments and overpressure of the munitions.

Point of contact is Mr. Aly Kewan, he can be reached at DSN: 372-7659; commercial: 571-372-7659; and E-mail: aly.a.kewan.civ@mail.mil.

CURTIS M. BOWLING
Chairman
DDESB

ATTACHMENT M-2
D2SV MODELS

```
D2SV Model
1 liter spill Mustard
Worst-case daytime meteorological conditions

                 --------------------------------
                 | DOWNWIND HAZARD PROGRAM D2PC |
                 | SPRING VALLEY VERSION        |
                 --------------------------------
    TYPE ? FOR DEFINITIONS

 1. YOUR NOVICE LEVEL: 3,2,1 OR 0 NOV
 INPUT:0

 2. LOCATION                      LOC
 INPUT:EWA

 3. SEASON                        SEA
 INPUT:SUM

 5. MUNITION TYPE                 MUN
 INPUT:NON

 6. AGENT TYPE                    AGN
 INPUT:HD

 8. RELEASE TYPE                  REL
 INPUT:EVP

 9. STABILITY TYPE                STB
 INPUT:D

10. WINDSPEED (M/SEC)             WND
 INPUT:1
BRT=25. DI=      2.0   100.0   150.0

 7. SPILL OR AIRBORNE SOURCE (MG) QQQ
 INPUT:LT1
     L TO MG    .127E+07

    SURFACE
12. TEMPERATURE (DEG C)           TMP
 INPUT:DF95
 DEG F TO DEG C .350E+02

17. SURFACE CODE                  SUR
 INPUT:GRA

18. TIME OF EVAPORATION (MIN)     TEV
 INPUT:15
GRA  EVR=2.985E+02(MG/MIN-SQ M)  AREA=1.940E-01(SQ M)  VPR=2.391E-01
Q=1.268E+06(MG)  Q'=8.686E+02(MG)     TEV=1.500E+01(MIN)
ALL OTHER INPUT
NDI 1
 INPUT: DI()S  (ASCENDING)
4
ALL OTHER INPUT
ALL


   1 MUN:NON  AGN:HD  REL:EVP  WND= 1.0(M/S)  TMP=35.0(C)  EWA-SUM STB:D

   Q(MG)   TS(MIN)  HTS(M)   HML(M)   SXS(M)   SYS(M)   SZS(M)
8.686E+02 1.50E+01  .00E+00 5.25E+02 1.47E-01 1.47E-01 1.00E-01  D
```

```
          5. (M) IS DISTANCE TO   .400E+01 (MG-MIN/M^3)

        NOTE: RESULTS HAVE BEEN REDUCED BY A FACTOR
              OF ~2 TO ACCOUNT FOR COMPLEX TERRAIN

 ALL OTHER INPUT
 TEV 60
 ALL
  2. LOCATION                     LOC  EWA
  3. SEASON                       SEA  SUM
  5. MUNITION TYPE                MUN  NON
  6. AGENT TYPE                   AGN  HD
  8. RELEASE TYPE                 REL  EVP
  9. STABILITY TYPE               STB  D
 10. WINDSPEED (M/SEC)            WND       1.00
 BRT=25. DI=     2.0   100.0   150.0
  7. SPILL OR AIRBORNE SOURCE (MG) QQQ 1.268E+06
     SURFACE
 12. TEMPERATURE (DEG C)          TMP      35.00
 17. SURFACE CODE                 SUR  GRA
 18. TIME OF EVAPORATION (MIN)    TEV      60.00
 GRA  EVR=2.985E+02(MG/MIN-SQ M)  AREA=1.940E-01(SQ M)  VPR=2.391E-01
 Q=1.268E+06(MG)  Q'=3.474E+03(MG)    TEV=6.000E+01(MIN)
 ALL OTHER INPUT
 NDI 1
  INPUT: DI()S  (ASCENDING)
 4
 ALL OTHER INPUT
 ALL

    1 MUN:NON  AGN:HD  REL:EVP  WND= 1.0(M/S)  TMP=35.0(C)  EWA-SUM STB:D

    Q(MG)    TS(MIN)  HTS(M)   HML(M)   SXS(M)   SYS(M)   SZS(M)
 3.474E+03 6.00E+01  .00E+00 5.25E+02 1.47E-01 1.47E-01 1.00E-01  D

         13. (M) IS DISTANCE TO   .400E+01 (MG-MIN/M^3)

        NOTE: RESULTS HAVE BEEN REDUCED BY A FACTOR
              OF ~2 TO ACCOUNT FOR COMPLEX TERRAIN

 ALL OTHER INPUT
```

```
               --------------------------------
               | DOWNWIND HAZARD PROGRAM D2PC |
               | SPRING VALLEY VERSION        |
               --------------------------------
    TYPE ? FOR DEFINITIONS

 1. YOUR NOVICE LEVEL: 3,2,1 OR 0 NOV
 INPUT:0

 2. LOCATION                      LOC
 INPUT:EWA

 3. SEASON                        SEA
 INPUT:SUM

 5. MUNITION TYPE                 MUN
 INPUT:NON

 6. AGENT TYPE                    AGN
 INPUT:LL

 8. RELEASE TYPE                  REL
 INPUT:EVP

 9. STABILITY TYPE                STB
 INPUT:D

10. WINDSPEED (M/SEC)             WND
 INPUT:1
BRT=25. DI=     2.0   100.0   150.0

 7. SPILL OR AIRBORNE SOURCE (MG) QQQ
 INPUT:LT1
     L TO MG    .189E+07

    SURFACE
12. TEMPERATURE (DEG C)           TMP
 INPUT:DF95
 DEG F TO DEG C .350E+02

17. SURFACE CODE                  SUR
 INPUT:GRA

18. TIME OF EVAPORATION (MIN)     TEV
 INPUT:60
GRA  EVR=1.275E+03(MG/MIN-SQ M)  AREA=2.892E-01(SQ M)  VPR=7.938E-01
Q=1.890E+06(MG)  Q'=2.211E+04(MG)    TEV=6.000E+01(MIN)
ALL OTHER INPUT
ALL


   1 MUN:NON  AGN:LL  REL:EVP  WND= 1.0(M/S)  TMP=35.0(C)  EWA-SUM STB:D

   Q(MG)   TS(MIN)  HTS(M)   HML(M)   SXS(M)   SYS(M)   SZS(M)
2.211E+04 6.00E+01  .00E+00 5.25E+02 1.79E-01 1.79E-01 1.00E-01  D

        4. (M) IS DISTANCE TO 1% LETHALITY


        5. (M) IS DISTANCE TO NO DEATHS


       59. (M) IS DISTANCE TO NO EFFECTS
```

```
      NOTE: RESULTS HAVE BEEN REDUCED BY A FACTOR
            OF ~2 TO ACCOUNT FOR COMPLEX TERRAIN

ALL OTHER INPUT
NDI 1
 INPUT: DI()S  (ASCENDING)
7.2
ALL OTHER INPUT
ALL


   1 MUN:NON  AGN:LL  REL:EVP  WND= 1.0(M/S)  TMP=35.0(C)  EWA-SUM STB:D

   Q(MG)   TS(MIN)  HTS(M)   HML(M)   SXS(M)   SYS(M)   SZS(M)
2.211E+04 6.00E+01  .00E+00 5.25E+02 1.79E-01 1.79E-01 1.00E-01  D

       28. (M) IS DISTANCE TO   .720E+01 (MG-MIN/M^3)


      NOTE: RESULTS HAVE BEEN REDUCED BY A FACTOR
            OF ~2 TO ACCOUNT FOR COMPLEX TERRAIN

ALL OTHER INPUT
```

```
D2SV Model
1 liter spill Lewisite
Worst-case daytime meteorological conditions

                 --------------------------------
                 | DOWNWIND HAZARD PROGRAM D2PC |
                 | SPRING VALLEY VERSION        |
                 --------------------------------
    TYPE ? FOR DEFINITIONS

 1. YOUR NOVICE LEVEL: 3,2,1 OR 0 NOV
 INPUT:0

 2. LOCATION                      LOC
 INPUT:EWA

 3. SEASON                        SEA
 INPUT:SUM

 5. MUNITION TYPE                 MUN
 INPUT:NON

 6. AGENT TYPE                    AGN
 INPUT:LL

 8. RELEASE TYPE                  REL
 INPUT:EVP

 9. STABILITY TYPE                STB
 INPUT:D

10. WINDSPEED (M/SEC)             WND
 INPUT:1
BRT=25. DI=      2.0   100.0   150.0

 7. SPILL OR AIRBORNE SOURCE (MG) QQQ
 INPUT:LT1
     L TO MG    .189E+07

    SURFACE
12. TEMPERATURE (DEG C)           TMP
 INPUT:DF95
 DEG F TO DEG C .350E+02

17. SURFACE CODE                  SUR
 INPUT:GRA

18. TIME OF EVAPORATION (MIN)     TEV
 INPUT:15
GRA  EVR=1.275E+03(MG/MIN-SQ M)  AREA=2.892E-01(SQ M)  VPR=7.938E-01
Q=1.890E+06(MG)  Q'=5.528E+03(MG)    TEV=1.500E+01(MIN)
ALL OTHER INPUT
IMA 1
 DEFINE NCI
NCI 1
 INPUT: CI()S  (ASCENDING)
0.12
ALL OTHER INPUT
ALL


   1 MUN:NON  AGN:LL  REL:EVP  WND= 1.0(M/S)  TMP=35.0(C)  EWA-SUM STB:D
```

```
     Q(MG)     TS(MIN)    HTS(M)    HML(M)      WND
   5.528E+03 1.500E+01  .000E+00 5.250E+02 1.000E+00     D

    ALF   SYR   BTA   SZR         SYS(M)  SZS(M)  XY(M)   XZ(M)   XC(M)
    .90 16.00   .85  9.00        1.8E-01 1.0E-01 6.8E-01 5.0E-01 4.3E+03


          X         CP          RF

        28.*  1.200E-01


       NOTE: RESULTS HAVE BEEN REDUCED BY A FACTOR
             OF ~2 TO ACCOUNT FOR COMPLEX TERRAIN

 ALL OTHER INPUT
 TEV 60
 ALL
  2. LOCATION                        LOC  EWA
  3. SEASON                          SEA  SUM
  5. MUNITION TYPE                   MUN  NON
  6. AGENT TYPE                      AGN  LL
  8. RELEASE TYPE                    REL  EVP
  9. STABILITY TYPE                  STB  D
 10. WINDSPEED (M/SEC)               WND       1.00
  7. SPILL OR AIRBORNE SOURCE (MG)  QQQ 1.890E+06
     SURFACE
 12. TEMPERATURE (DEG C)             TMP      35.00
 17. SURFACE CODE                    SUR  GRA
 18. TIME OF EVAPORATION (MIN)       TEV      60.00
 GRA  EVR=1.275E+03(MG/MIN-SQ M)  AREA=2.892E-01(SQ M)  VPR=7.938E-01
 Q=1.890E+06(MG)  Q'=2.211E+04(MG)     TEV=6.000E+01(MIN)
 ALL OTHER INPUT
 ALL


    1 MUN:NON  AGN:LL  REL:EVP  WND= 1.0(M/S)  TMP=35.0(C)  EWA-SUM STB:D

     Q(MG)     TS(MIN)    HTS(M)    HML(M)      WND
   2.211E+04 6.000E+01  .000E+00 5.250E+02 1.000E+00     D

    ALF   SYR   BTA   SZR         SYS(M)  SZS(M)  XY(M)   XZ(M)   XC(M)
    .90 16.00   .85  9.00        1.8E-01 1.0E-01 6.8E-01 5.0E-01 1.9E+04


          X         CP          RF

        28.*  1.200E-01


       NOTE: RESULTS HAVE BEEN REDUCED BY A FACTOR
             OF ~2 TO ACCOUNT FOR COMPLEX TERRAIN

 ALL OTHER INPUT
```

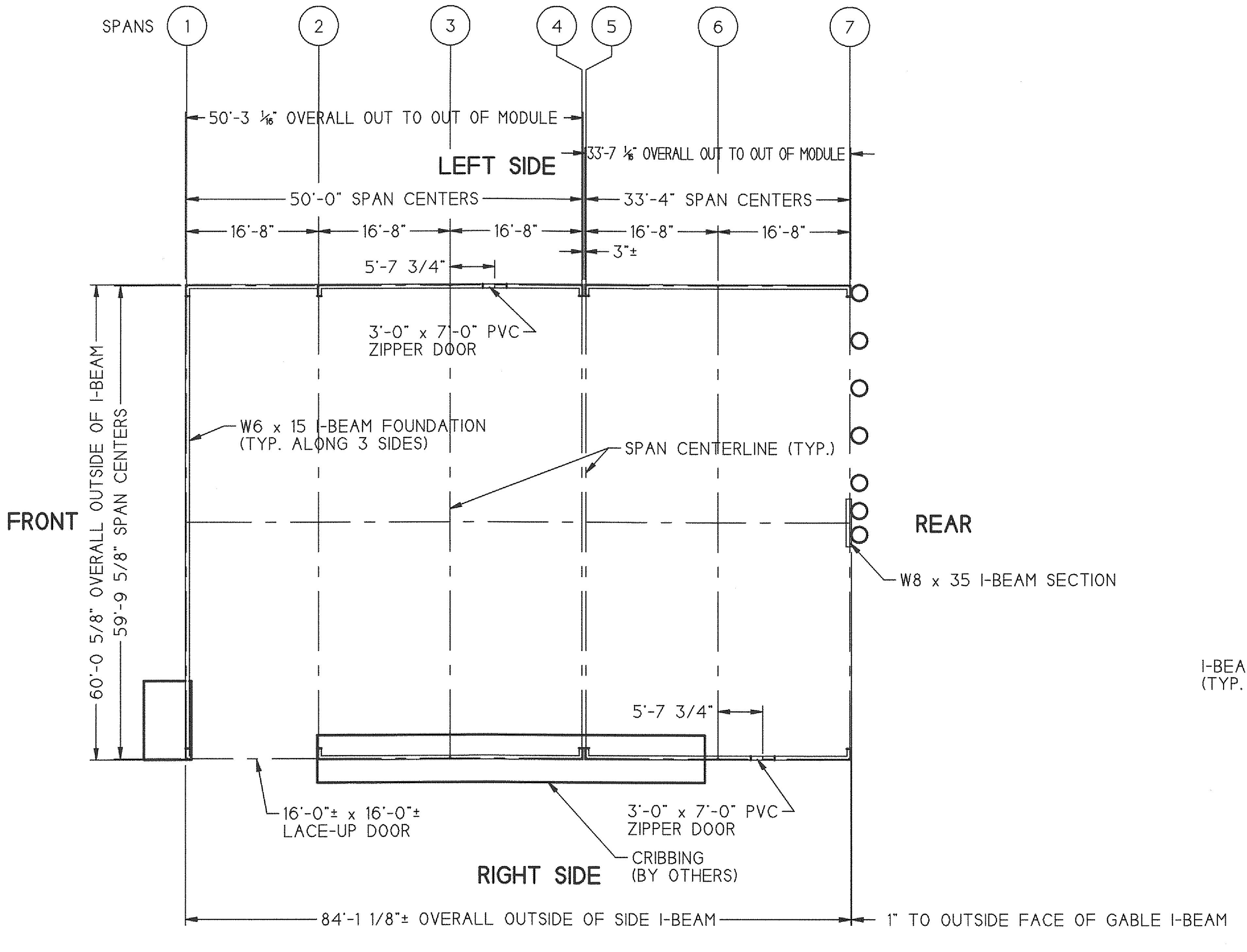
```
              --------------------------------
              | DOWNWIND HAZARD PROGRAM D2PC |
              | SPRING VALLEY VERSION        |
              --------------------------------
    TYPE ? FOR DEFINITIONS

 1. YOUR NOVICE LEVEL: 3,2,1 OR 0 NOV
 INPUT:0

 2. LOCATION                      LOC
 INPUT:EWA

 3. SEASON                        SEA
 INPUT:SUM

 5. MUNITION TYPE                 MUN
 INPUT:NON

 6. AGENT TYPE                    AGN
 INPUT:HD

 8. RELEASE TYPE                  REL
 INPUT:EVP

 9. STABILITY TYPE                STB
 INPUT:D

10. WINDSPEED (M/SEC)             WND
 INPUT:1
BRT=25. DI=     2.0   100.0   150.0

 7. SPILL OR AIRBORNE SOURCE (MG) QQQ
 INPUT:LT1
     L TO MG    .127E+07

    SURFACE
12. TEMPERATURE (DEG C)           TMP
 INPUT:DF95
 DEG F TO DEG C .350E+02

17. SURFACE CODE                  SUR
 INPUT:GRA

18. TIME OF EVAPORATION (MIN)     TEV
 INPUT:60
GRA  EVR=2.985E+02(MG/MIN-SQ M)  AREA=1.940E-01(SQ M)  VPR=2.391E-01
Q=1.268E+06(MG)  Q'=3.474E+03(MG)    TEV=6.000E+01(MIN)
ALL OTHER INPUT
ALL


   1 MUN:NON  AGN:HD  REL:EVP  WND= 1.0(M/S)  TMP=35.0(C)  EWA-SUM STB:D

   Q(MG)   TS(MIN)  HTS(M)   HML(M)   SXS(M)   SYS(M)   SZS(M)
3.474E+03 6.00E+01  .00E+00 5.25E+02 1.47E-01 1.47E-01 1.00E-01  D

        1. (M) IS DISTANCE TO 1% LETHALITY


        2. (M) IS DISTANCE TO NO DEATHS


       20. (M) IS DISTANCE TO NO EFFECTS
```

```
      NOTE: RESULTS HAVE BEEN REDUCED BY A FACTOR
            OF ~2 TO ACCOUNT FOR COMPLEX TERRAIN

ALL OTHER INPUT
```

```
D2SV Model
1 liter spill AsCl3
Worst-case daytime meteorological conditions


                 --------------------------------
                 | DOWNWIND HAZARD PROGRAM D2PC |
                 | SPRING VALLEY VERSION        |
                 --------------------------------
    TYPE ? FOR DEFINITIONS

 1. YOUR NOVICE LEVEL: 3,2,1 OR 0 NOV
 INPUT:0

 2. LOCATION                      LOC
 INPUT:EWA

 3. SEASON                        SEA
 INPUT:SUM

 5. MUNITION TYPE                 MUN
 INPUT:NON

 6. AGENT TYPE                    AGN
 INPUT:NA

 8. RELEASE TYPE                  REL
 INPUT:EVP

 9. STABILITY TYPE                STB
 INPUT:D

10. WINDSPEED (M/SEC)             WND
 INPUT:1

 7. SPILL OR AIRBORNE SOURCE (MG) QQQ
 INPUT:2.16E6

TEMPERATURE IS USED ONLY IF ANTOINE CONSTANTS ARE INPUT
ANTOINE CONSTANTS ARE INPUT BY ENTERING A NEGATIVE NUMBER FOR VAP (Q21)

    SURFACE
12. TEMPERATURE (DEG C)           TMP
 INPUT:DF95
 DEG F TO DEG C .350E+02

17. SURFACE CODE                  SUR
 INPUT:GRA

18. TIME OF EVAPORATION (MIN)     TEV
 INPUT:15

21. FMW,FMV,VAP(MM HG),BPT(DEG K)
 INPUT:181 91.7 19.54 403
GRA  EVR=2.987E+04(MG/MIN-SQ M)  AREA=3.305E-01(SQ M)  VPR=1.954E+01
Q=2.160E+06(MG)  Q'=1.481E+05(MG)    TEV=1.500E+01(MIN)
ALL OTHER INPUT
IMA 1
 DEFINE NCI
NCI 1
 INPUT: CI()S  (ASCENDING)
0.91
ALL OTHER INPUT
```

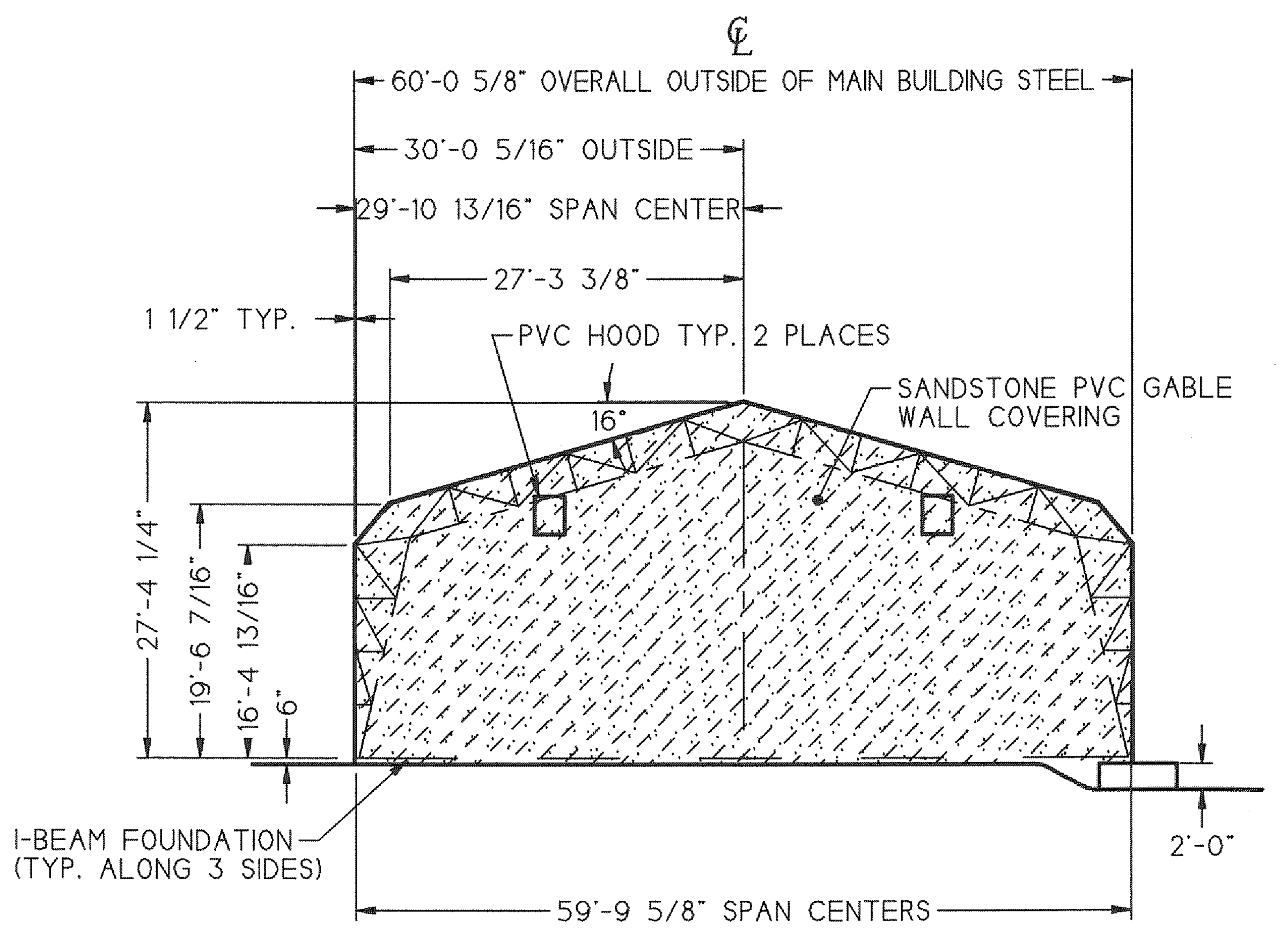
```
ALL

   1 MUN:NON   AGN:NA   REL:EVP   WND= 1.0(M/S)   TMP=35.0(C)   EWA-SUM STB:D

    Q(MG)      TS(MIN)    HTS(M)     HML(M)       WND
  1.481E+05 1.500E+01  .000E+00 5.250E+02 1.000E+00      D

   ALF    SYR    BTA    SZR          SYS(M)  SZS(M)  XY(M)    XZ(M)    XC(M)
   .90 16.00    .85   9.00         1.9E-01 1.0E-01 7.3E-01 5.0E-01 4.3E+03


       X          CP          RF

      59.*   9.100E-01


      NOTE: RESULTS HAVE BEEN REDUCED BY A FACTOR
            OF ~2 TO ACCOUNT FOR COMPLEX TERRAIN

ALL OTHER INPUT
TEV 60
ALL
 2. LOCATION                        LOC  EWA
 3. SEASON                          SEA  SUM
 5. MUNITION TYPE                   MUN  NON
 6. AGENT TYPE                      AGN  NA
 8. RELEASE TYPE                    REL  EVP
 9. STABILITY TYPE                  STB  D
10. WINDSPEED (M/SEC)               WND       1.00
 7. SPILL OR AIRBORNE SOURCE (MG)  QQQ 2.160E+06

TEMPERATURE IS USED ONLY IF ANTOINE CONSTANTS ARE INPUT
ANTOINE CONSTANTS ARE INPUT BY ENTERING A NEGATIVE NUMBER FOR VAP (Q21)
    SURFACE
12. TEMPERATURE (DEG C)             TMP      35.00
17. SURFACE CODE                    SUR  GRA
18. TIME OF EVAPORATION (MIN)       TEV      60.00
21. FMW,FMV,VAP(MM HG),BPT(DEG K)          181.00      91.70      19.54     403.00
GRA  EVR=2.987E+04(MG/MIN-SQ M)  AREA=3.305E-01(SQ M)  VPR=1.954E+01
Q=2.160E+06(MG)  Q'=5.923E+05(MG)     TEV=6.000E+01(MIN)
ALL OTHER INPUT
ALL

   1 MUN:NON   AGN:NA   REL:EVP   WND= 1.0(M/S)   TMP=35.0(C)   EWA-SUM STB:D

    Q(MG)      TS(MIN)    HTS(M)     HML(M)       WND
  5.923E+05 6.000E+01  .000E+00 5.250E+02 1.000E+00      D

   ALF    SYR    BTA    SZR          SYS(M)  SZS(M)  XY(M)    XZ(M)    XC(M)
   .90 16.00    .85   9.00         1.9E-01 1.0E-01 7.3E-01 5.0E-01 1.9E+04


       X          CP          RF

      59.*   9.100E-01


      NOTE: RESULTS HAVE BEEN REDUCED BY A FACTOR
            OF ~2 TO ACCOUNT FOR COMPLEX TERRAIN

ALL OTHER INPUT
```

ATTACHMENT M-3
RUBB TENT DESIGN SHOP DRAWINGS



PLAN VIEW

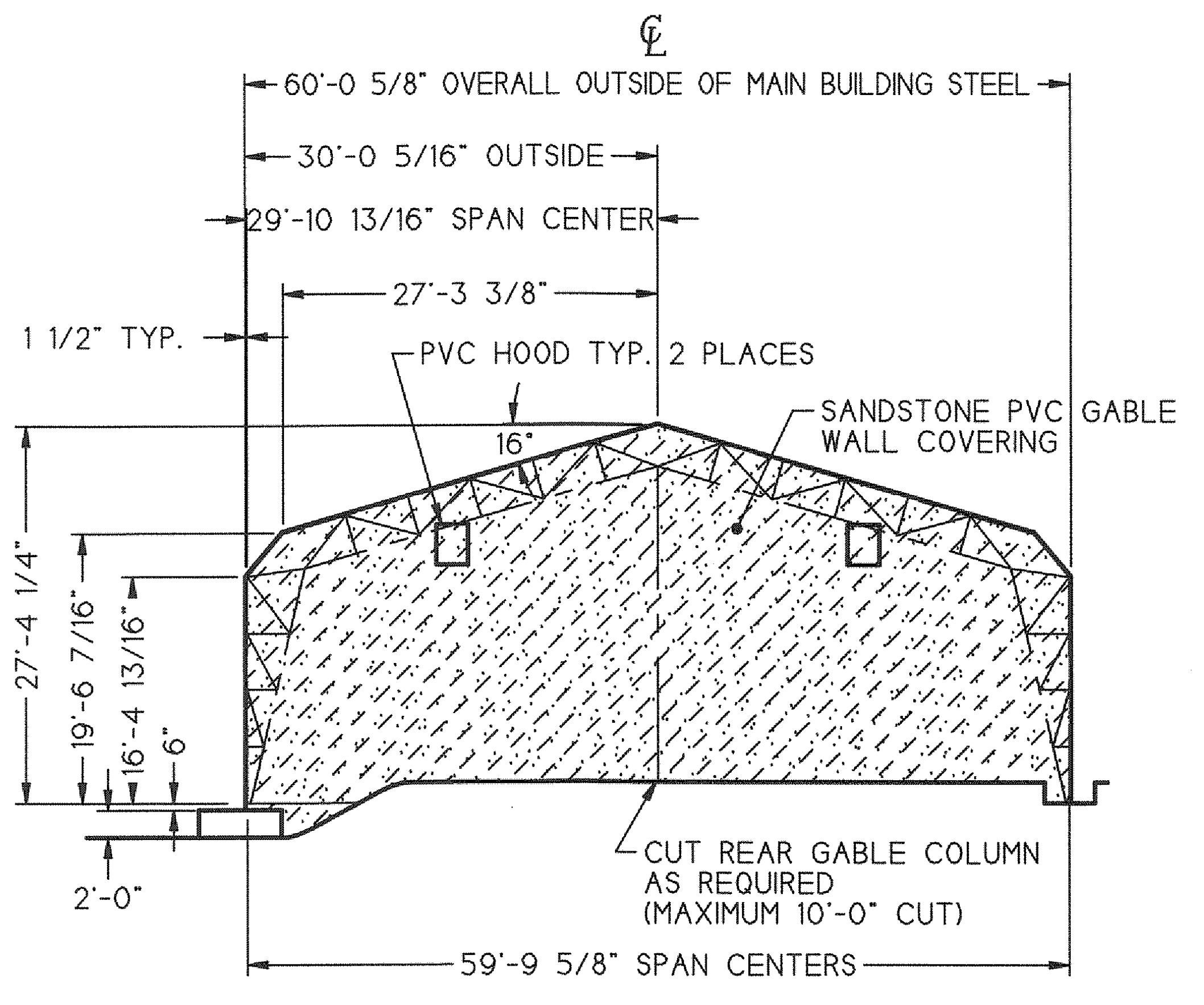
2 MODULE CONFIGURATION
THIS SIDE TOWARDS GLENBROOK ROAD



GABLE ELEVATION

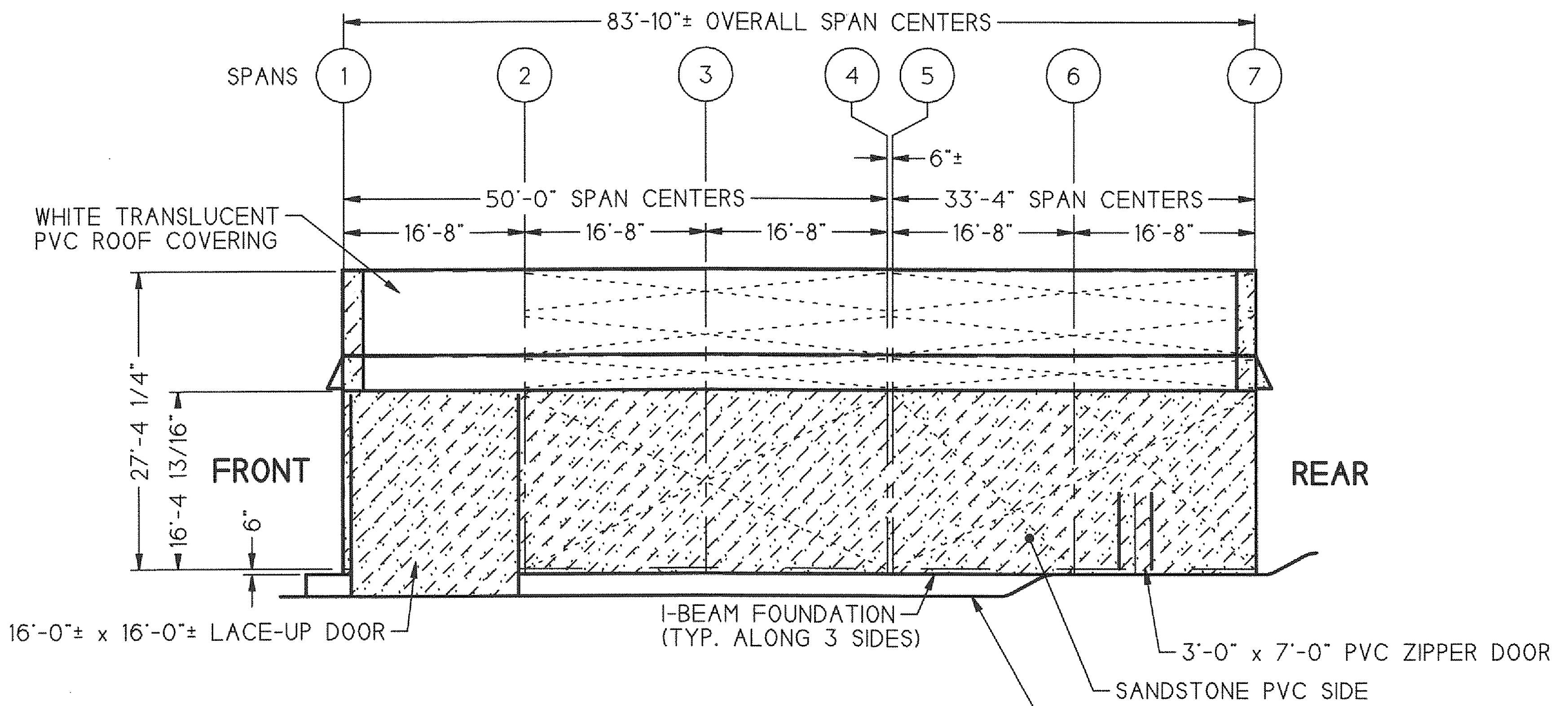
FRONT GABLE

NOTE:
BALLAST BARS AND WEIGHTS NOT SHOWN FOR CLARITY.



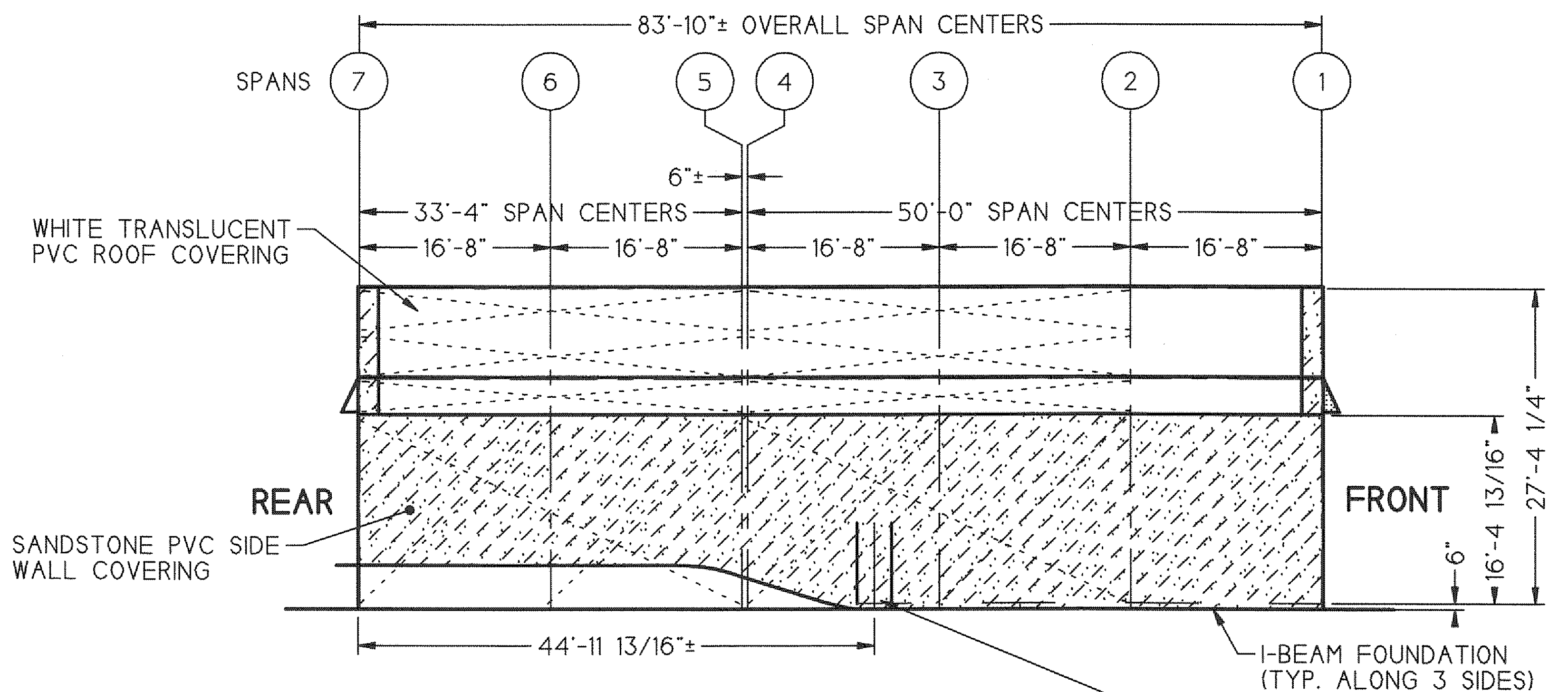
GABLE ELEVATION

REAR GABLE



SIDE ELEVATION

RIGHT SIDE



SIDE ELEVATION

LEFT SIDE

NOTES:

1.) COVERING MATERIAL IS A PVC IMPREGNATED POLYESTER WEAVE FABRIC SELF EXTINGUISHING TO FEDERAL TEST STANDARD 191 METHOD 5903 AND COMPLIES WITH NFPA STANDARD 701, UBC 55-1 AND CALIFORNIA STATE FIRE MARSHALL'S OFFICE.
2.) STRUCTURAL FRAMEWORK IS GALVANIZED TUBULAR STEEL TRUSS FRAMES INTERCONNECTED WITH GALVANIZED TUBULAR STEEL PURLINS. STEEL PLATE AND SHAPES ARE A36. STEEL TUBING IS A500.
3.) SEE DRAWING #51163 FOR SECOND MOVE AND DRAWING #51162 FOR THIRD MOVE.

REV.	DESCRIPTION	DRAWN	APP.	DATE
E	REVISED FOR CONSTRUCTION	MRB		10-31-12
D	REVISED FOR RESUBMITTAL	MJG	AR	10/8/12
C	REVISED FOR RESUBMITTAL	MRB	AR	9-21-12
B	REVISED TO SHOW NEW ARRANGEMENT	MRB	AR	9/10/12
A	REVISED DOORS	MRB	-	-

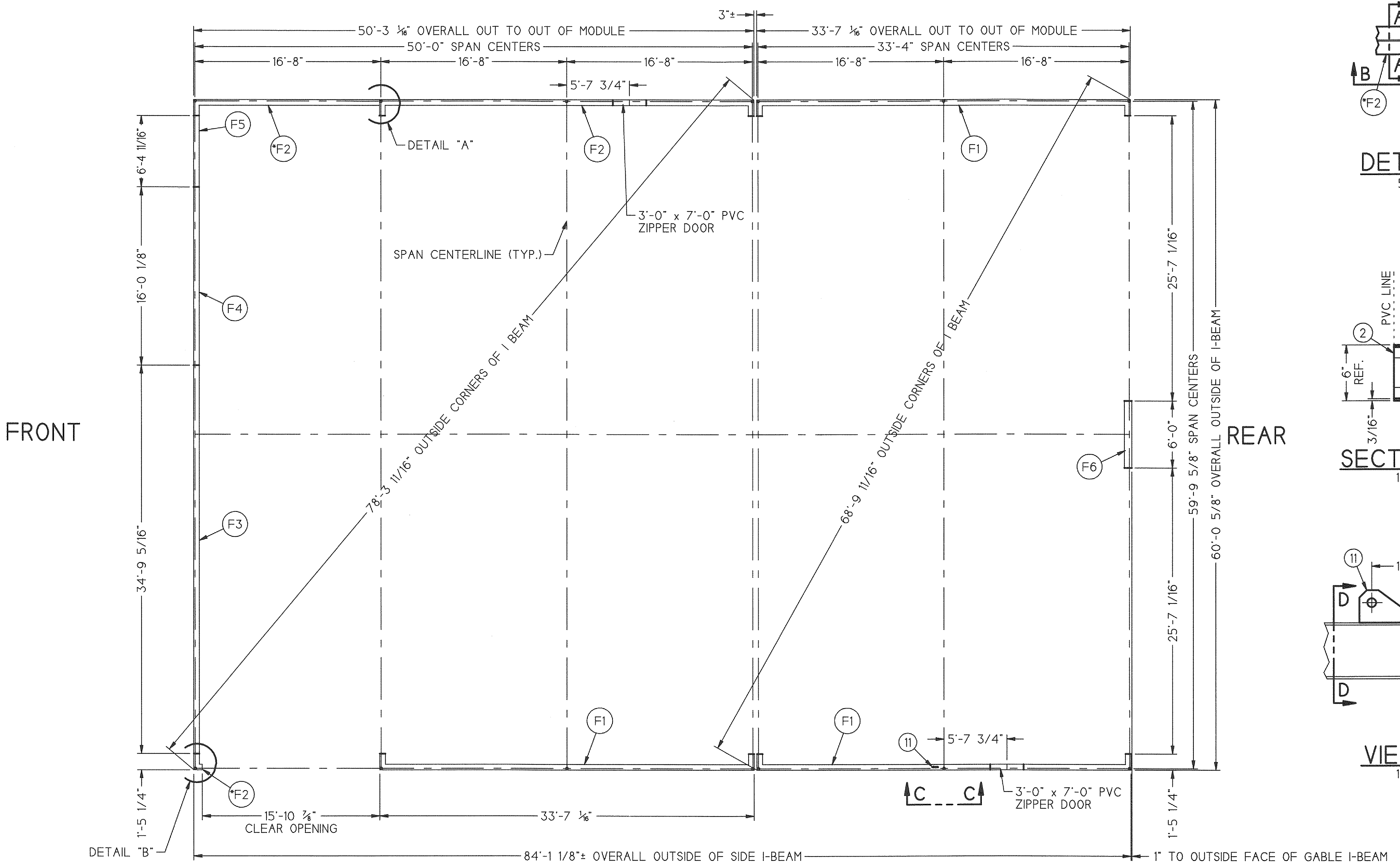
We Cover The World
RUBB
BUILDING SYSTEMS

TITLE
18.29m BVE / 5m LEG
PLAN VIEW & ELEVATIONS
INITIAL LOCATION #1

DRAWN: MJG 5-30-12
SCALE: 1 : 150
APP.: AR 6/9/12
JOB #: 12038
DATE:
JOB NAME: PARSONS

RUBB, INC. SANFORD MAINE 04073
TEL: 207-324-2877 FAX 207-324-2347

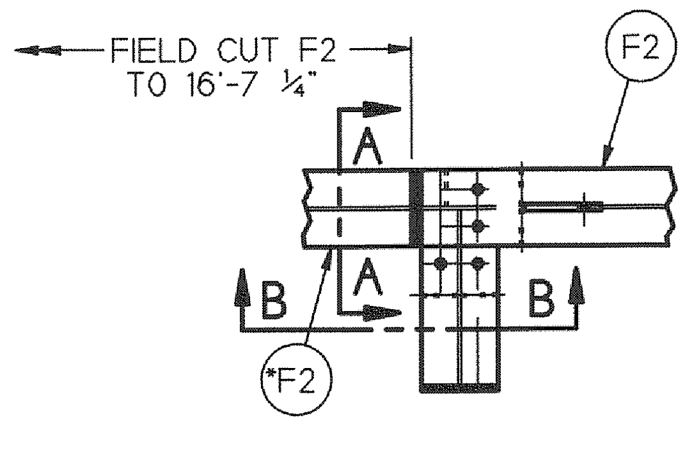
DRAWING NO.: 50698



***ASSEMBLY IS FIELD CUT.**

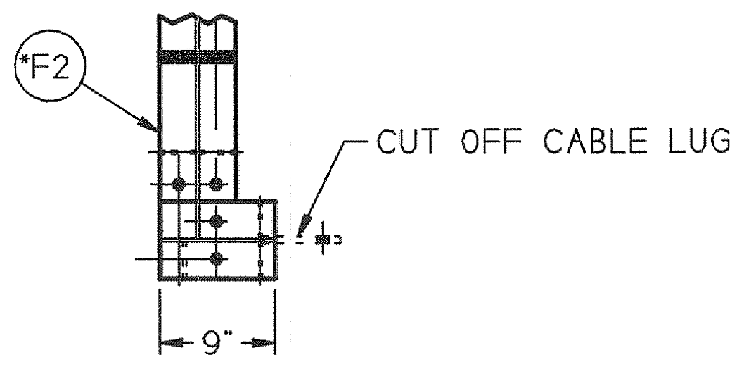
PLAN VIEW

THIS SIDE TOWARDS GLENBROOK ROAD



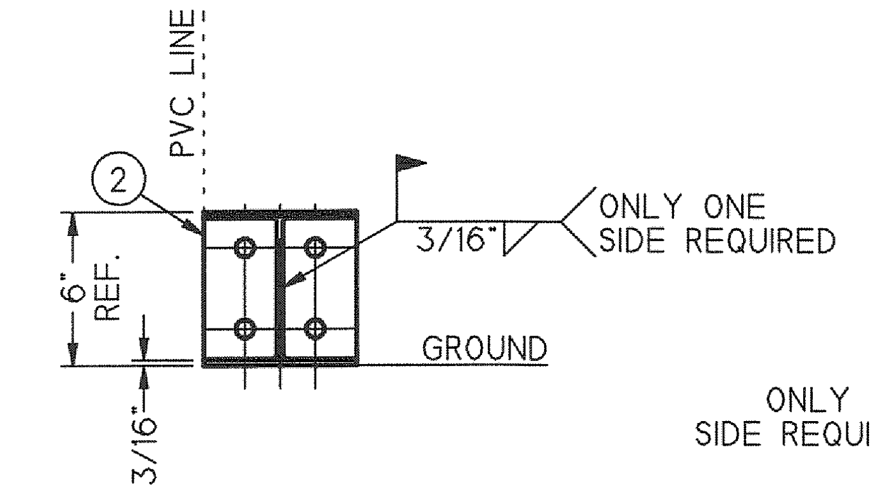
DETAIL "A"

5x SCALE



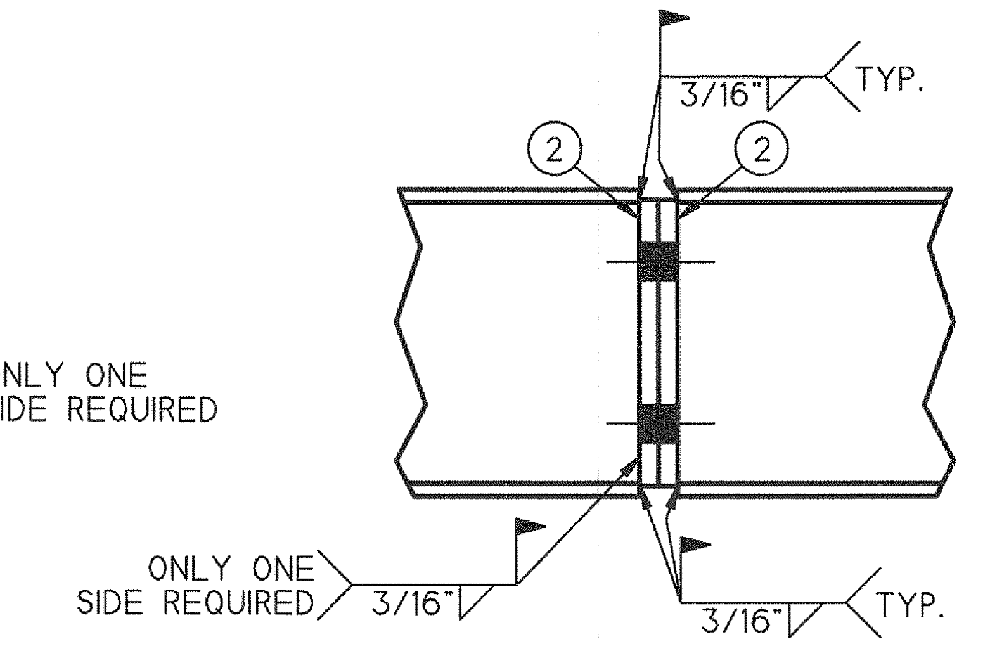
DETAIL "B"

5x SCALE



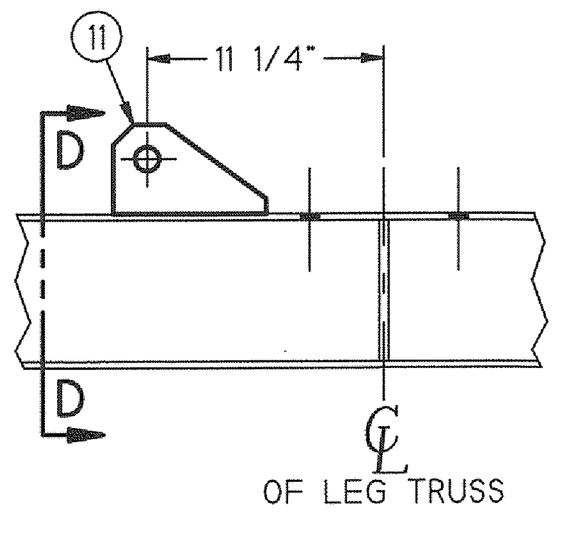
SECTION "A-A"

10x SCALE



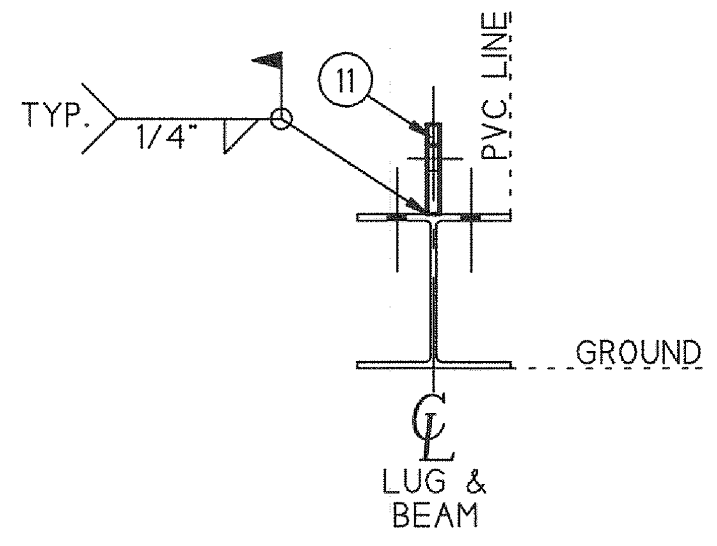
SECTION "B-B"

20x SCALE
RETURN ON F2 NOT
SHOWN FOR CLARITY



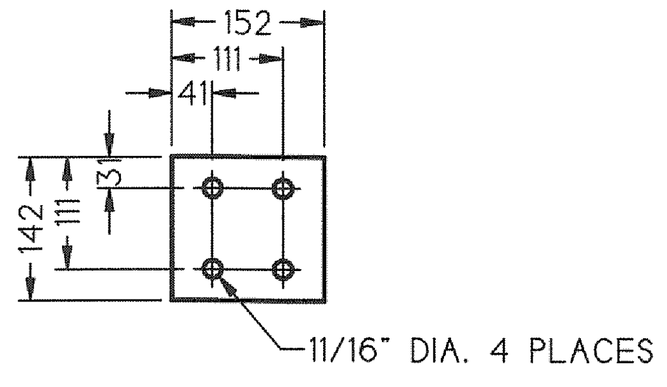
VIEW "C-C"

10x SCALE



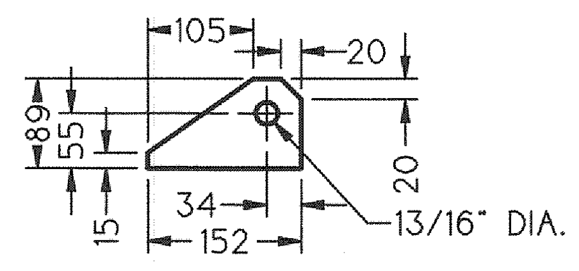
SECTION "D-D"

10x SCALE



DETAIL ITEM 2

10x SCALE
A36 FLAT 6" x 3/8" x 142mm



DETAIL ITEM 11

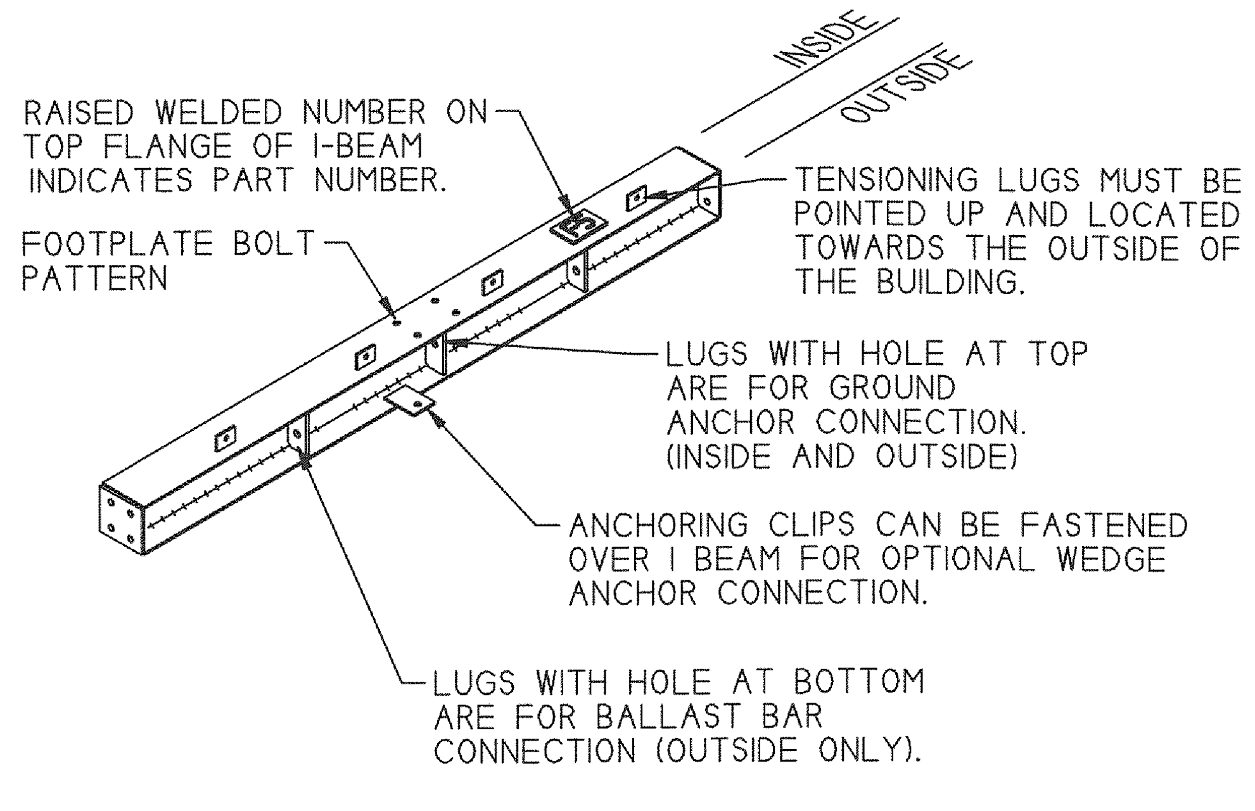
10x SCALE
A36 FLAT 3 1/2" x 1/2" x 152mm

FIELD NOTE:
I-BEAM FOUNDATION LAYOUT IS
THE SAME FOR ALL 3 LOCATIONS

FIELD NOTE:
BURN OFF ANY TENSIONING LUGS
IN OPENING OF ANY ZIPPER DOOR
AS NEEDED.

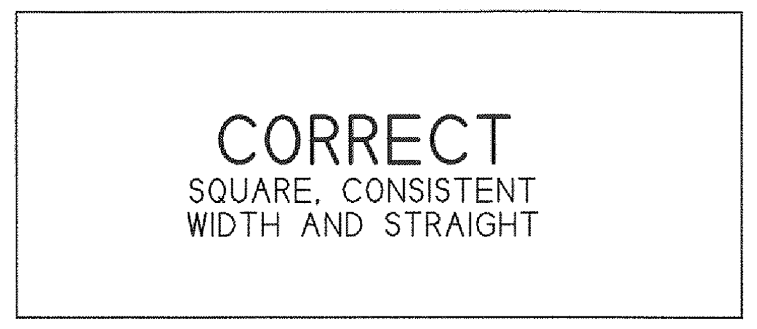
ASSEMBLY	QTY.	DESCRIPTION	DRAWING
F1	3	SIDE I-BEAM FOUNDATION	40069
F2	1	SIDE I-BEAM FOUNDATION w/ ACCESS DOOR	40070
F2*	2	SIDE I-BEAM FOUNDATION w/ ACCESS DOOR	40070
F3	1	34'-9 5/16" GABLE I-BEAM FOUNDATION	40071
F4	1	16'-0 1/8" GABLE DOOR I-BEAM FOUNDATION	40080
F5	1	6'-4 11/16" GABLE SIDE I-BEAM FOUNDATION	40119
F6	1	6'-0" GABLE I-BEAM FOUNDATION	51232

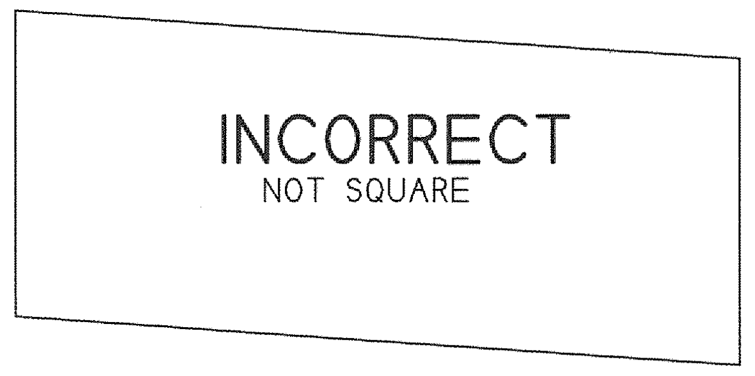
***ASSEMBLY IS CUT TO FIT AS REQUIRED.**

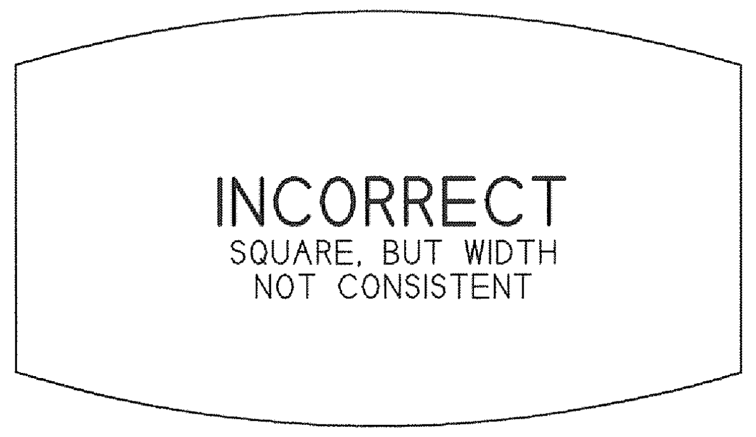


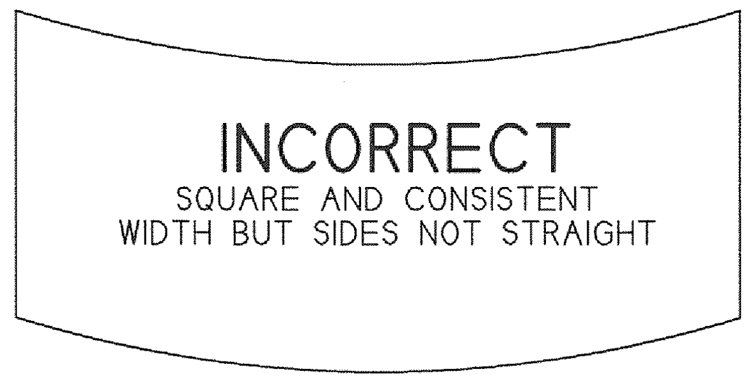
I-BEAM ORIENTATION DETAIL

NOT TO SCALE









REV.	DESCRIPTION	DRAWN	APP.	DATE
A	REVISED FOR FABRICATION	MRB	Ac	10-31-12

We Cover The World
RUBB
BUILDING SYSTEMS

TITLE
18.29m BVE / 5m LEG
I-BEAM FOUNDATION LAYOUT

DRAWN MJG 5-30-12
SCALE 1 : 75
APP. AR 6/11/12
JOB # 12038
DATE
JOB NAME PARSONS

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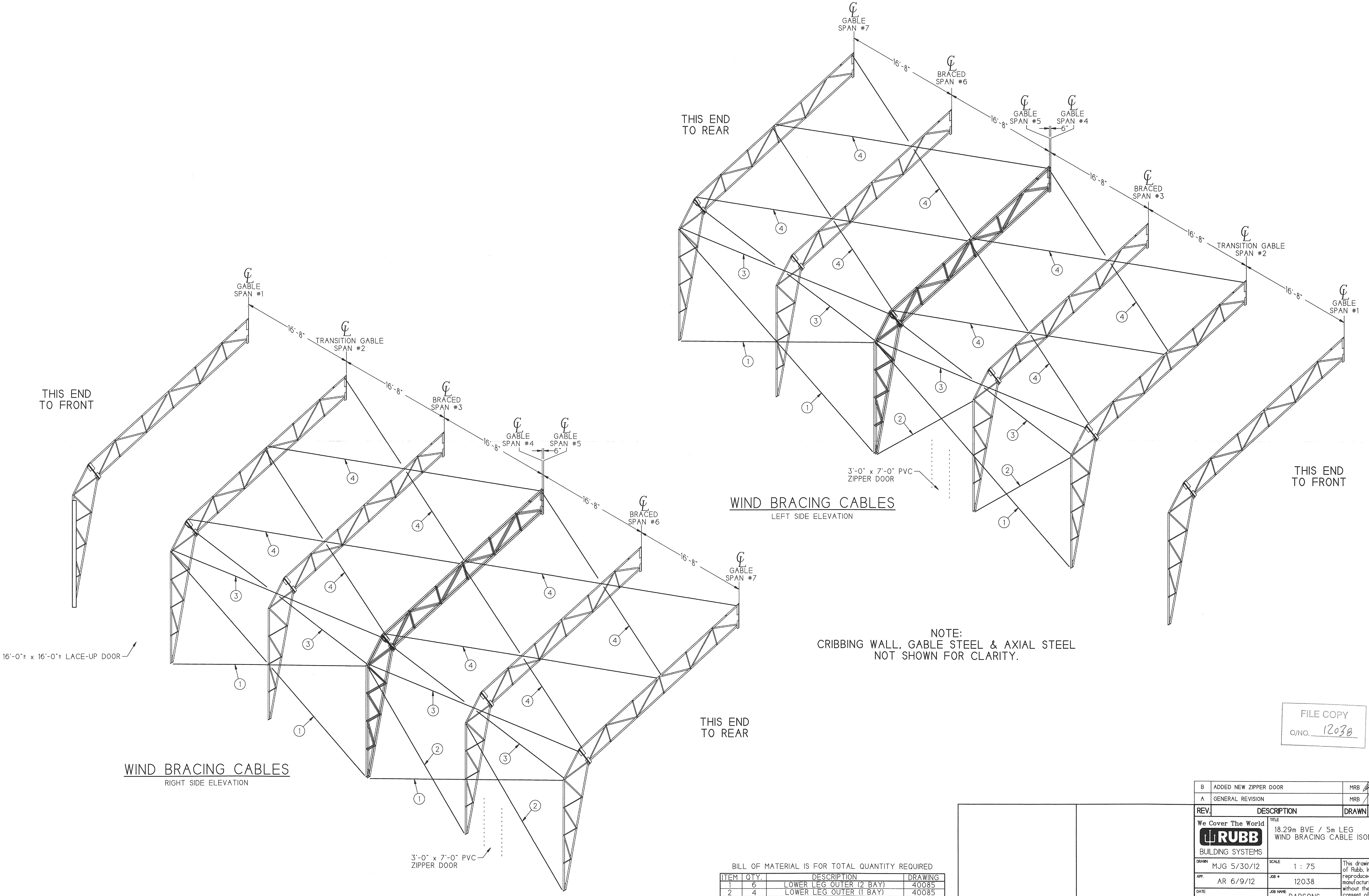
RUBB, INC. SANFORD MAINE 04073
TEL: 207-324-2877 FAX 207-324-2347

DRAWING NO. 50700



WIND BRACING CABLES
LEFT SIDE ELEVATION

WIND BRACING CABLES
RIGHT SIDE ELEVATION

NOTE:
CRIBBING WALL, GABLE STEEL & AXIAL STEEL
NOT SHOWN FOR CLARITY.

FILE COPY
O/NO. 12038

BILL OF MATERIAL IS FOR TOTAL QUANTITY REQUIRED

ITEM	QTY.	DESCRIPTION	DRAWING
1	6	LOWER LEG OUTER (2 BAY)	40085
2	4	LOWER LEG OUTER (1 BAY)	40085
3	8	UPPER LEG OUTER	40085
4	16	ROOF OUTER	40085

REV.	DESCRIPTION	DRAWN	APP.	DATE
B	ADDED NEW ZIPPER DOOR	MRB	AR	9-21-12
A	GENERAL REVISION	MRB	AR	9/10/12

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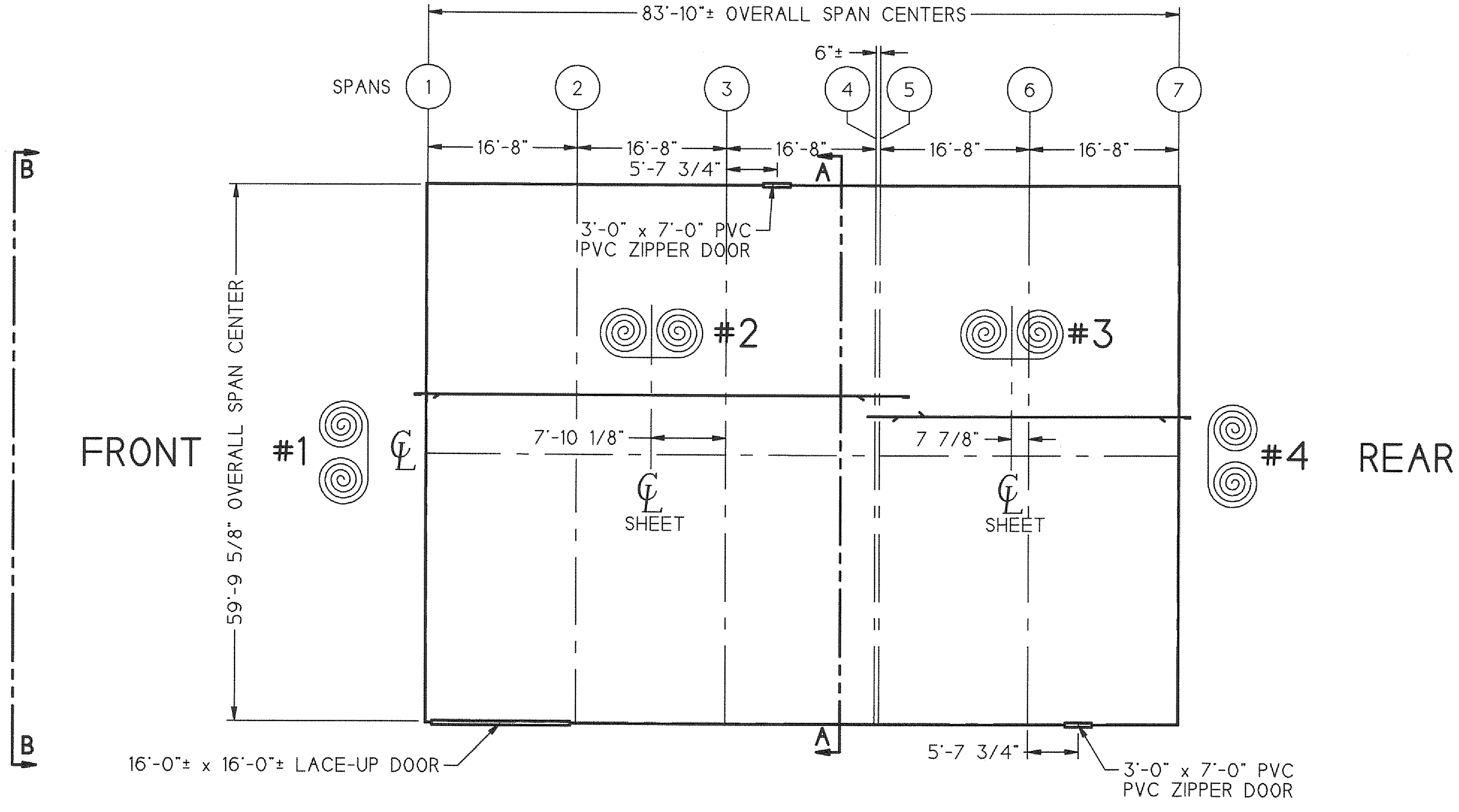
RUBB
BUILDING SYSTEMS

TITLE
18.29m BVE / 5m LEG
WIND BRACING CABLE ISOMETRIC

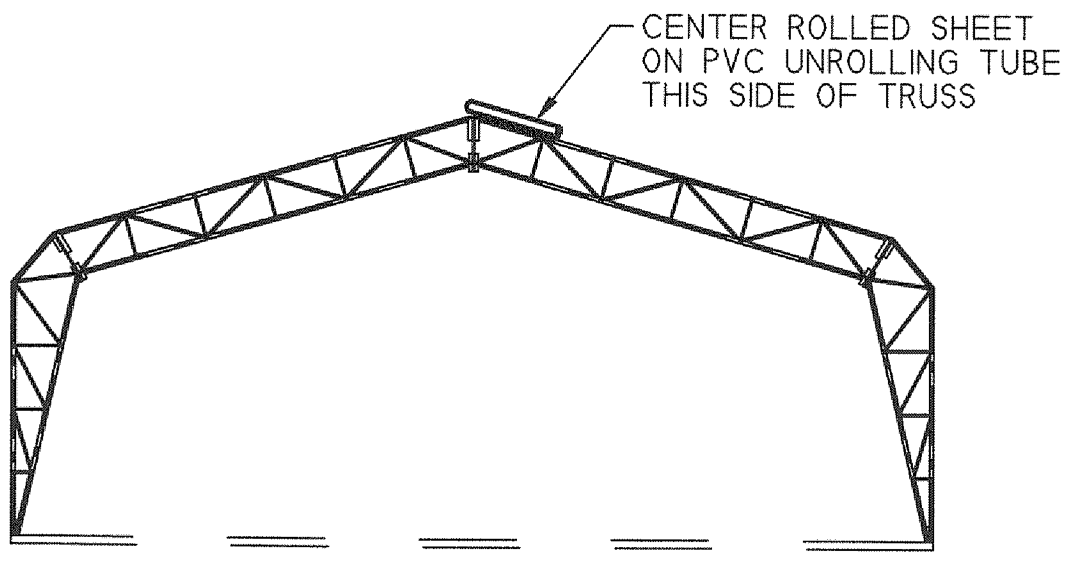
DRAWN MJG 5/30/12	SCALE 1 : 75	This drawing is the property of Rubb, Inc. and may not be reproduced or used for any manufacturing purpose without the express written consent of Rubb, Inc.
APP. AR 6/9/12	JOB # 12038	
DATE	JOB NAME PARSONS	
RUBB, INC. SANFORD MAINE 04073 TEL: 207-324-2877 FAX 207-324-2347		DRAWING NO. 50701

SHEET	QTY.	DESCRIPTION	DRAWING
1	1	FRONT GABLE PVC SHEET	51051
2	1	50'-0" TOP END PVC SHEET	51052
3	1	33'-4" TOP END PVC SHEET	51053
4	1	REAR GABLE PVC SHEET	51051

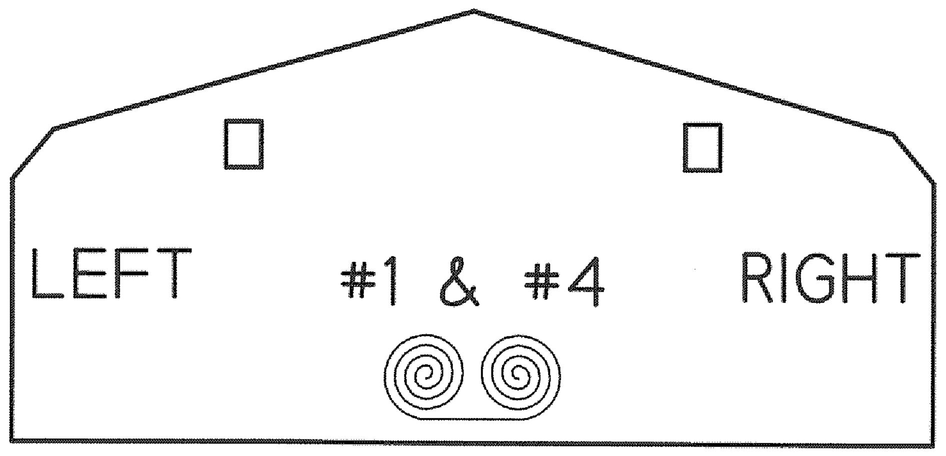


PLAN VIEW

REFERENCE ARROW



SECTION 'A-A'
VIEW TOWARDS FRONT



POSITION GABLE SHEET ON GROUND NEAR CENTER OF BUILDING.
UNROLL SHEETS TOWARDS LEFT AND RIGHT SIDE.
UNFOLD AS REQUIRED TO EXPOSE HANGING POCKETS.
INSERT POCKET TUBES INTO POCKETS. RAISE GABLE SHEET UP.

VIEW 'B-B'
FRONT GABLE SHOWN
REAR GABLE SIMILAR
DOORS NOT SHOWN FOR CLARITY

REV.	DESCRIPTION	DRAWN	APP.	DATE
B	REVISED FOR FABRICATION	MRB	AR	11-1-12
A	GENERAL UPDATE AND REVISION TO SHOW NEW JOB REQUIREMENTS	MRB	-	-

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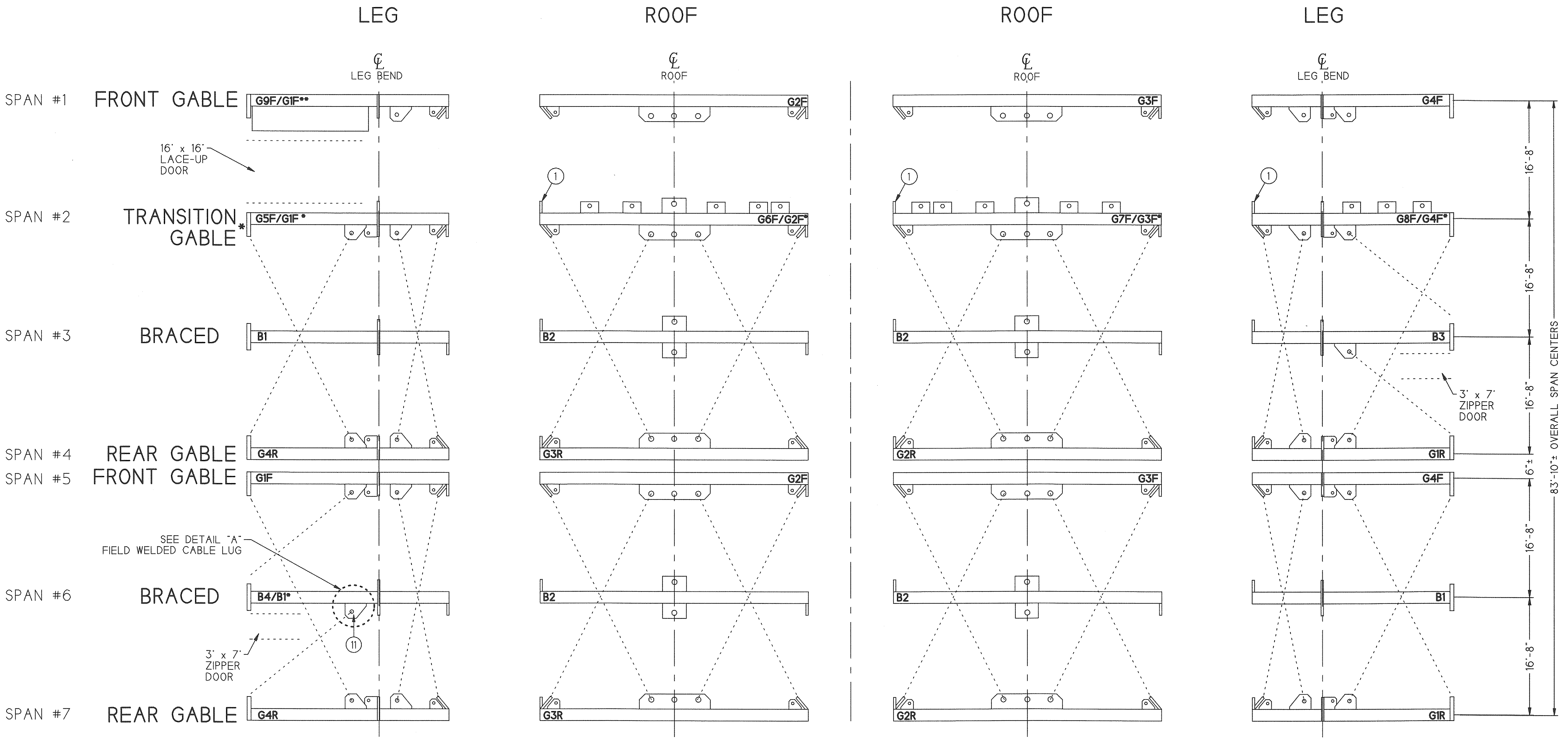
RUBB
BUILDING SYSTEMS

TITLE
18.29m BVE / 5m LEG
PVC SCHEMATIC

DRAWN MJG 5-30-12	SCALE 1 : 150	This drawing is the property of Rubb, Inc. and may not be reproduced or used for any manufacturing purpose without the express written consent of Rubb, Inc.
APP. AR 6/9/12	JOB # 12038	
DATE	JOB NAME PARSONS	

RUBB, INC. SANFORD MAINE 04073
TEL: 207-324-2877 FAX 207-324-2347

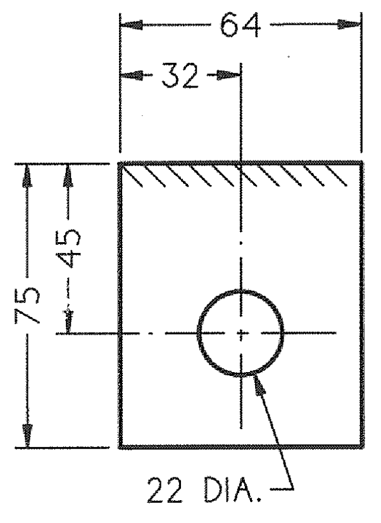
DRAWING NO.
50702 (BVE-12)



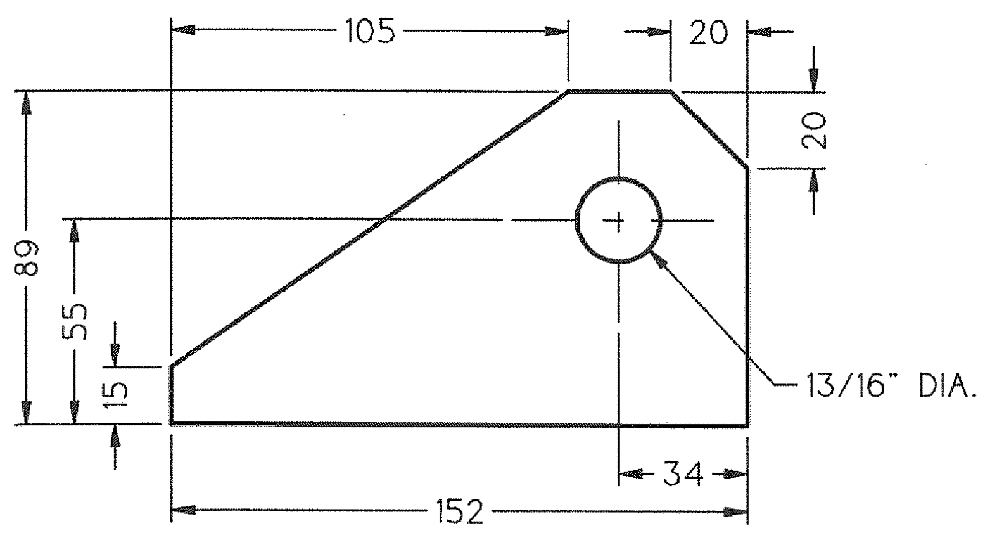
*ASSEMBLIES REQUIRE FIELD MODIFICATIONS FOR THIS ARRANGEMENT. SEE THIS DRAWING AND DRAWINGS 50733 AND 50734 FOR DETAILS.

**ASSEMBLIES REQUIRE FIELD MODIFICATIONS INCLUDING LUG REMOVAL FOR THIS ARRANGEMENT. SEE DRAWING 50732 FOR DETAILS.

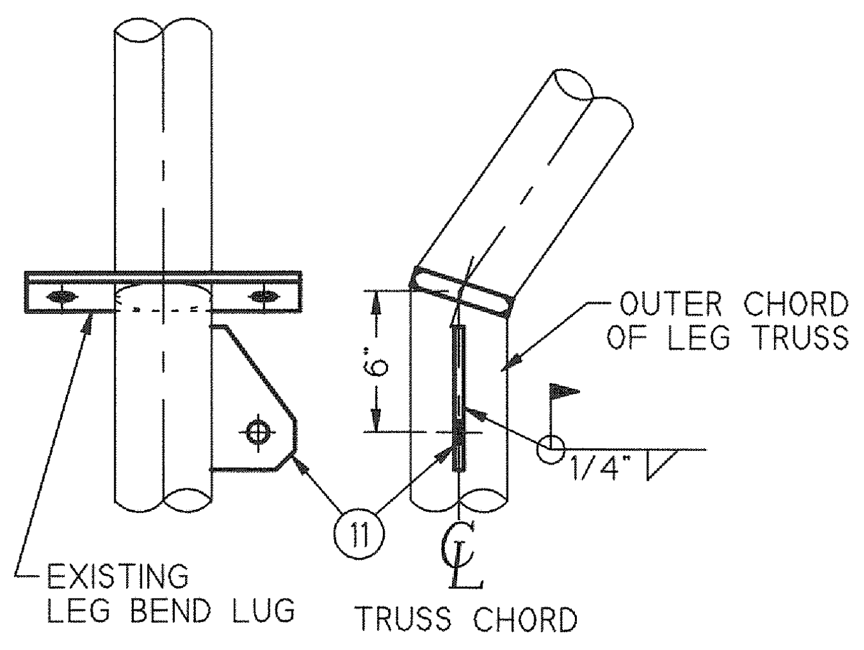
SCHEMATIC PLAN VIEW
NOT TO SCALE



ITEM #1
AX. FR. & TUBE (FLANGE)
1/2" THICK

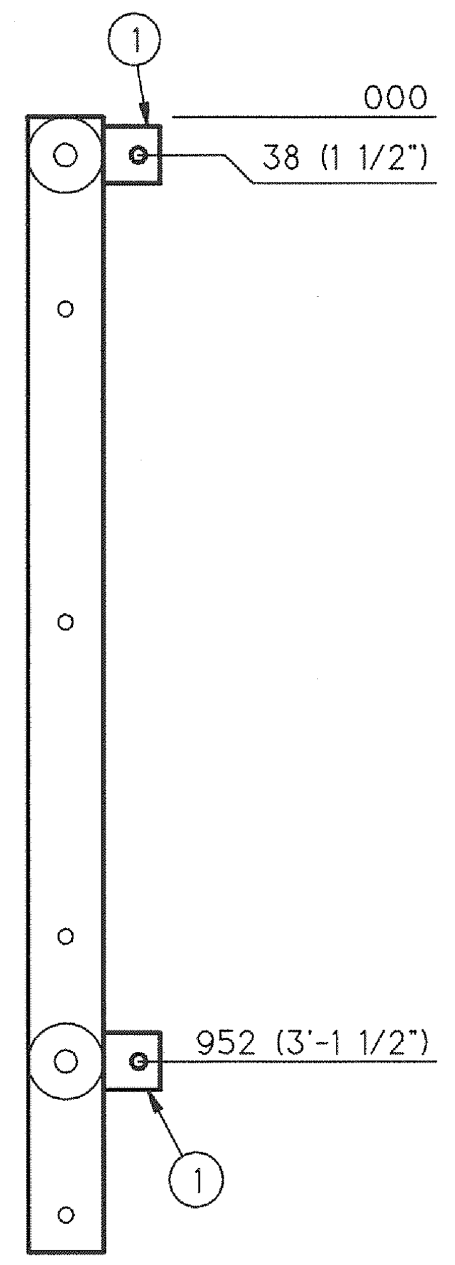


DETAIL ITEM 11
CABLE LUG LEG BEND

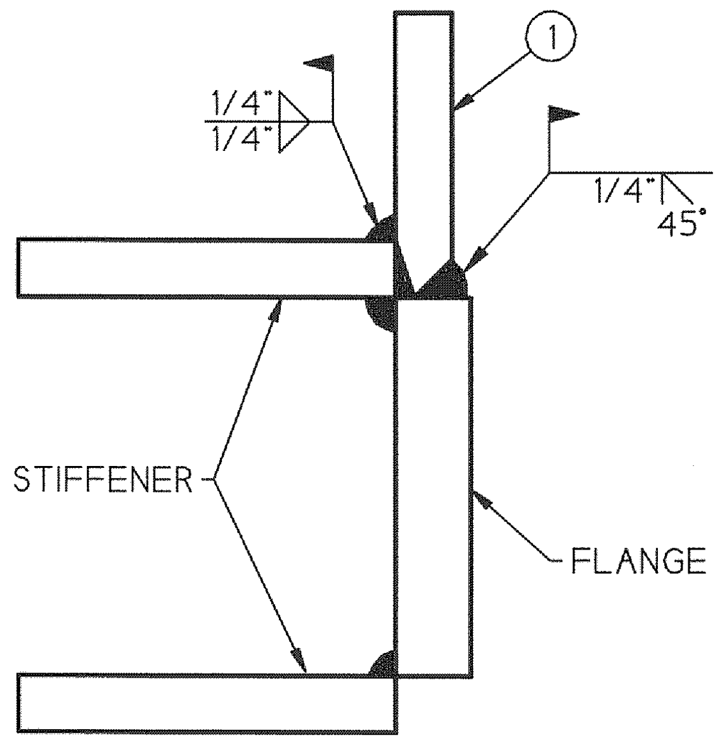


DETAIL "A"
POSITION OF FIELD WELDED CABLE LUGS AT THE LEG BEND
NOT TO SCALE

ITEM	QTY.	LOCATION	DESCRIPTION	SPEC.
1	6	FLANGE TOP & BOT. UNLESS NOTED	FLAT 2 1/2" x 1/2" x 75	A36
11	1	LEG BEND TOP ONLY	FLAT 3 1/2" x 1/2" x 152	A36



FLANGE LUGS
NOT TO SCALE



FLANGE LUG WELDING DETAIL
(NOT TO SCALE)

NOTE:
ALL SPAN #2 TRUSSES, ONE LEG TRUSS FOR SPAN #1 AND ONE LEG TRUSS FOR SPAN #6 ARE MODIFIED FOR THIS CONFIGURATION. SEE REFERENCED DRAWINGS FOR DETAILS.

ASS'Y	QTY.	DESCRIPTION	DRAWING
G1F	1	FRONT GABLE LEG TRUSS	40000
G2F	2	FRONT GABLE ROOF TRUSS	40001
G3F	2	FRONT GABLE ROOF TRUSS	40001
G4F	2	FRONT GABLE LEG TRUSS	40000
B1	2	BRACED LEG TRUSS	40000
B2	4	BRACED ROOF TRUSS	40001
B3	1	BRACED LEG TRUSS	40000
B1/B4*	1	BRACED LEG TRUSS	40000/50703
G1F/G5F*	1	FRONT GABLE LEG TRUSS	40000/50733
G2F/G6F*	1	FRONT GABLE ROOF TRUSS	40001/50734
G3F/G7F*	1	FRONT GABLE ROOF TRUSS	40001/50734
G4F/G8F*	1	FRONT GABLE LEG TRUSS	40000/50733
G1F/G9F**	1	FRONT GABLE LEG TRUSS	40000/50732
G1R	2	REAR GABLE LEG TRUSS	40000
G2R	2	REAR GABLE ROOF TRUSS	40001
G3R	2	REAR GABLE ROOF TRUSS	40001
G4R	2	REAR GABLE LEG TRUSS	40000

*ASSEMBLIES REQUIRE FIELD MODIFICATIONS FOR THIS ARRANGEMENT.

**ASSEMBLIES REQUIRE FIELD MODIFICATIONS FOR THIS ARRANGEMENT.

REV.	DESCRIPTION	DRAWN	APP.	DATE
B	REVISED FOR CONSTRUCTION	MRB	Jh	11-1-12
A	OVERALL REVISION	MRB	AR	9/10/12

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RUBB
BUILDING SYSTEMS

TITLE
18.29m BVE / 5m LEG
STEEL LAYOUT

DRAWN MJG 5-30-12	SCALE 1 : 2	This drawing is the property of Rubb, Inc. and may not be reproduced or used for any manufacturing purpose without the express written consent of Rubb, Inc.
APP. AR 6/9/12	JOB # 12038	
DATE	JOB NAME PARSONS	

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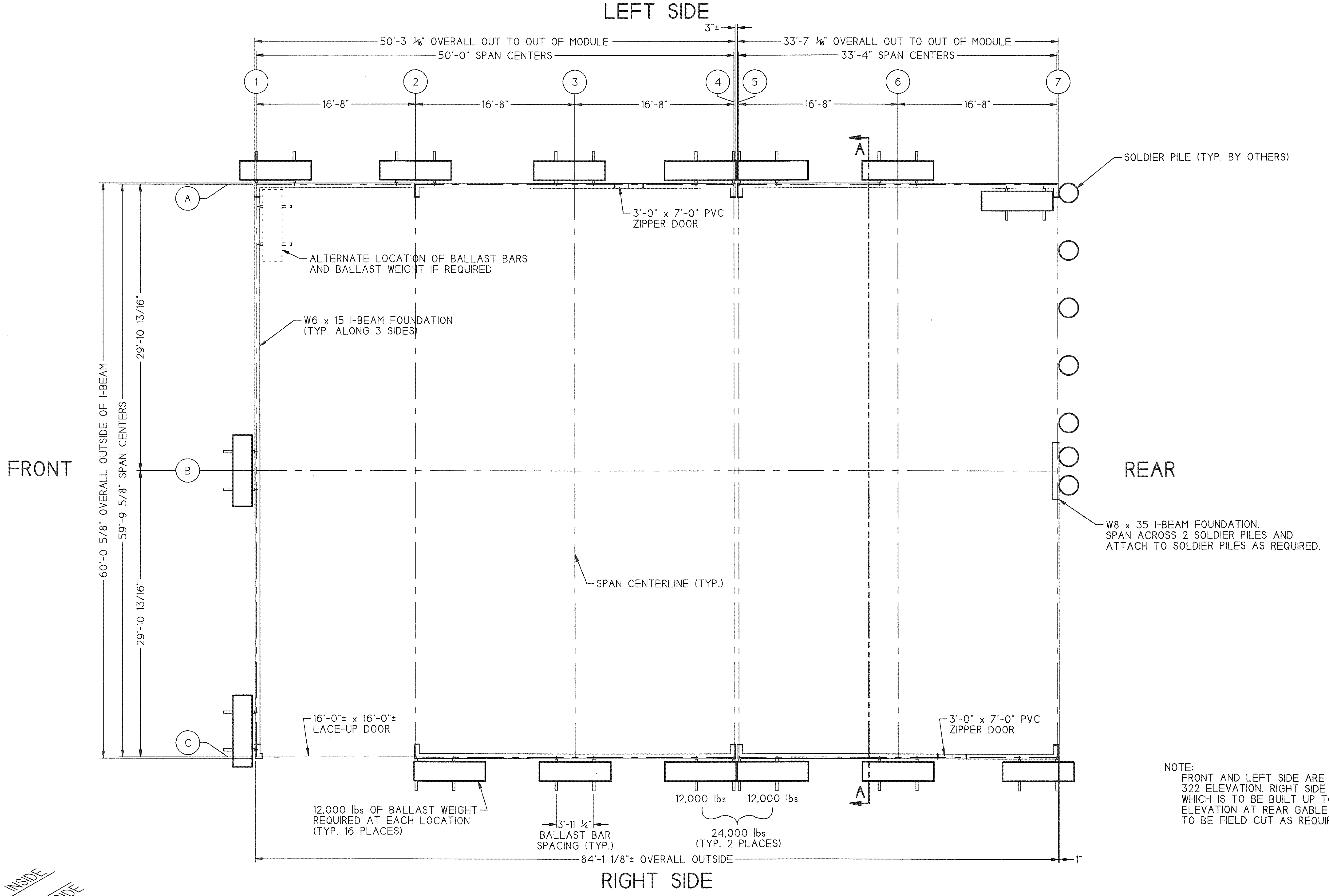
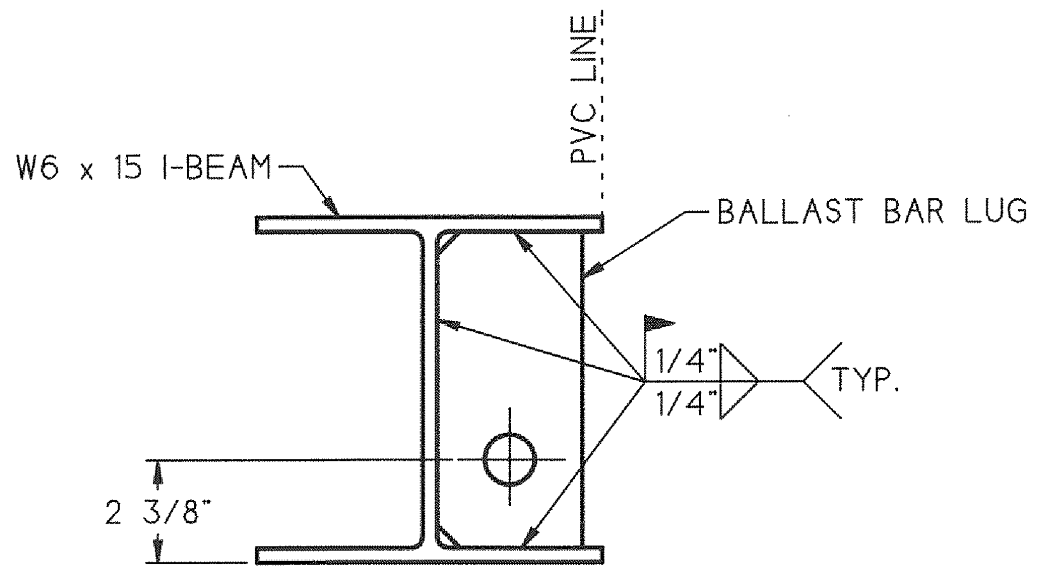
DRAWING NO.
50703



PLAN VIEW

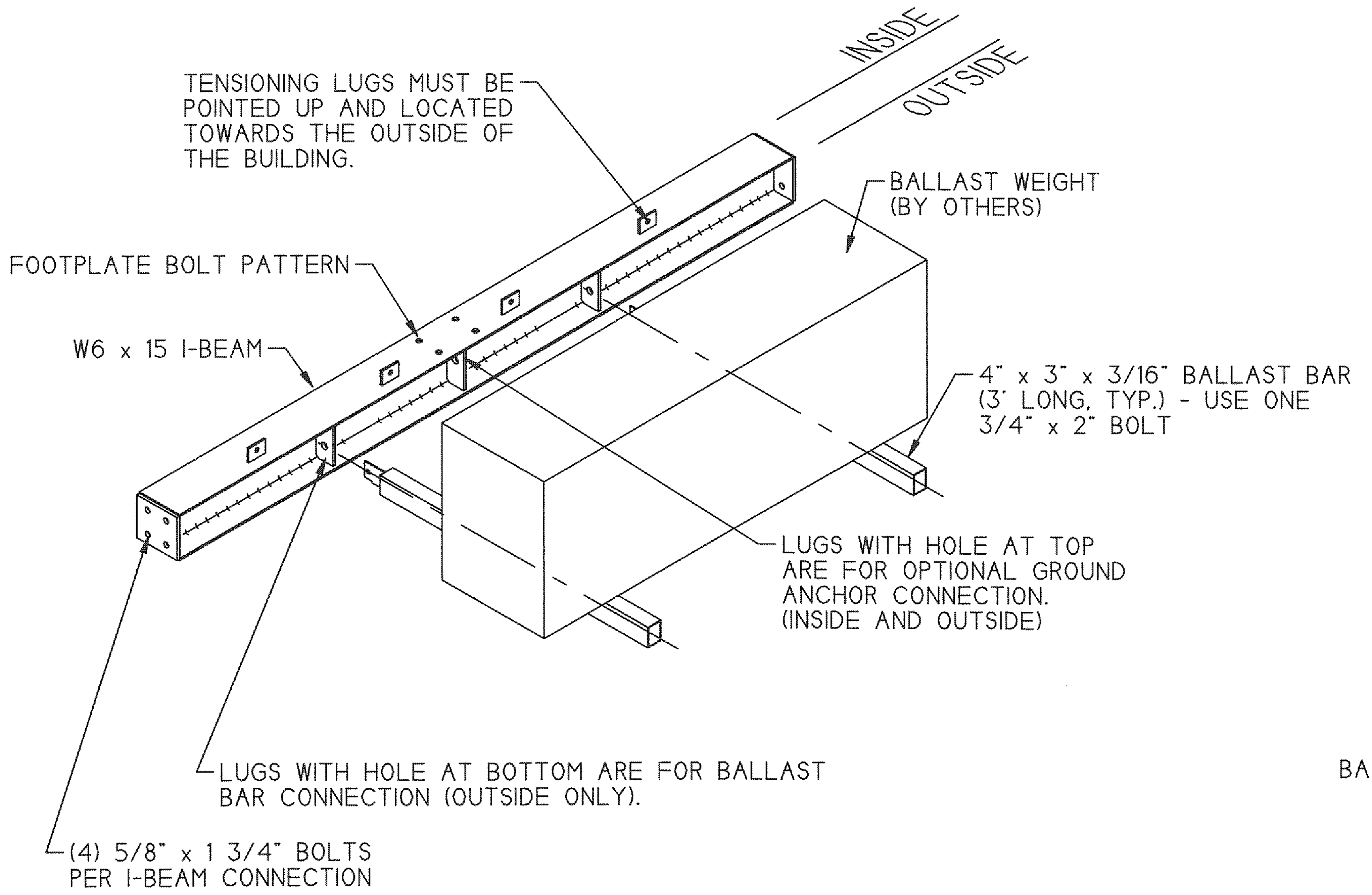
THIS SIDE TOWARDS GLENBROOK ROAD

NOTE:
FRONT AND LEFT SIDE ARE BOTH AT APPROXIMATELY 322 ELEVATION. RIGHT SIDE IS AT ABOUT 320 ELEVATION WHICH IS TO BE BUILT UP TO 322 WITH THE USE OF CRIBBING. ELEVATION AT REAR GABLE IS ABOUT 330. REAR GABLE COLUMN TO BE FIELD CUT AS REQUIRED TO FIT.



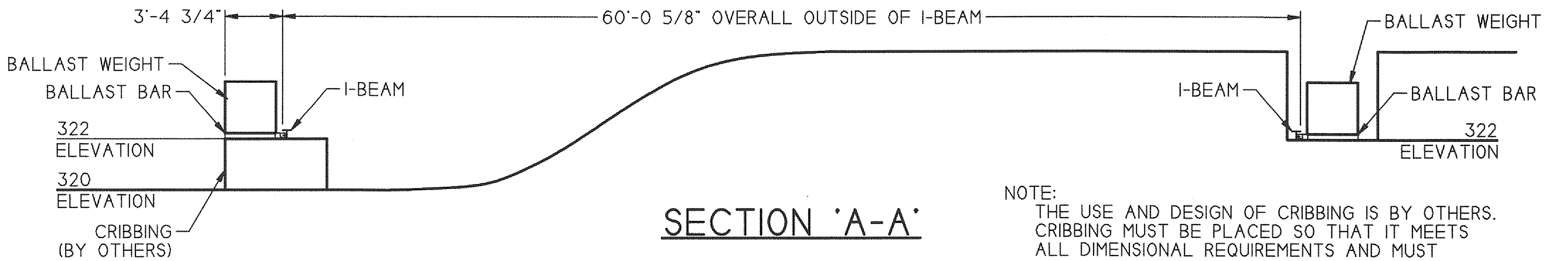
FIELD WELDED LUGS DETAIL

NOT TO SCALE



I-BEAM ORIENTATION DETAIL

NOT TO SCALE



SECTION 'A-A'

NOTE:
THE USE AND DESIGN OF CRIBBING IS BY OTHERS. CRIBBING MUST BE PLACED SO THAT IT MEETS ALL DIMENSIONAL REQUIREMENTS AND MUST BE DESIGNED TO MEET ALL STRUCTURAL REQUIREMENTS.

NOTES:
1.) SEE DRAWING 50700 FOR I-BEAM FOUNDATION LAYOUT.
2.) EACH BALLAST WEIGHT IS SHOWN REPRESENTATIVE ONLY. ACTUAL DIMENSIONS OF WEIGHTS TO BE DETERMINED BY SPATIAL REQUIREMENTS.
3.) BALLAST WEIGHTS BY OTHERS.
4.) GRID LABELING SHOWN ON THIS DRAWING IS FOR BALLASTING PURPOSES ONLY AND MAY NOT COINCIDE WITH GRID LABELLING FOR STRUCTURAL LAYOUT.
5.) BALLAST WEIGHTS TO BE PLACED AS CLOSE TO STRUCTURE AS POSSIBLE.
6.) SEE DRAWING #51161 FOR SECOND MOVE AND DRAWING #51156 FOR THIRD MOVE.

STRUCTURE LOADS: 25 PSF GROUND SNOW.
90 MPH 3 SEC. GUST.
IBC 2000

REV.	DESCRIPTION	DRAWN	APP.	DATE
C	REVISED FOR CONSTRUCTION	MRB	MR	10-31-12
B	REVISED FOR RESUBMITTAL.	MJG	AR	10/8/12
A	REVISED TO SHOW NEW ARRANGEMENT	MRB	AR	9-21-12

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BUILDING SYSTEMS

TITLE
18.29m BVE / 5m LEG
BALLAST BAR LAYOUT
FOR INITIAL LOCATION #1

DRAWN MJG 5-30-12
SCALE 1 : 75
APP. AR 6/9/12
JOB # 12038
DATE
JOB NAME PARSONS

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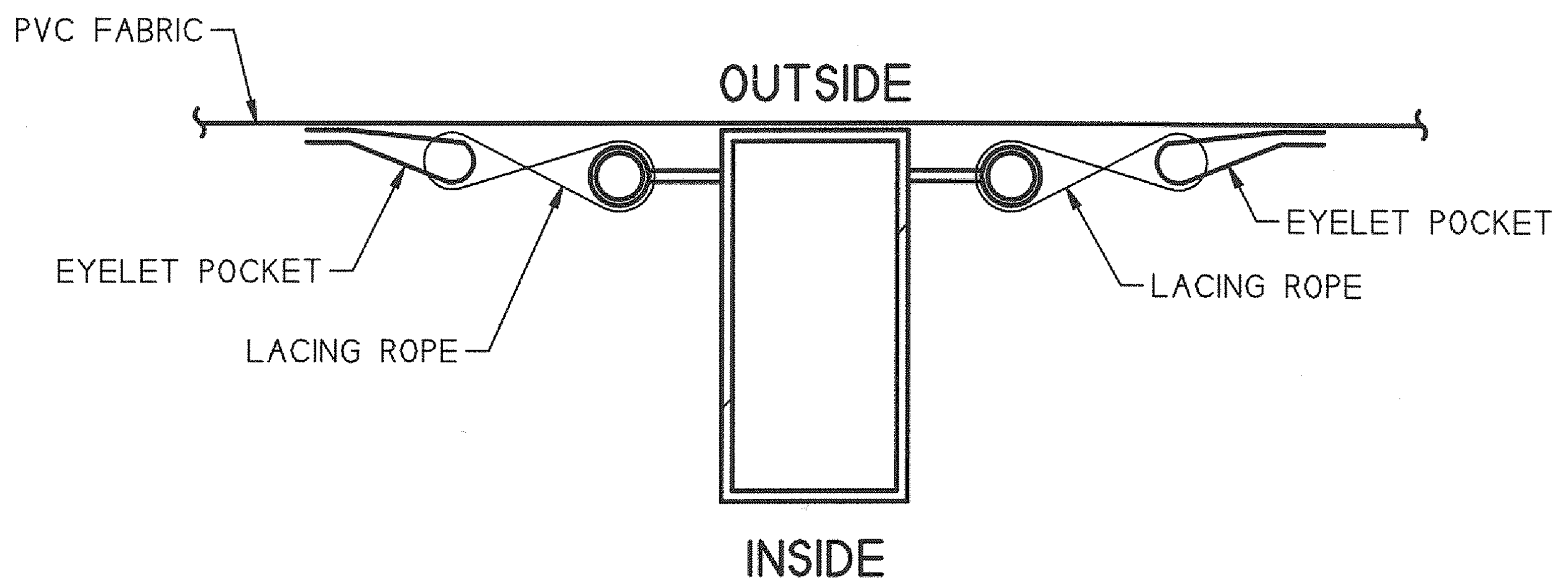
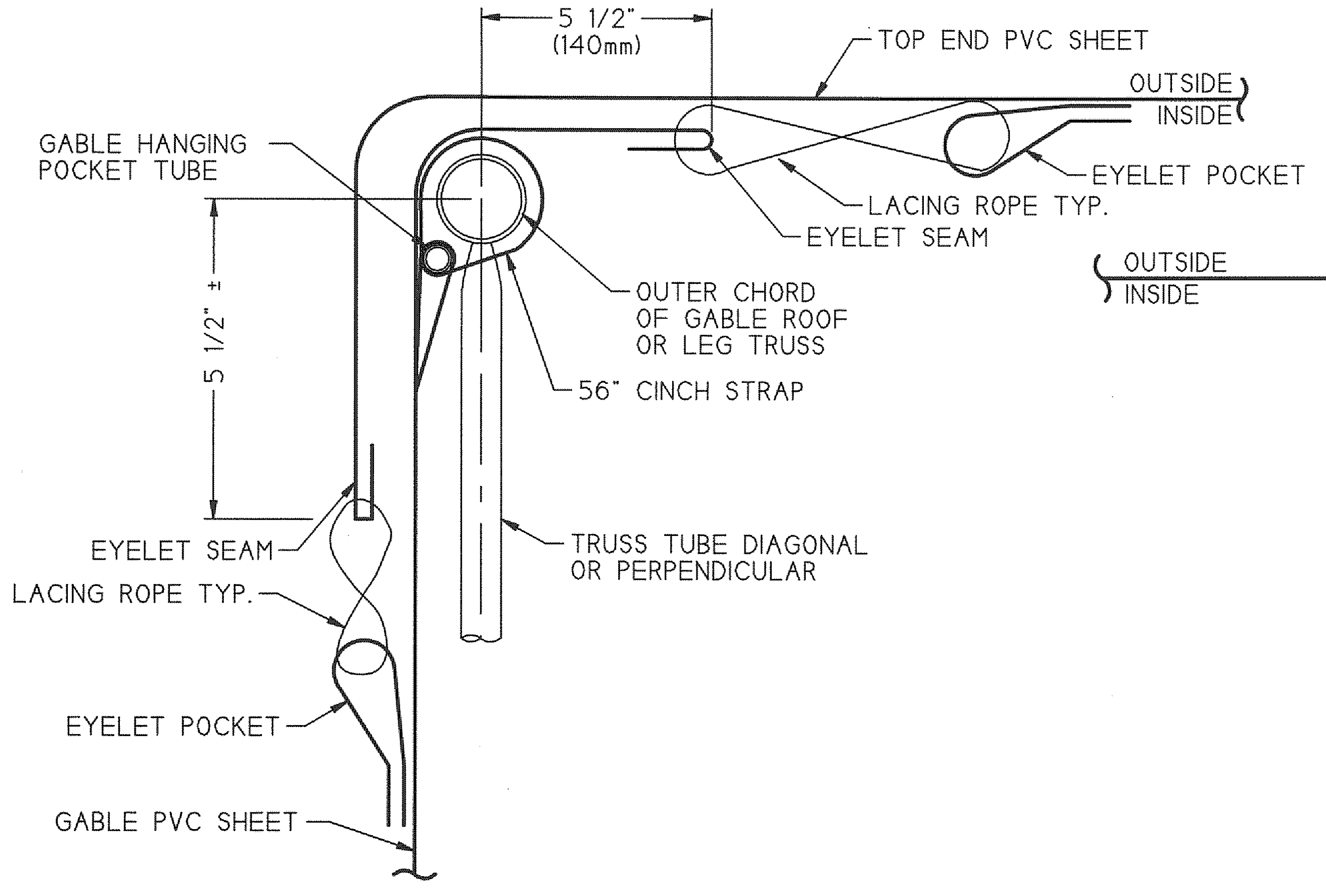
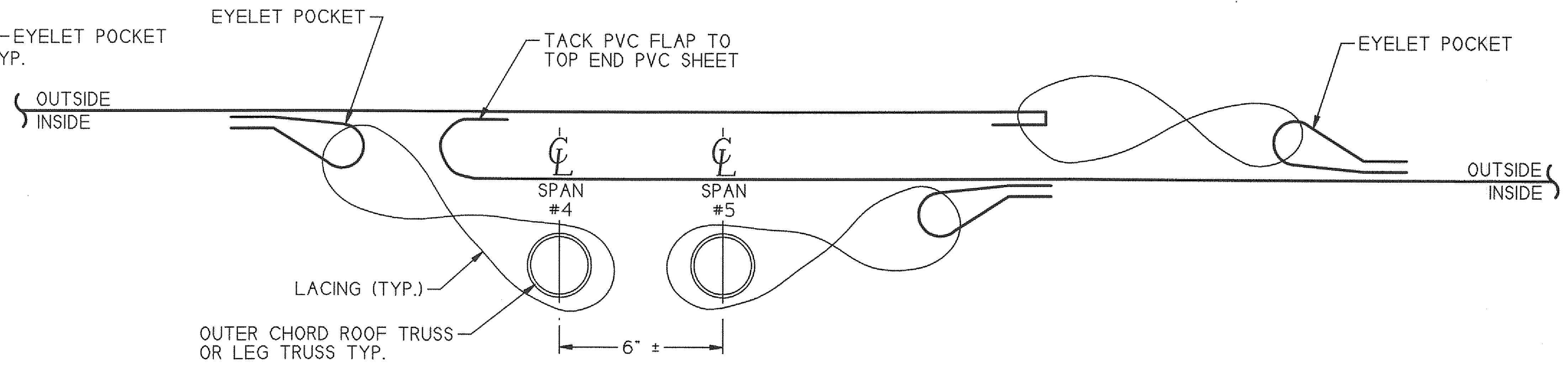
DRAWING NO. 50704



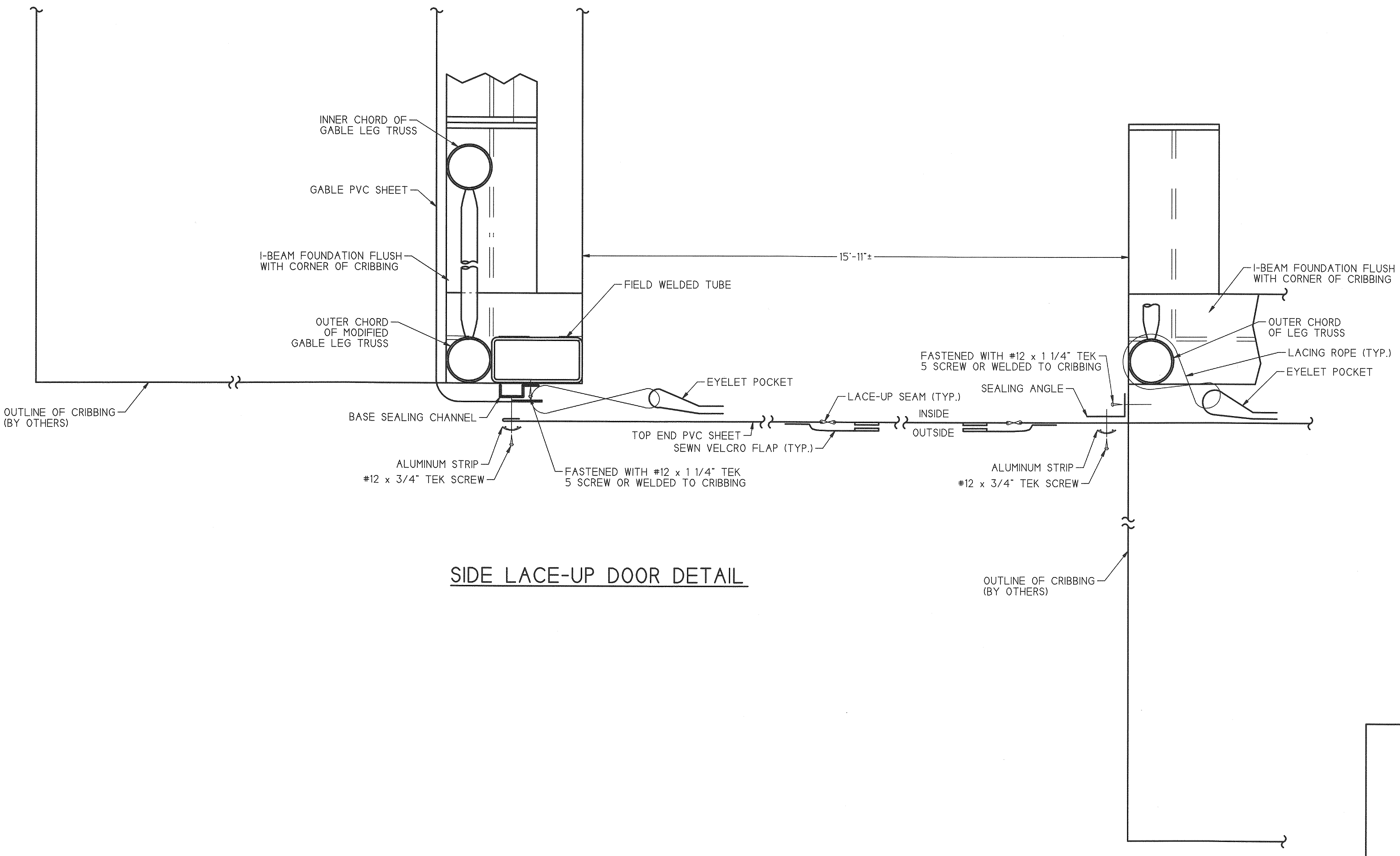
LACING AT GABLE COLUMNS



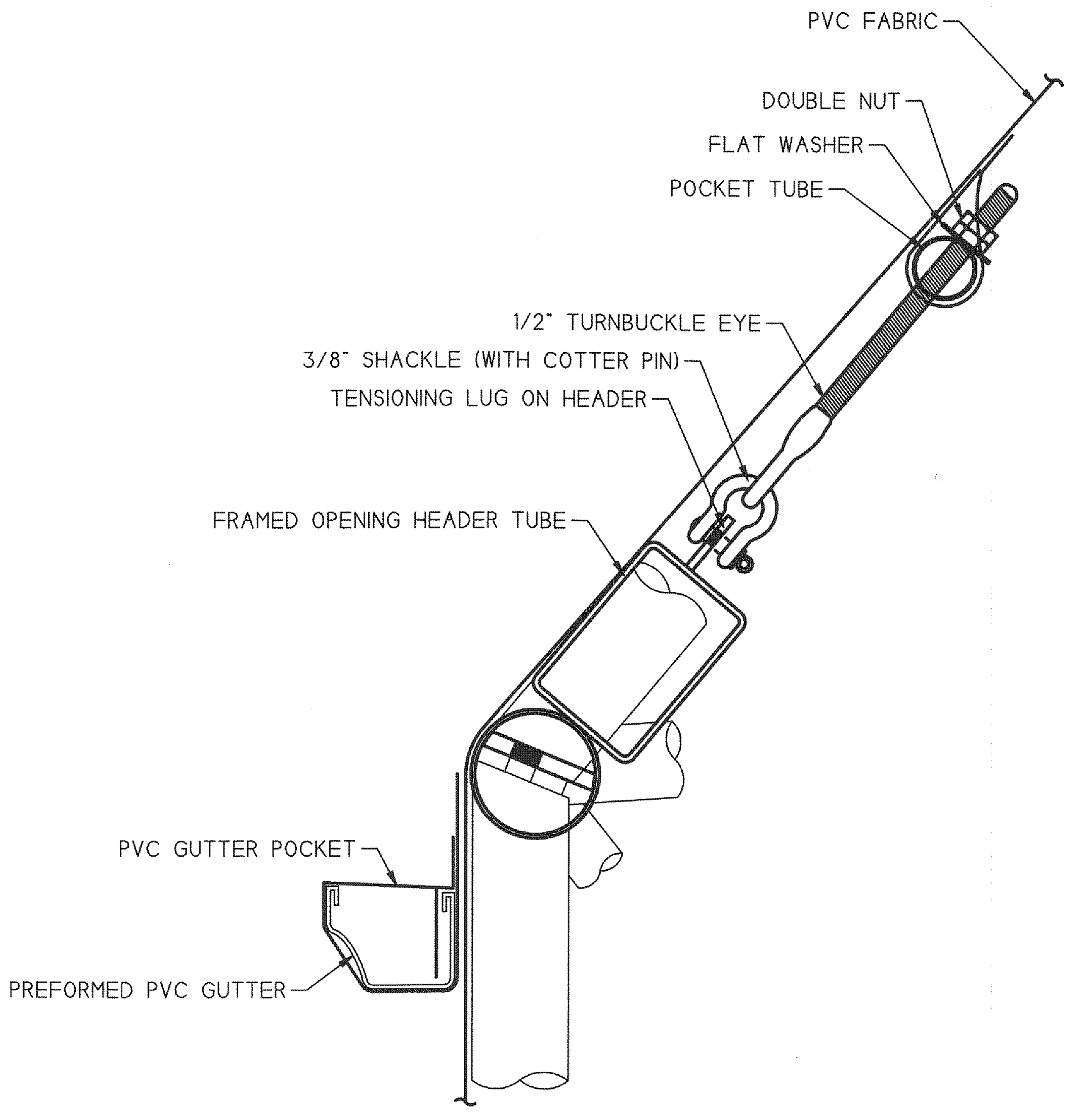
TOP END SHEET TO GABLE PVC SEALING



SHEET #2 TO SHEET #3 PVC LACING



SIDE LACE-UP DOOR DETAIL



SIDE LACE-UP DOOR TENSIONING

REV.	DESCRIPTION	DRAWN	APP.	DATE
B	REVISED FOR FABRICATION	MRB	AR	11-7-12
A	GENERAL REVISION AND UPDATE TO SHOW NEW JOB REQUIREMENTS	MRB	-	-

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BUILDING SYSTEMS

TITLE
18.29m BVE / 5m LEG
TENSIONING AND SEALING DETAILS
1 OF 2 DRAWINGS

DRAWN MJG 5-30-12	SCALE 1 : 4	This drawing is the property of Rubb, Inc. and may not be reproduced or used for any manufacturing purpose without the express written consent of Rubb, Inc.
APP. AR 6/9/12	JOB # 12038	
DATE	JOB NAME PARSONS	

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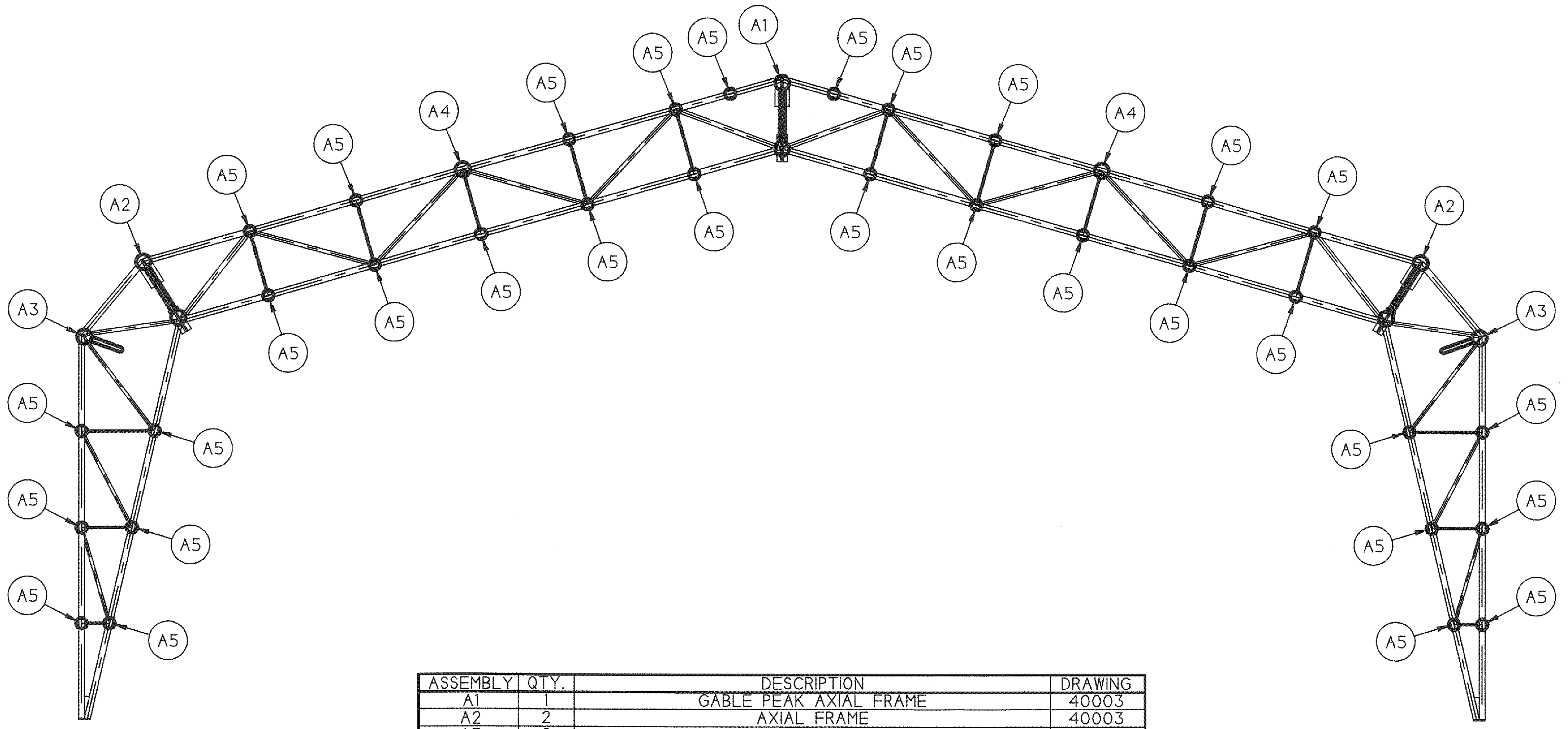
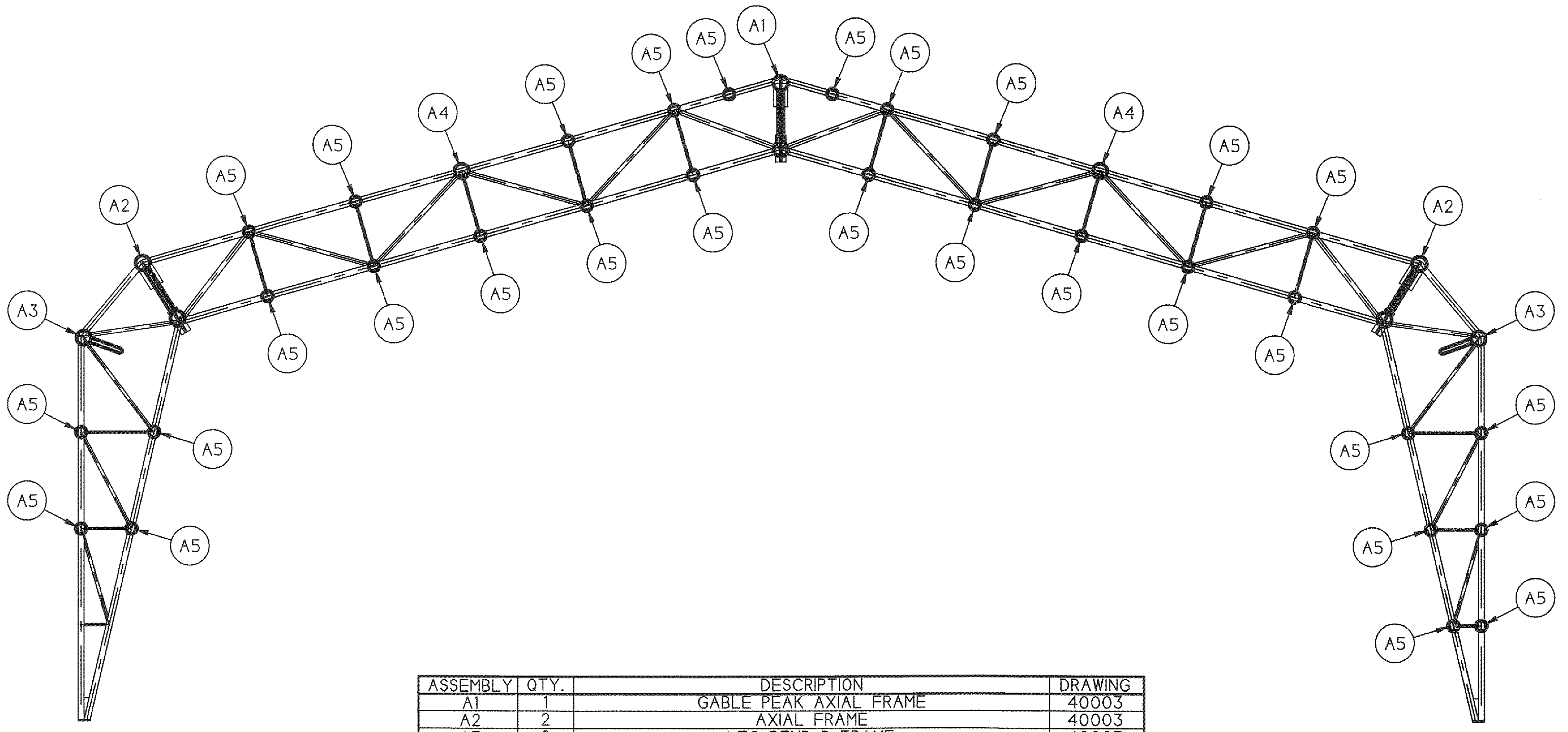
TEL: 207-324-2877 FAX 207-324-2347

DRAWING NO.
50705



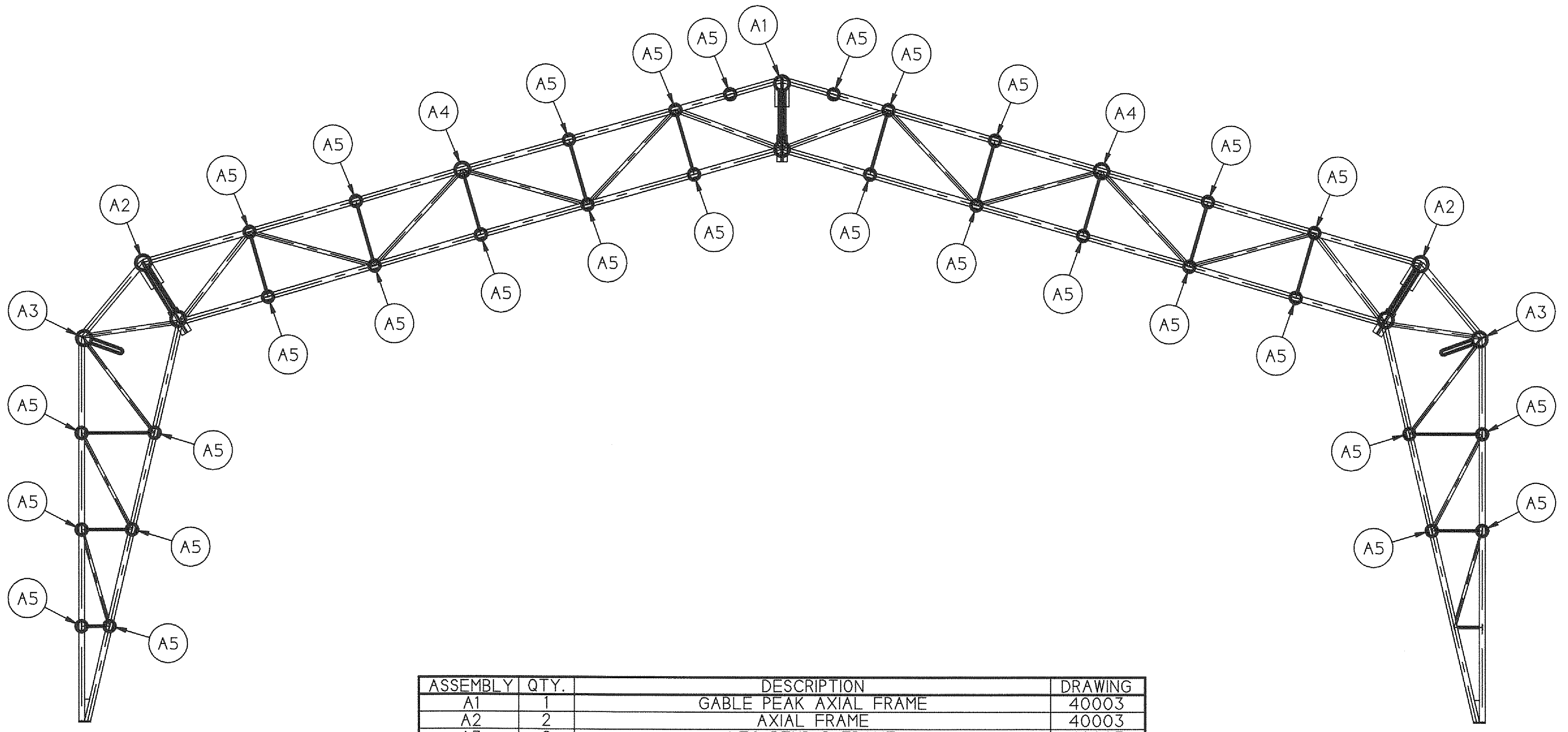
ASSEMBLY	QTY.	DESCRIPTION	DRAWING
A1	1	GABLE PEAK AXIAL FRAME	40003
A2	2	AXIAL FRAME	40003
A3	2	LEG BEND D-FRAME	40003
A4	2	4" DIA. NON APEX COMPRESSION TUBE	40003
A5	32	3" DIA. LONGITUDINAL / NODE RESTRAINT TUBE	40003

BRACED BAY 1
VIEW "A-A"



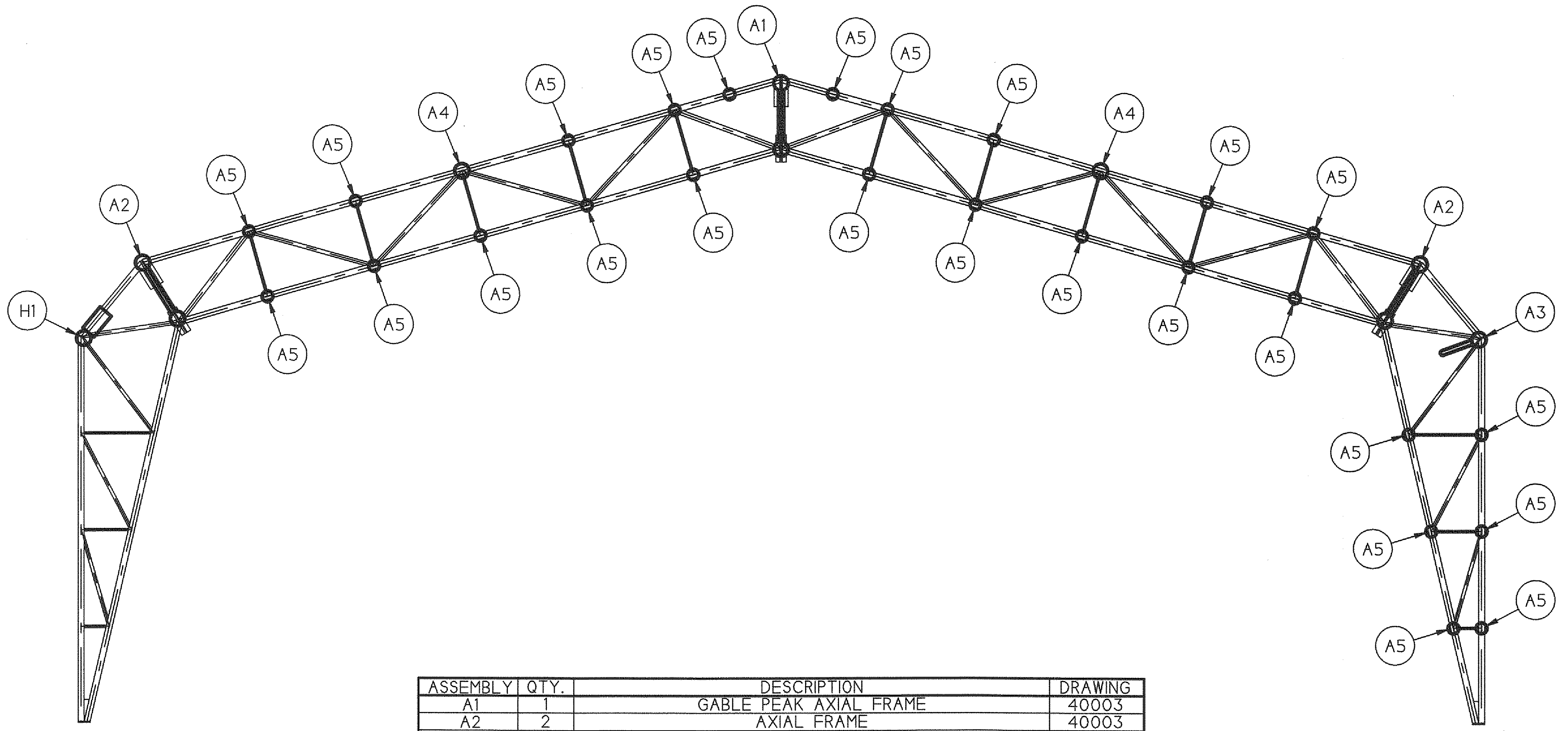
ASSEMBLY	QTY.	DESCRIPTION	DRAWING
A1	1	GABLE PEAK AXIAL FRAME	40003
A2	2	AXIAL FRAME	40003
A3	2	LEG BEND D-FRAME	40003
A4	2	4" DIA. NON APEX COMPRESSION TUBE	40003
A5	30	3" DIA. LONGITUDINAL / NODE RESTRAINT TUBE	40003

BRACED BAY 3
VIEW "A-A"



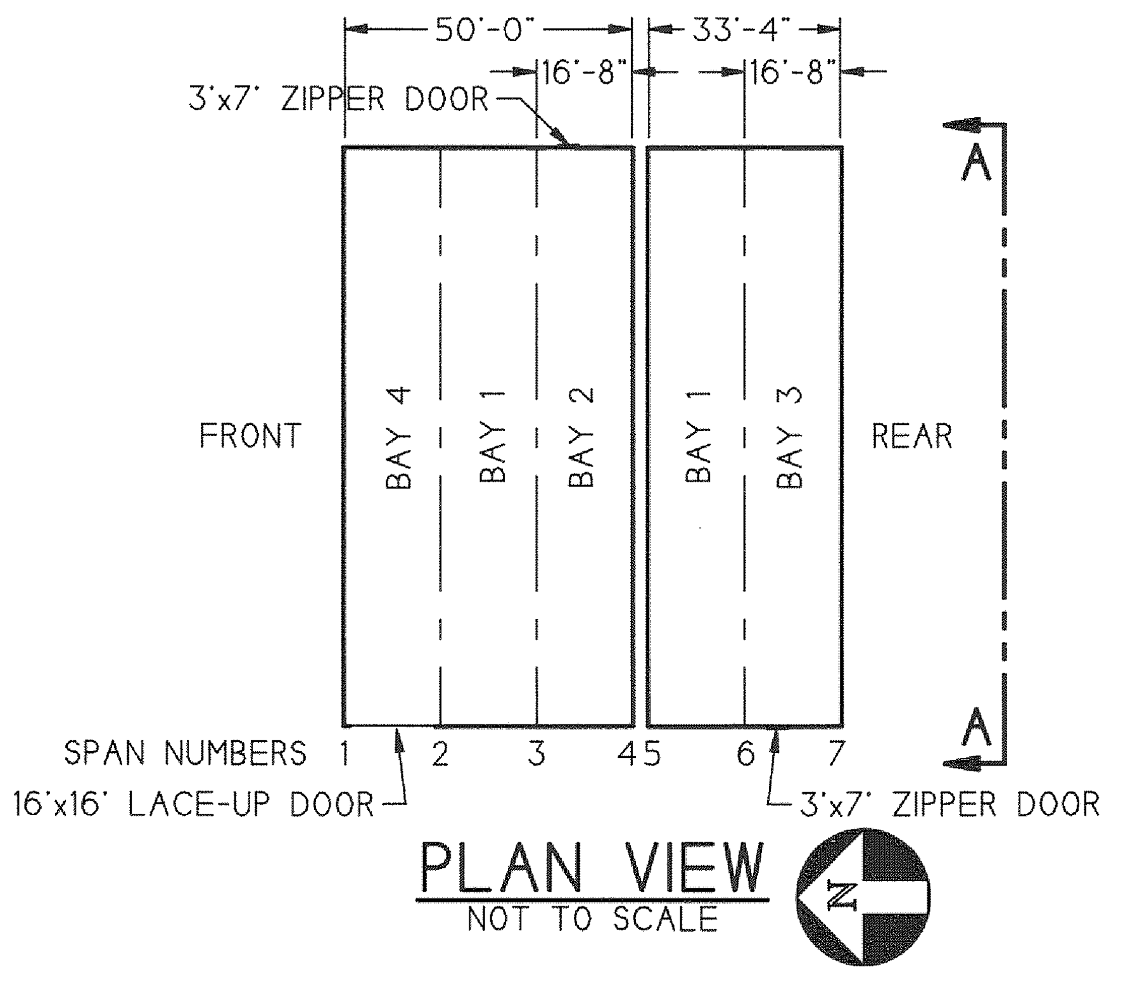
ASSEMBLY	QTY.	DESCRIPTION	DRAWING
A1	1	GABLE PEAK AXIAL FRAME	40003
A2	2	AXIAL FRAME	40003
A3	2	LEG BEND D-FRAME	40003
A4	2	4" DIA. NON APEX COMPRESSION TUBE	40003
A5	30	3" DIA. LONGITUDINAL / NODE RESTRAINT TUBE	40003

BRACED BAY 2
VIEW "A-A"



ASSEMBLY	QTY.	DESCRIPTION	DRAWING
A1	1	GABLE PEAK AXIAL FRAME	40003
A2	2	AXIAL FRAME	40003
A3	1	LEG BEND D-FRAME	40003
A4	2	4" DIA. NON APEX COMPRESSION TUBE	40003
A5	26	3" DIA. LONGITUDINAL / NODE RESTRAINT TUBE	40003
H1	1	FRAMED OPENING HEADER	50723

BRACED BAY 4
VIEW "A-A"



PLAN VIEW
NOT TO SCALE

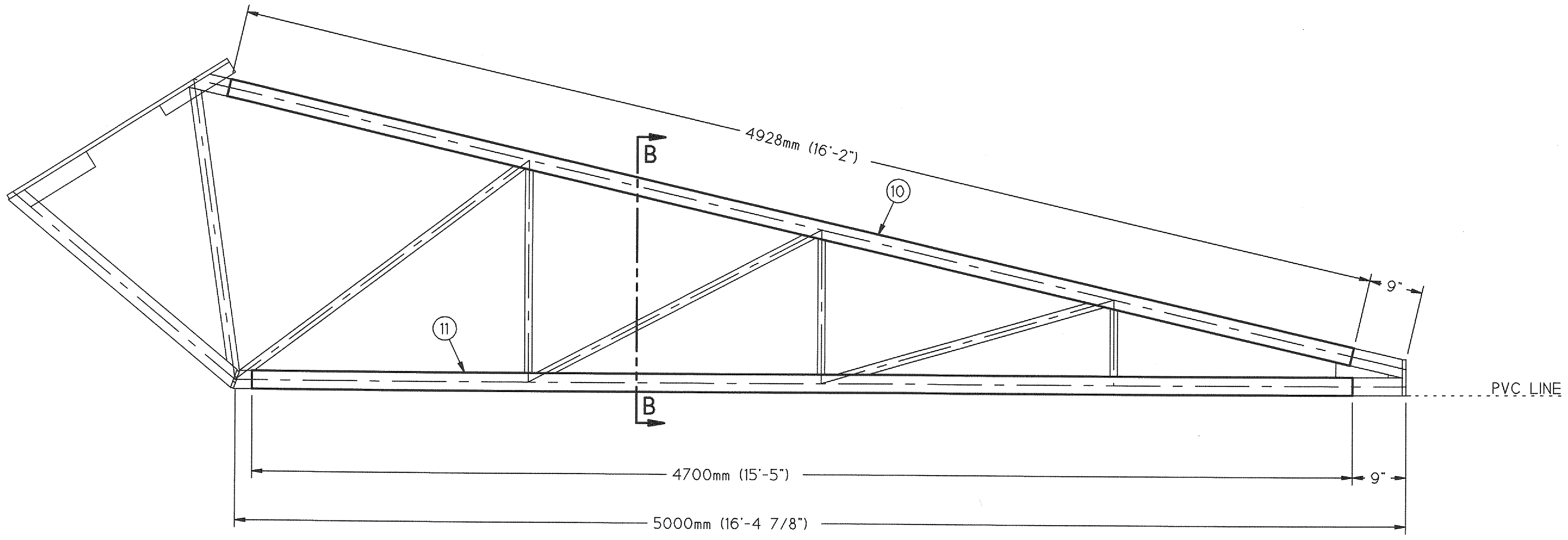
BOLT SCHEDULE

ITEM	BOLT	SPEC.
A1	3/4" DIA x 2 1/4"	A325
A2	3/4" DIA x 2 1/4"	A325
A3	3/4" DIA x 2 1/4"	A325
A4	3/4" DIA x 2 1/4"	A325
A5	1/2" DIA x 1 1/2"	GRADE 5
H1	3/4" DIA x 2 1/4"	A325

REV.	DESCRIPTION	DRAWN	APP.	DATE
A	REVISED FOR CONSTRUCTION	MRB	AR	11-5-12

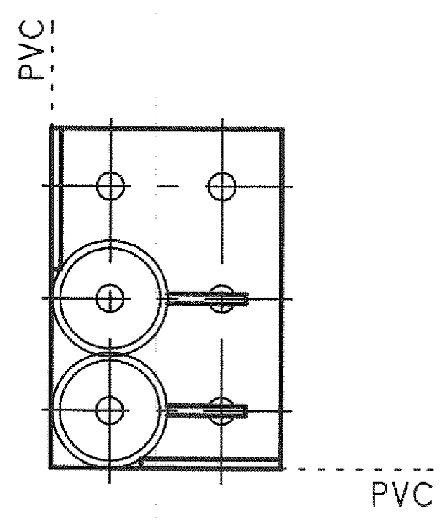
We Cover The World
RUBB
BUILDING SYSTEMS

TITLE	18.29m BVE / 5m LEG PURLIN PROFILE	
DRAWN MJG 5-30-12	SCALE 1 : 50	This drawing is the property of Rubb, Inc. and may not be reproduced or used for any manufacturing purpose without the express written consent of Rubb, Inc.
APP. AR 6/9/12	JOB # 12038	
DATE	JOB NAME PARSONS	
RUBB, INC. SANFORD MAINE 04073 TEL: 207-324-2877 FAX 207-324-2347		DRAWING NO. 50706

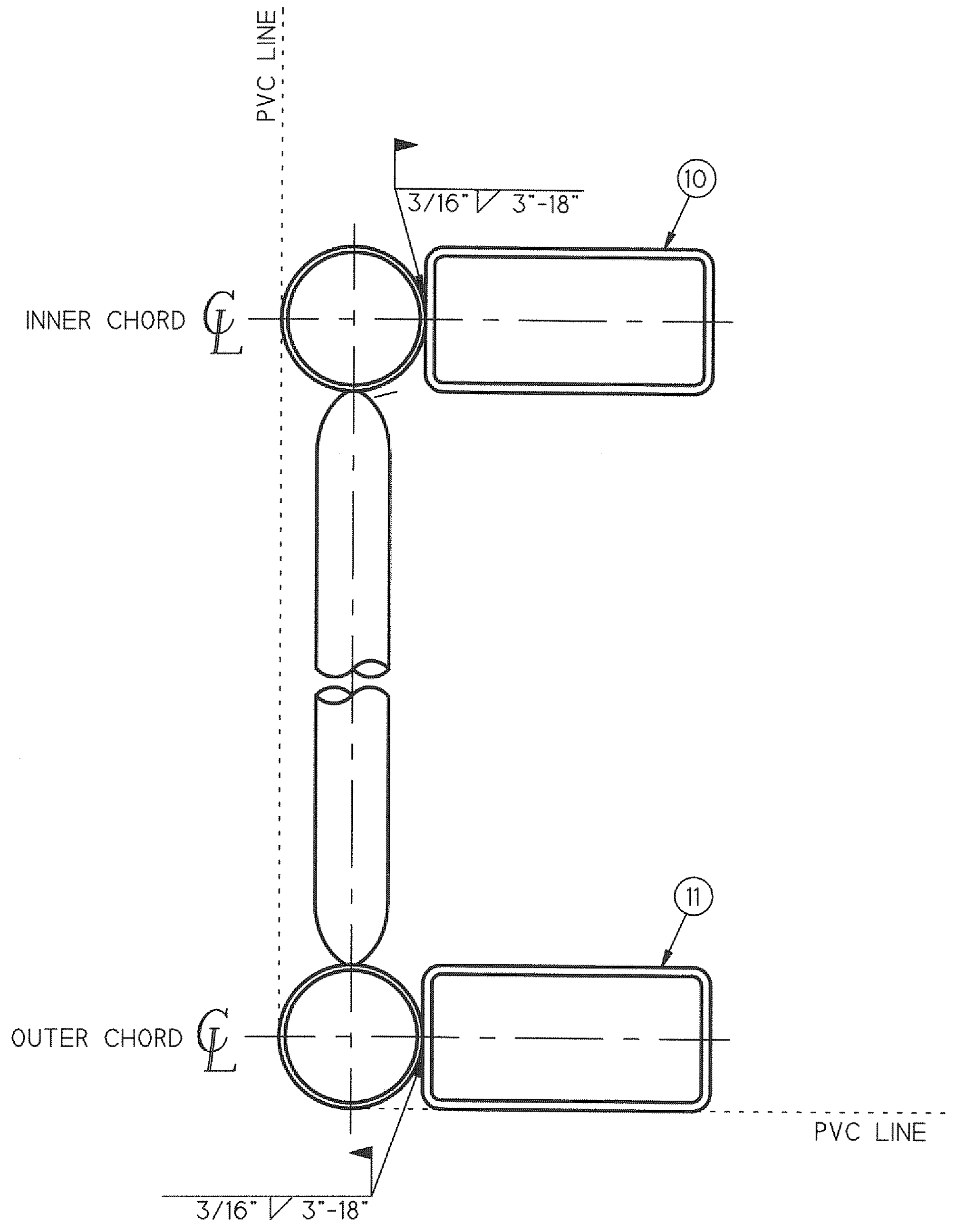


GABLE LEG TRUSS

FIELD NOTES:
1.) REFERENCE DRAWING 40000 FOR COMPLETE DETAILS OF EXISTING LEG TRUSS.
2.) FIND A G1F FRONT GABLE LEG TRUSS.
3.) CUT OFF ALL LUGS AS REQUIRED.
4.) FIELD WELD 6" x 3" TO INNER AND OUTER CHORD AS SHOWN.
5.) IDENTIFY NEW PIECE AS G9F.



GABLE BASEPLATE
3x SCALE
SHOWN FOR REFERENCE



SECTION "B-B"
REINFORCING TUBES - GABLE
5x SCALE

NOTES:
1.) BREAK SHARP CORNERS FOR PVC.
2.) SEE DRAWING 11006 FOR GENERAL WELD NOTES.
3.) BILL OF MATERIAL IS FOR ONE ASSEMBLY.
4.) DIMENSIONS NOT LABELED WITH UNITS ARE IN MILLIMETERS.
5.) VENT ALL TUBES AS REQUIRED FOR GALVANIZING.
6.) ALL A500 MATERIAL TO BE Fy = 50 ksi MINIMUM.
7.) SEE APPLICABLE LUG SCHEMATIC FOR FLANGE LUGS.
8.) SEE STEEL LAYOUT FOR LOCATION.

ITEM	QTY.	DESCRIPTION	SPEC.
1	-	-	-
2	-	-	-
3	-	-	-
4	-	-	-
5	-	-	-
6	-	-	-
7	-	-	-
8	-	-	-
9	-	-	-
10	1	HSS 6" x 3" x 3/16" x 4928	A500
11	1	HSS 6" x 3" x 3/16" x 4700	A500

REV.	DESCRIPTION	DRAWN	APP.	DATE
A	REVISED FOR CONSTRUCTION	MRB		10-31-12

We Cover The World
RUBB
BUILDING SYSTEMS

TITLE
18.29m BVE / 5m LEG
GABLE LEG TRUSS MODIFICATIONS

DRAWN
MJG 6-7-12
APP.
AR 6/9/12
DATE

SCALE
1 : 15
JOB #
12038
JOB NAME
PARSONS

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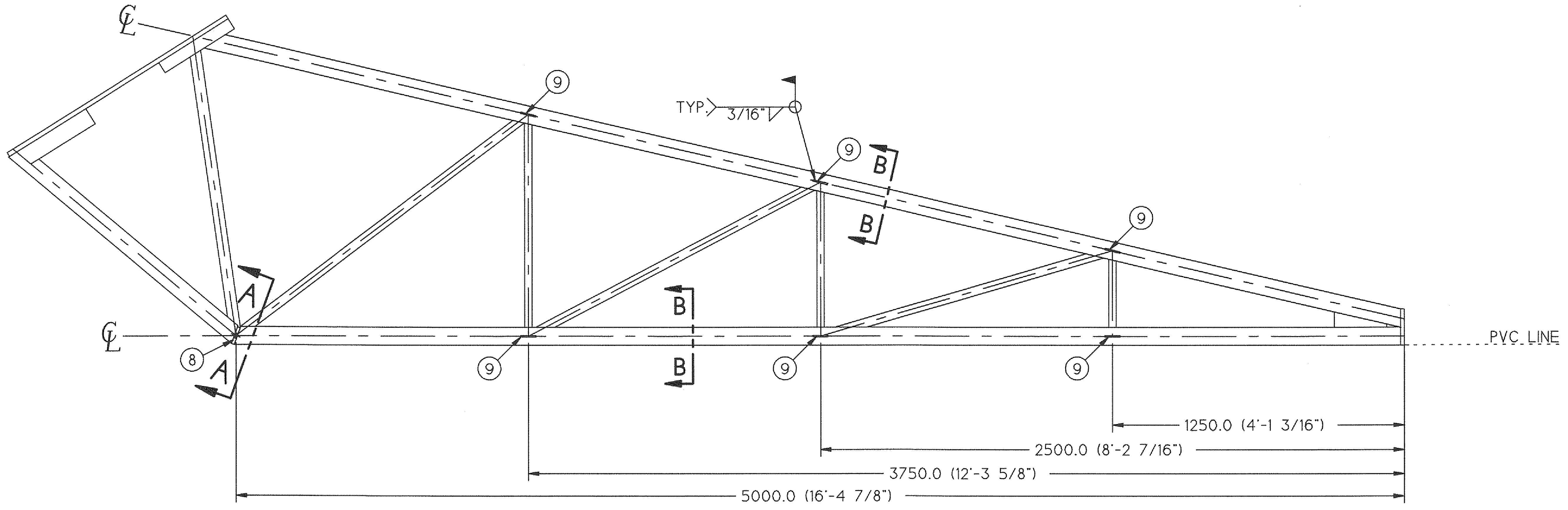
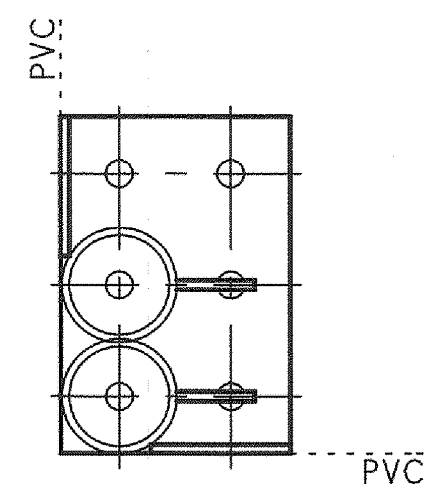
DRAWING NO.
50732



GABLE LEG TRUSS

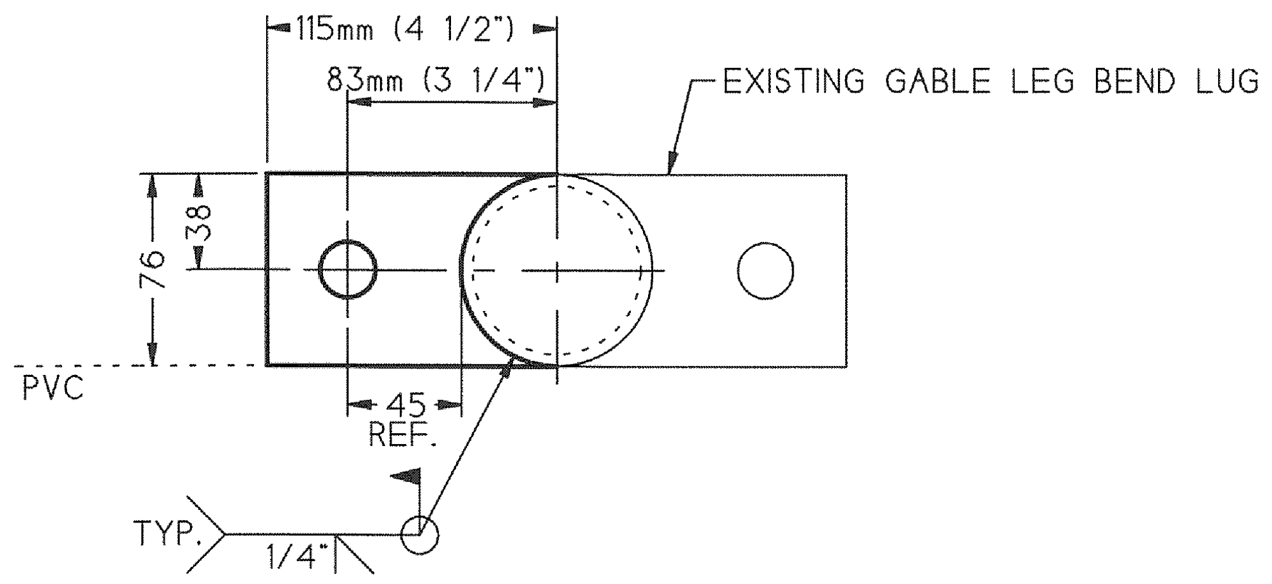
G8F/G4F SHOWN
G5F/G1F SIMILAR

FIELD NOTES:
1.) REFERENCE DRAWING 40000 FOR COMPLETE DETAILS OF EXISTING LEG TRUSS.
2.) FIND A G4F LEG AND WELD LUGS ON ONE SIDE AS SHOWN.
3.) IDENTIFY NEW PIECE AS G8F.
4.) FOR LEG TRUSS ON OPPOSITE SIDE OF BUILDING FIND A G1F TRUSS AND WELD ON AN ITEM 8 LUG. ITEM 9 LUGS NOT REQUIRED.
5.) IDENTIFY NEW PIECE AS G5F.
6.) SEE DRAWING 50703 FOR ADDITIONAL FLANGE LUGS REQUIRED.



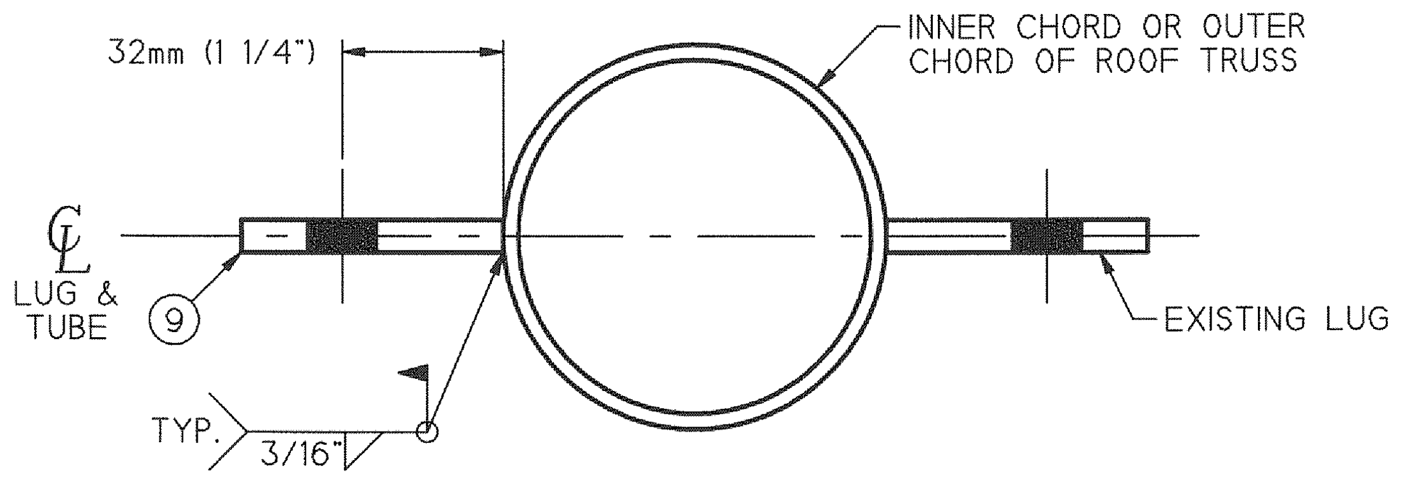
GABLE BASEPLATE

3x SCALE
SHOWN FOR REFERENCE



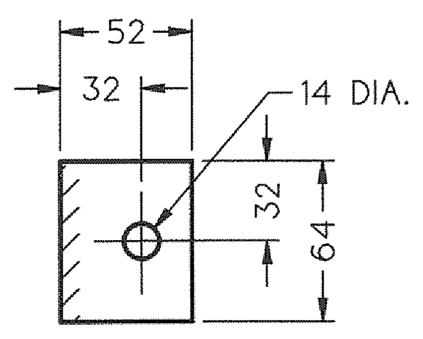
SECTION "A-A"

LEG BEND LUG - GABLE
5x SCALE



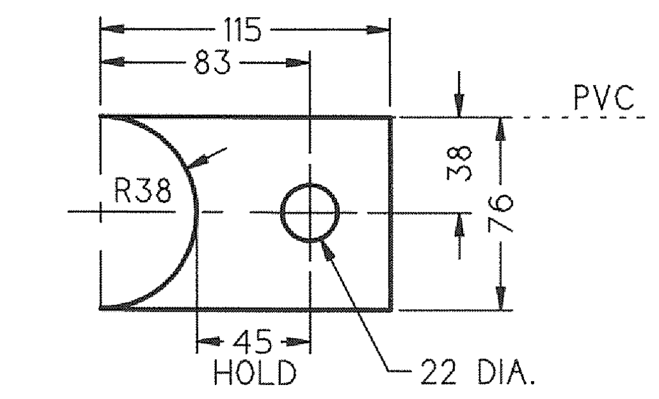
SECTION 'B-B'

10x SCALE



ITEM 9

"52" LUG
5x SCALE



DETAIL ITEM 8

LEG BEND LUG - GABLE
5x SCALE

NOTES:
1.) BREAK SHARP CORNERS FOR PVC.
2.) SEE DRAWING 11006 FOR GENERAL WELD NOTES.
3.) BILL OF MATERIAL IS FOR ONE ASSEMBLY.
4.) DIMENSIONS NOT LABELED WITH UNITS ARE IN MILLIMETERS.
5.) VENT ALL TUBES AS REQUIRED FOR GALVANIZING.
6.) ALL A500 MATERIAL TO BE Fy = 50 ksi MINIMUM.
7.) SEE APPLICABLE LUG SCHEMATIC FOR FLANGE LUGS.
8.) SEE STEEL LAYOUT FOR LOCATION.

ITEM	QTY.	DESCRIPTION	SPEC.
1	-	-	-
2	-	-	-
3	-	-	-
4	-	-	-
5	-	-	-
6	-	-	-
7	-	-	-
8	1	FLAT 3" x 1/2" x 115	A36
9	6	FLAT 2 1/2" x 1/4" x 52	A36
10			

REV.	DESCRIPTION	DRAWN	APP.	DATE
A	REVISED FOR CONSTRUCTION	MRB		6-31-12

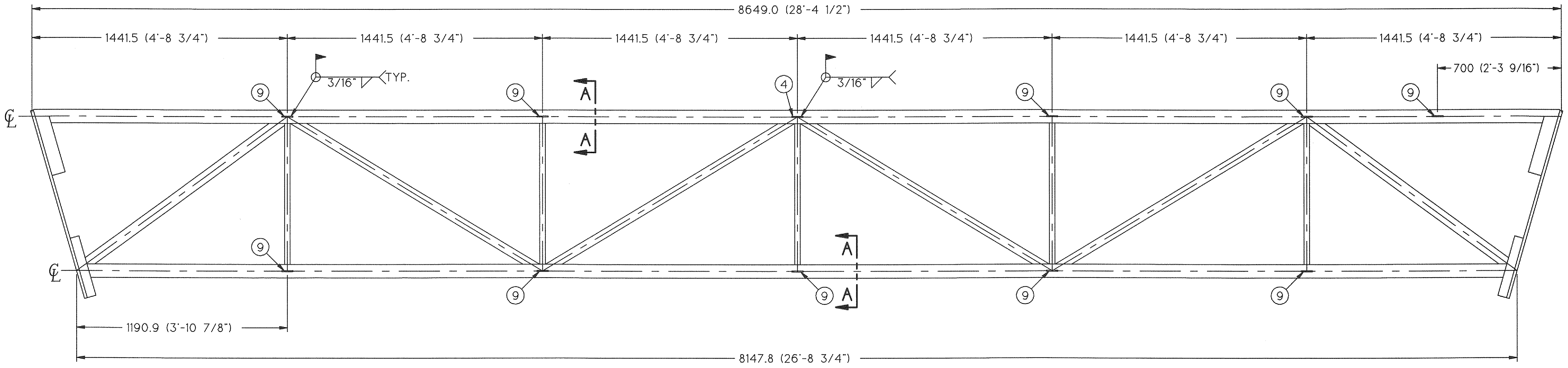
We Cover The World
RUBB
BUILDING SYSTEMS

TITLE
18.29m BVE / 5m LEG
GABLE LEG TRUSS MODIFICATIONS

DRAWN MJG 6-7-12
SCALE 1 : 15
APP. AR 6/9/12
JOB # 12038
DATE
JOB NAME PARSONS

RUBB, INC. SANFORD MAINE 04073
TEL: 207-324-2877 FAX 207-324-2347

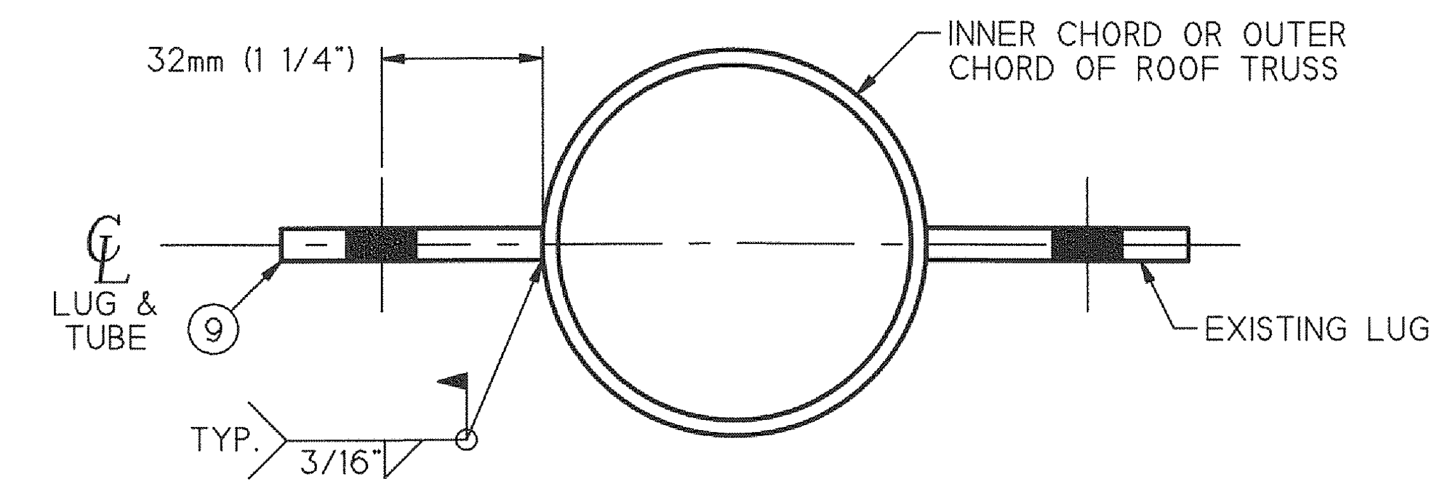
DRAWING NO. 50733



THIS END
TO PEAK

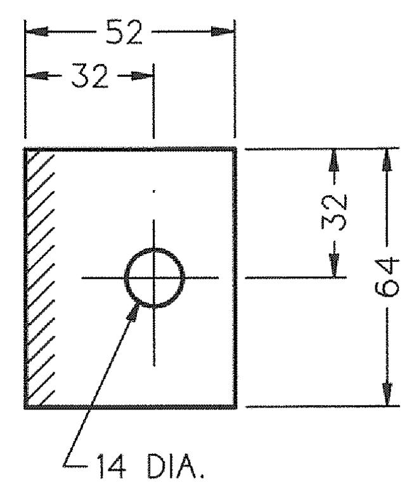
GABLE ROOF TRUSS

G7F/G3F SHOWN
G6F/G2F OPPOSITE



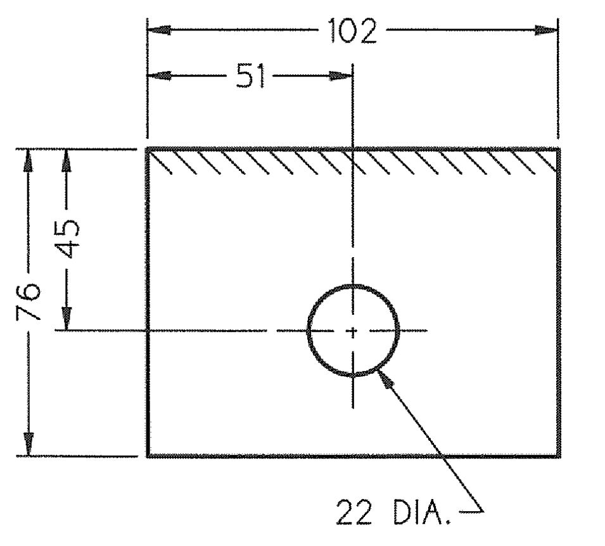
SECTION 'A-A'

10x SCALE



ITEM 9

8x SCALE
"52" LUG



ITEM #4

NON-APEX COMPRESSION TUBE
1/2" THICK

NOTES:
1.) REFERENCE DRAWING 40001 FOR COMPLETE DETAILS OF EXISTING ROOF.
2.) FIND A G3F ROOF AND WELD LUGS ON ONE SIDE AS SHOWN.
3.) IDENTIFY NEW PIECE AS G7F.
4.) FOR OPPOSITE HAND USE A G2F ROOF AND IDENTIFY NEW ASSEMBLY AS G6F.
5.) SEE DRAWING 50703 FOR ADDITIONAL FLANGE LUGS REQUIRED.

ITEM	QTY.	DESCRIPTION	SPEC.
1			
2			
3			
4	1	FLAT 3" x 1/2" x 102	A36
5			
6			
7			
8			
9	10	FLAT 2 1/2" x 1/4" x 52	A36

REV.	DESCRIPTION	DRAWN	APP.	DATE
A	REVISED FOR CONSTRUCTION	MRB		10-31-12

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RUBB
BUILDING SYSTEMS

TITLE
18.29m BVE / 5m LEG
GABLE ROOF TRUSS MODIFICATIONS

DRAWN MJG 6-06-12	SCALE 1 : 15	This drawing is the property of Rubb, Inc. and may not be reproduced or used for any manufacturing purpose without the express written consent of Rubb, Inc.
APP. AR 6/9/12	JOB # 12038	
DATE	JOB NAME PARSONS	

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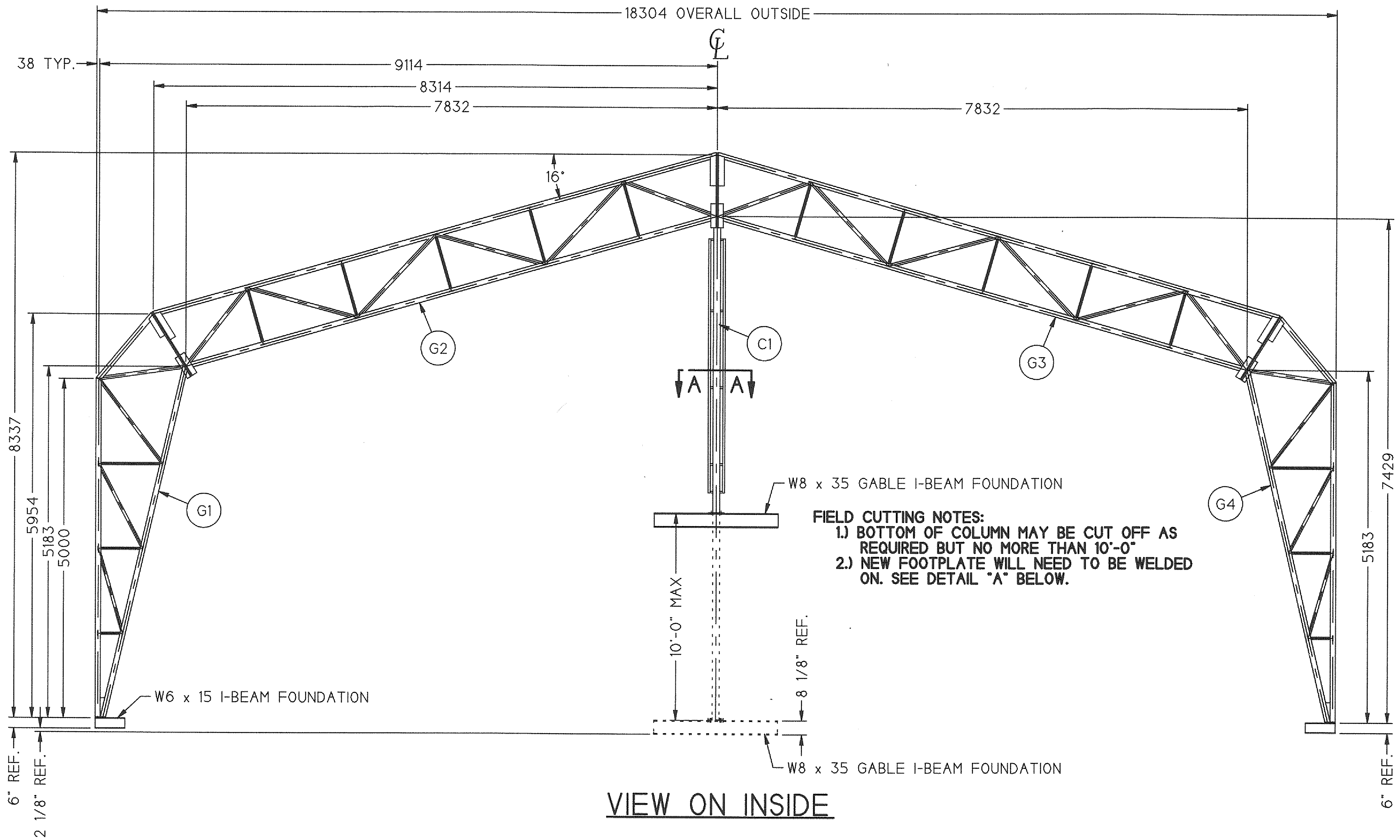
TEL: 207-324-2877 FAX 207-324-2347

DRAWING NO.
50734



FIELD CUTTING NOTES:

1.) BOTTOM OF COLUMN MAY BE CUT OFF AS REQUIRED BUT NO MORE THAN 10'-0"

2.) NEW FOOTPLATE WILL NEED TO BE WELDED ON. SEE DETAIL "A" BELOW.

VIEW ON INSIDE

ITEM	QTY.	DESCRIPTION	DWG. #
G1	1	LEG TRUSS	40000
G2	1	ROOF TRUSS	40001
G3	1	ROOF TRUSS	40001
G4	1	LEG TRUSS	40000
C1	1	GABLE CENTER COLUMN	40092

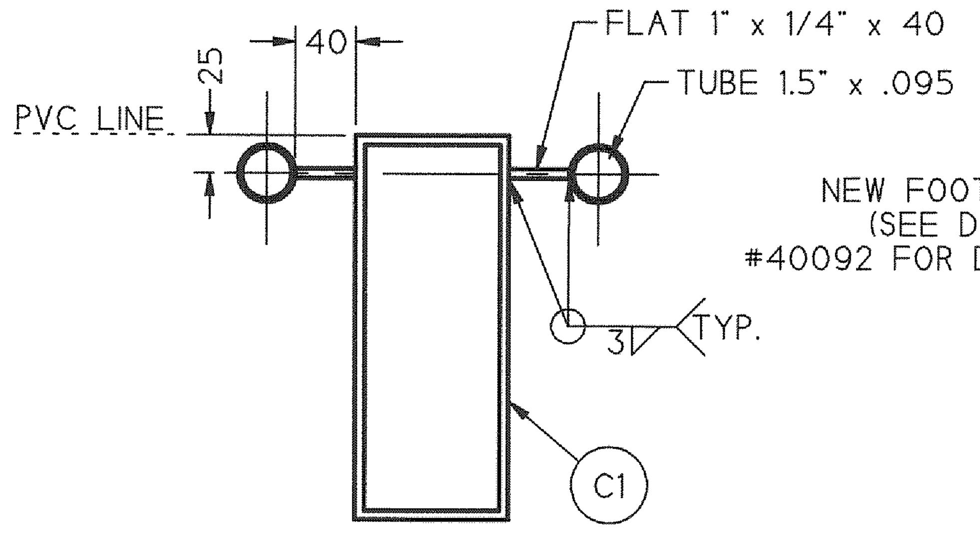
NOTES:

1.) BREAK SHARP CORNERS FOR PVC.

2.) SEE DRAWING 11006 FOR GENERAL WELD NOTES.

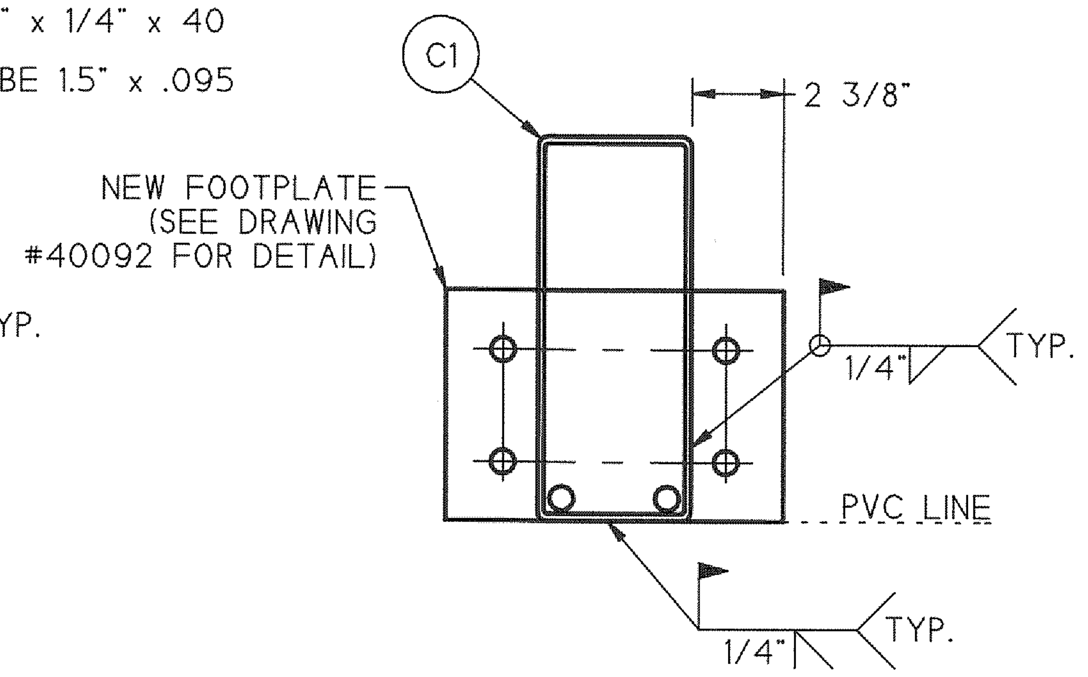
3.) BILL OF MATERIAL IS FOR ONE GABLE.

4.) DIMENSIONS NOT LABELED WITH UNITS ARE IN MILLIMETERS.



SECTION 'A-A'

10x SCALE



DETAIL "A"

10x SCALE

REV.	DESCRIPTION	DRAWN	APP.	DATE

We Cover The World
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BUILDING SYSTEMS

TITLE
18.29m BVE / 5m LEG
REAR GABLE STEEL LAYOUT
AND CUTTING DETAILS

DRAWN MRB 10/30/12
SCALE 1 : 50
APP. AR 11-1-12
JOB # 12038
DATE GB 11/7/12
JOB NAME PARSONS

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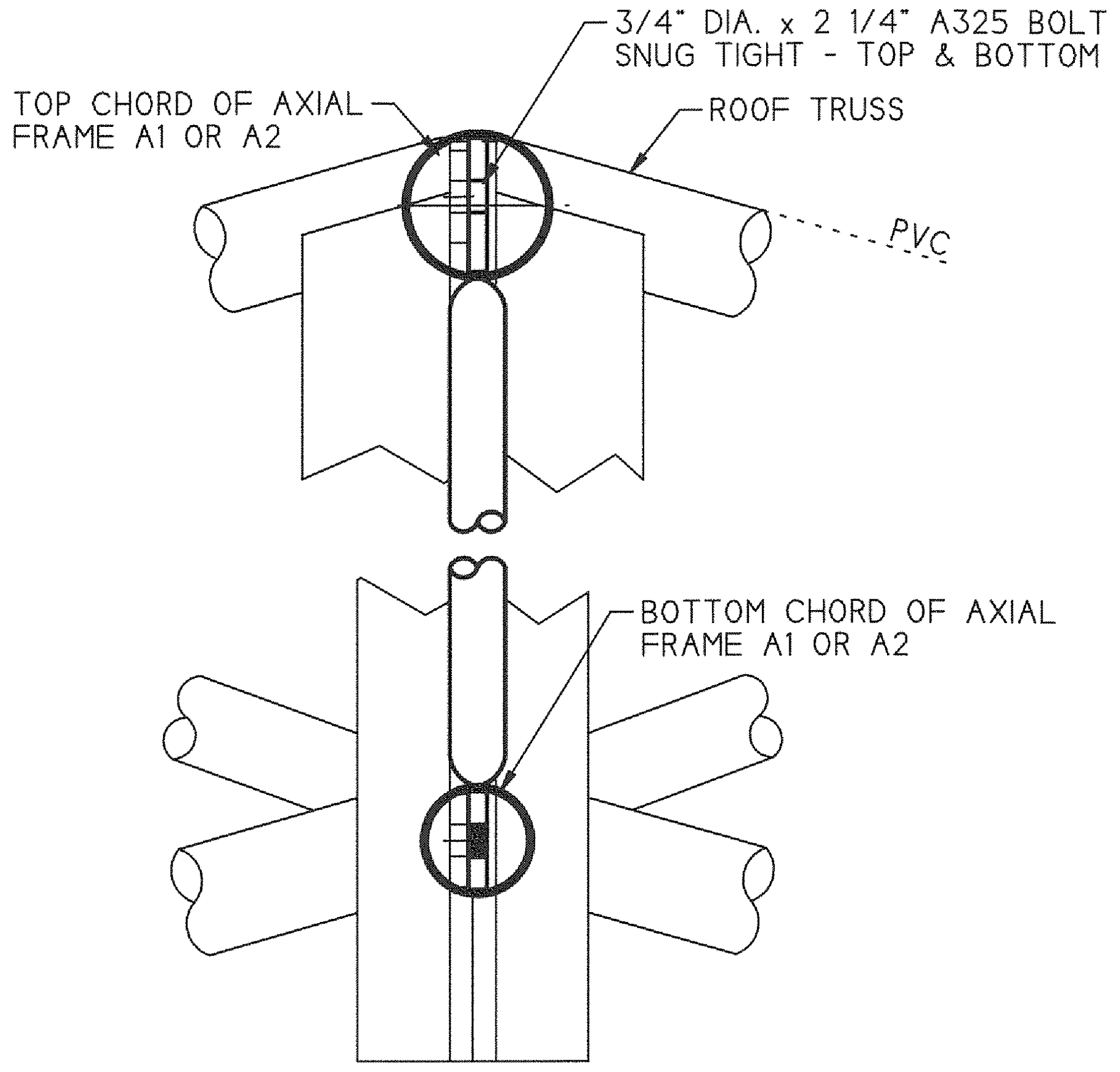
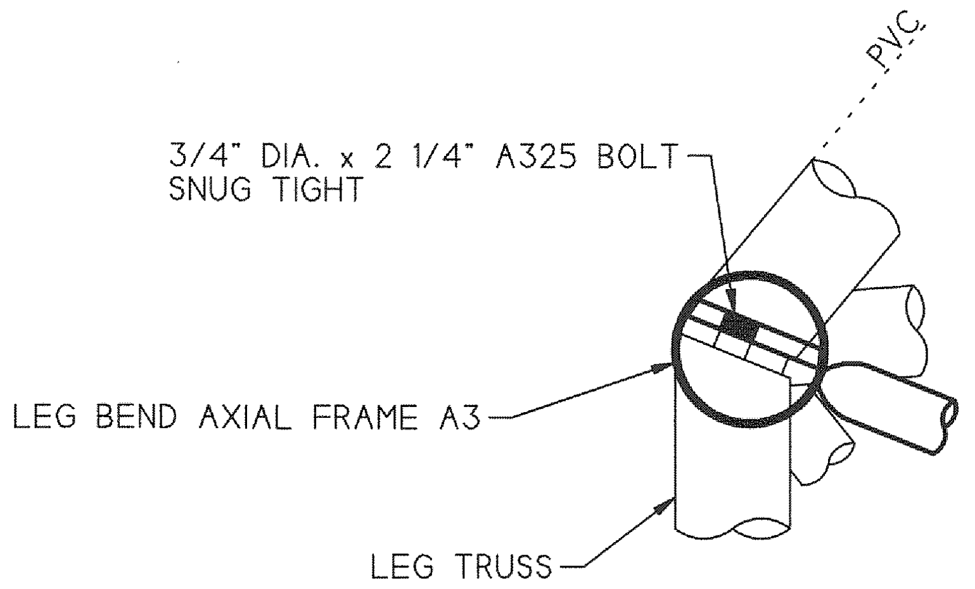
DRAWING NO. 51054

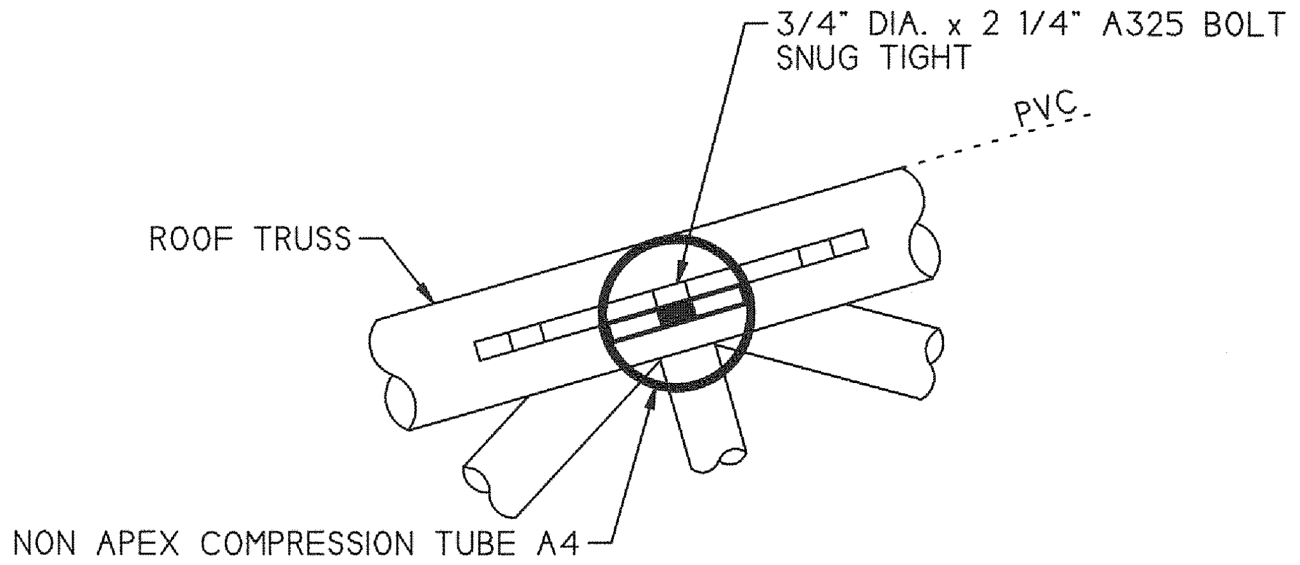


AXIAL FRAME A1 AND A2
PEAK POSITION SHOWN
NON-PEAK LOCATIONS SIMILAR
2x SCALE

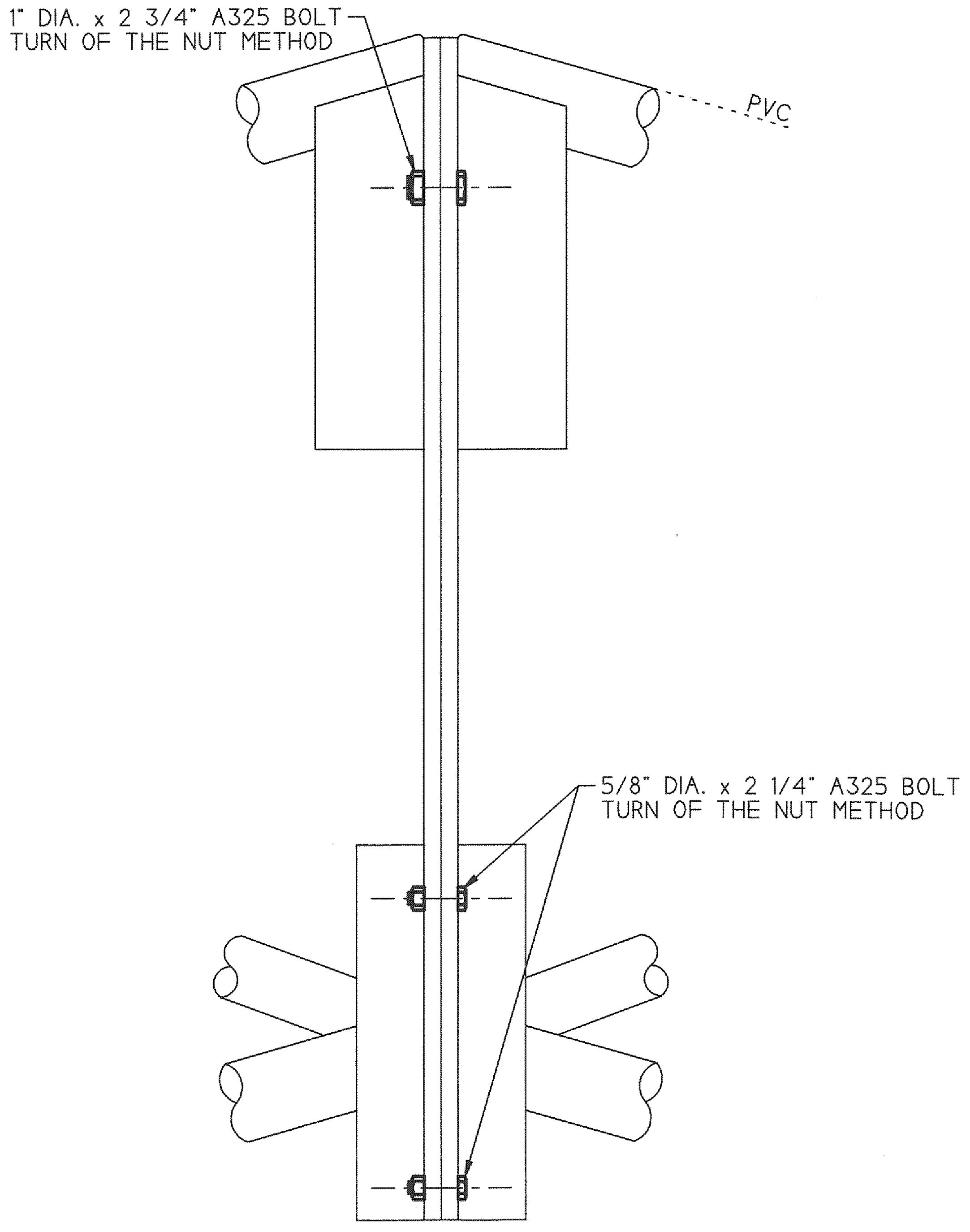


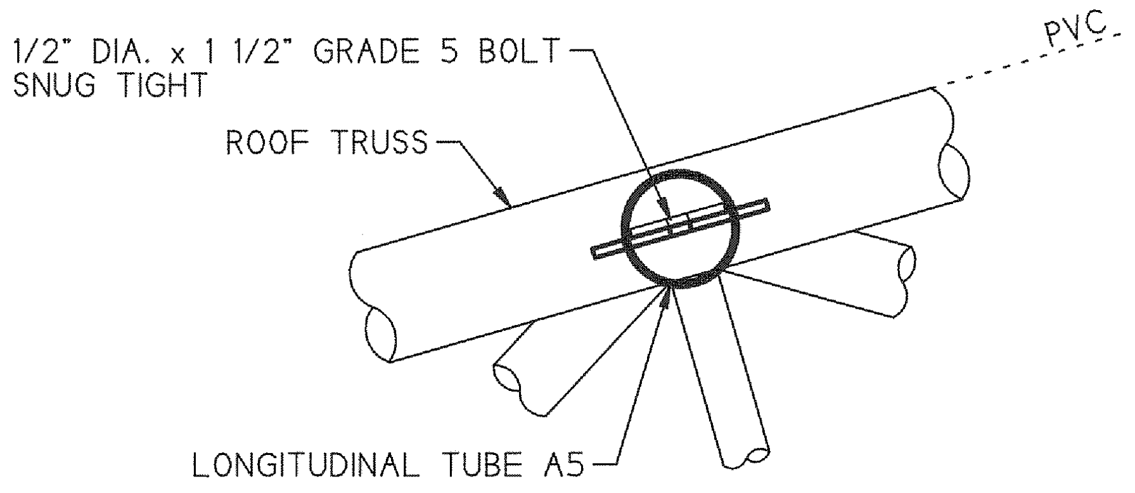
LEG BEND AXIAL FRAME A3
AXIAL STEEL IS BOLTED ON TOP OF TRUSS LUG.
2x SCALE

NOTE:
SEE DRAWING #50723 FOR FIT-UP
OF H1 WHICH REPLACES A3 IN BAY 4.

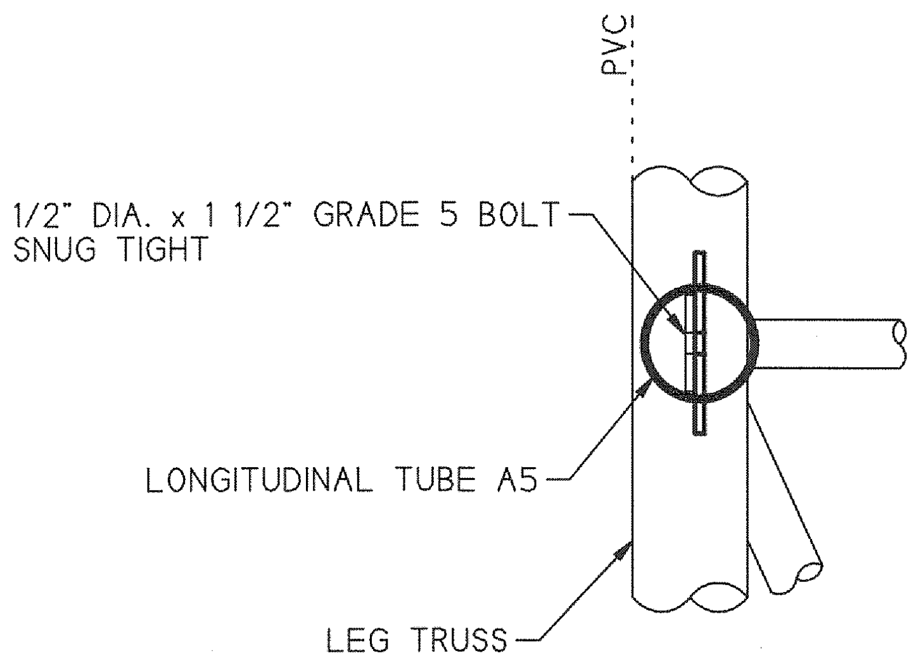


NON APEX COMPRESSION TUBE A4
AXIAL STEEL IS BOLTED ON BOTTOM OF TRUSS LUG.
2x SCALE

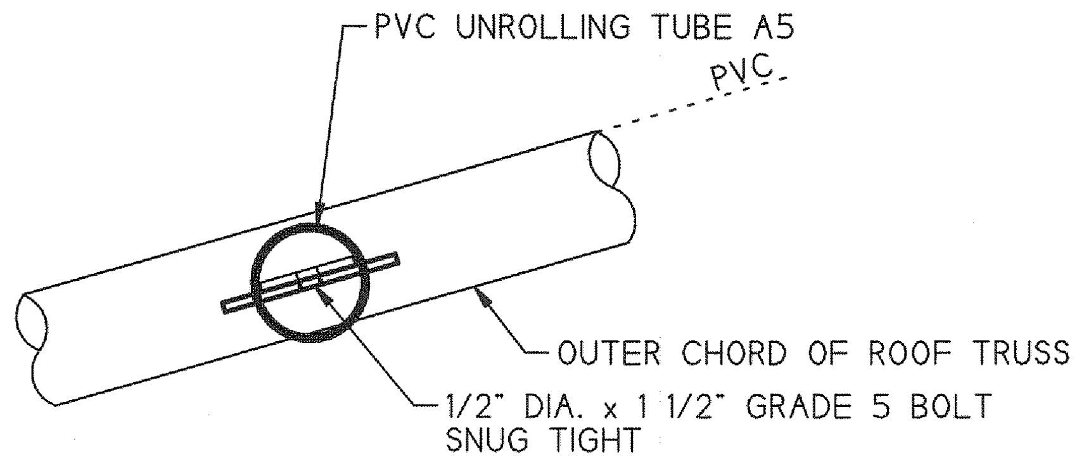




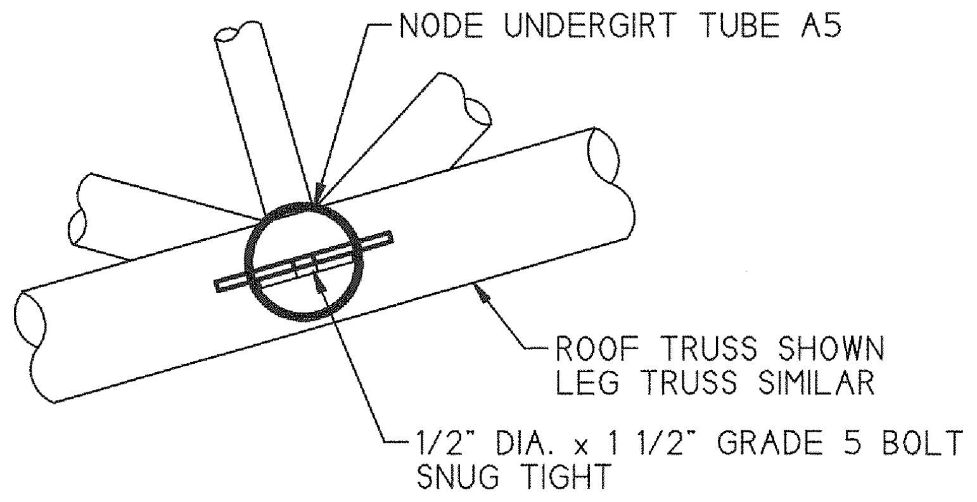
LONGITUDINAL TUBE A5
ROOF LOCATION
AXIAL STEEL IS BOLTED ON BOTTOM OF TRUSS LUG.
2x SCALE

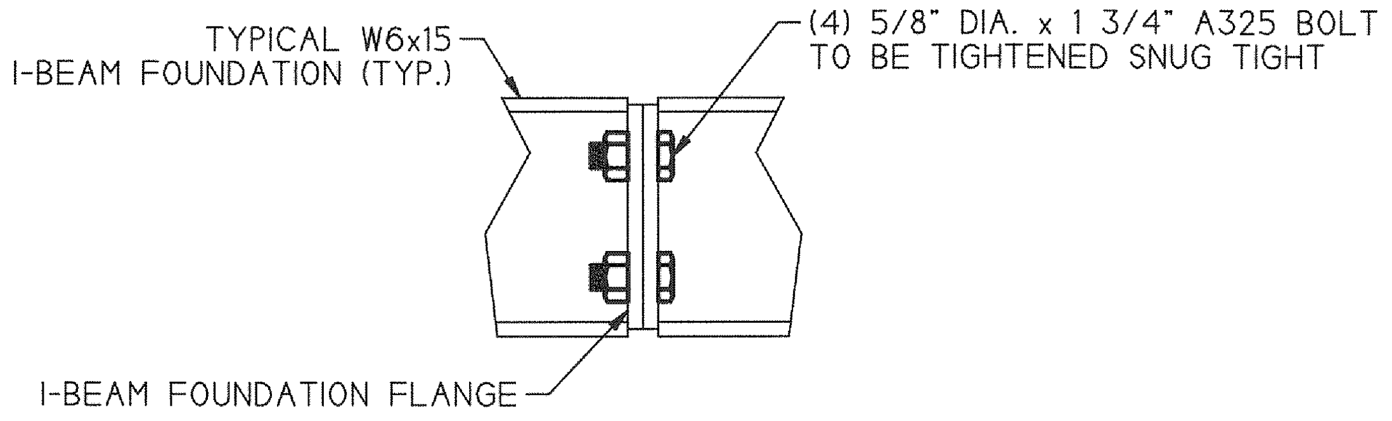


LONGITUDINAL TUBE A5
LEG LOCATION
AXIAL STEEL IS BOLTED ON INSIDE OF TRUSS LUG.
2x SCALE



PVC UNROLLING TUBE A5
AXIAL STEEL IS BOLTED ON BOTTOM OF TRUSS LUG.
2x SCALE





FIELD NOTE:
ALL METHODS FOR TIGHTENING NUTS ARE AS DEFINED IN THE AISC STEEL MANUAL (13TH EDITION), AND SUBJECT TO CONTROLLED INSPECTION

FLANGE CONNECTION
ROOF/ROOF FLANGE SHOWN
LEG/ROOF FLANGE SIMILAR
2x SCALE

NODE UNDERGIRT TUBE A5
AXIAL STEEL IS BOLTED ON TOP OF TRUSS LUG.
ROOF POSITION SHOWN / LEG POSITION SIMILAR
2x SCALE

TYPICAL I-BEAM TO I-BEAM
FOUNDATION FLANGE
NOT TO SCALE

REV.	DESCRIPTION	DRAWN	APP.	DATE

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RUBB
BUILDING SYSTEMS

TITLE
18.29m BVE / 5m LEG
AXIAL STEEL FIT UP AND
BOLTING INSTRUCTIONS

DRAWN
MRB 10/31/12

SCALE
1 : 10

APP.
AR 11-1-12

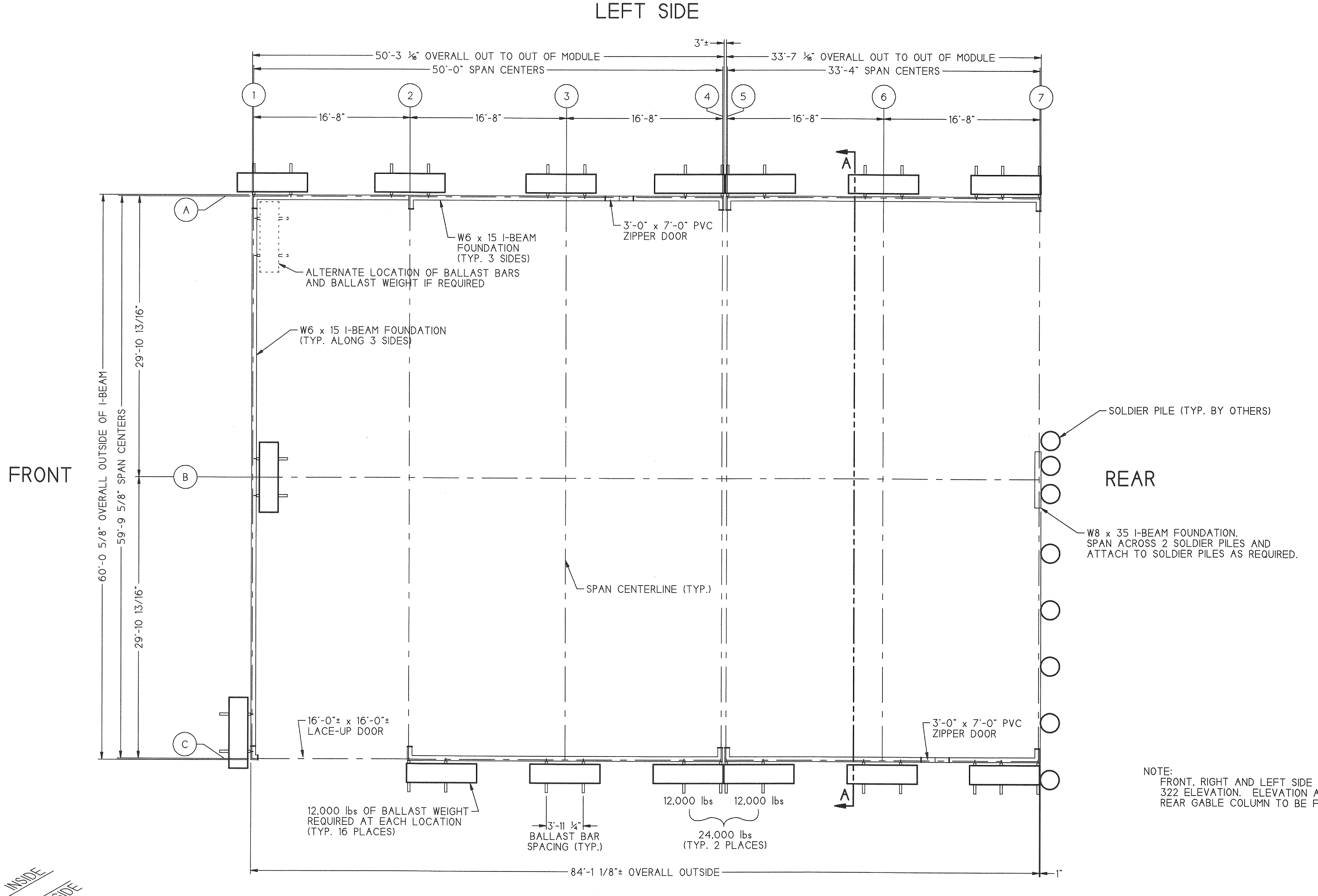
JOB #
12038

DATE
GB 11/7/12

JOB NAME
PARSONS

RUBB, INC. SANFORD MAINE 04073
TEL: 207-324-2877 FAX 207-324-2347

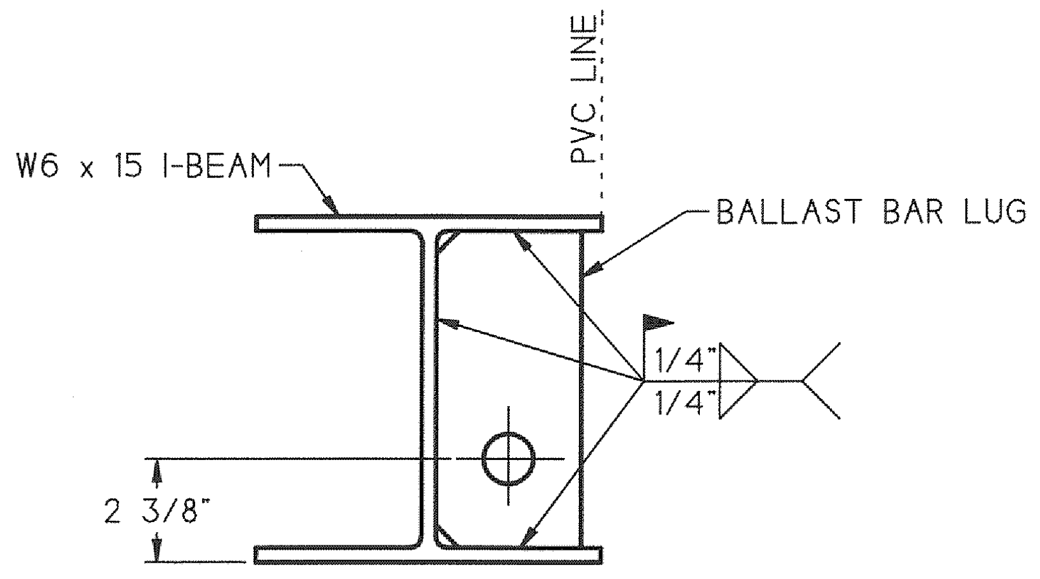
DRAWING NO.
51146



PLAN VIEW

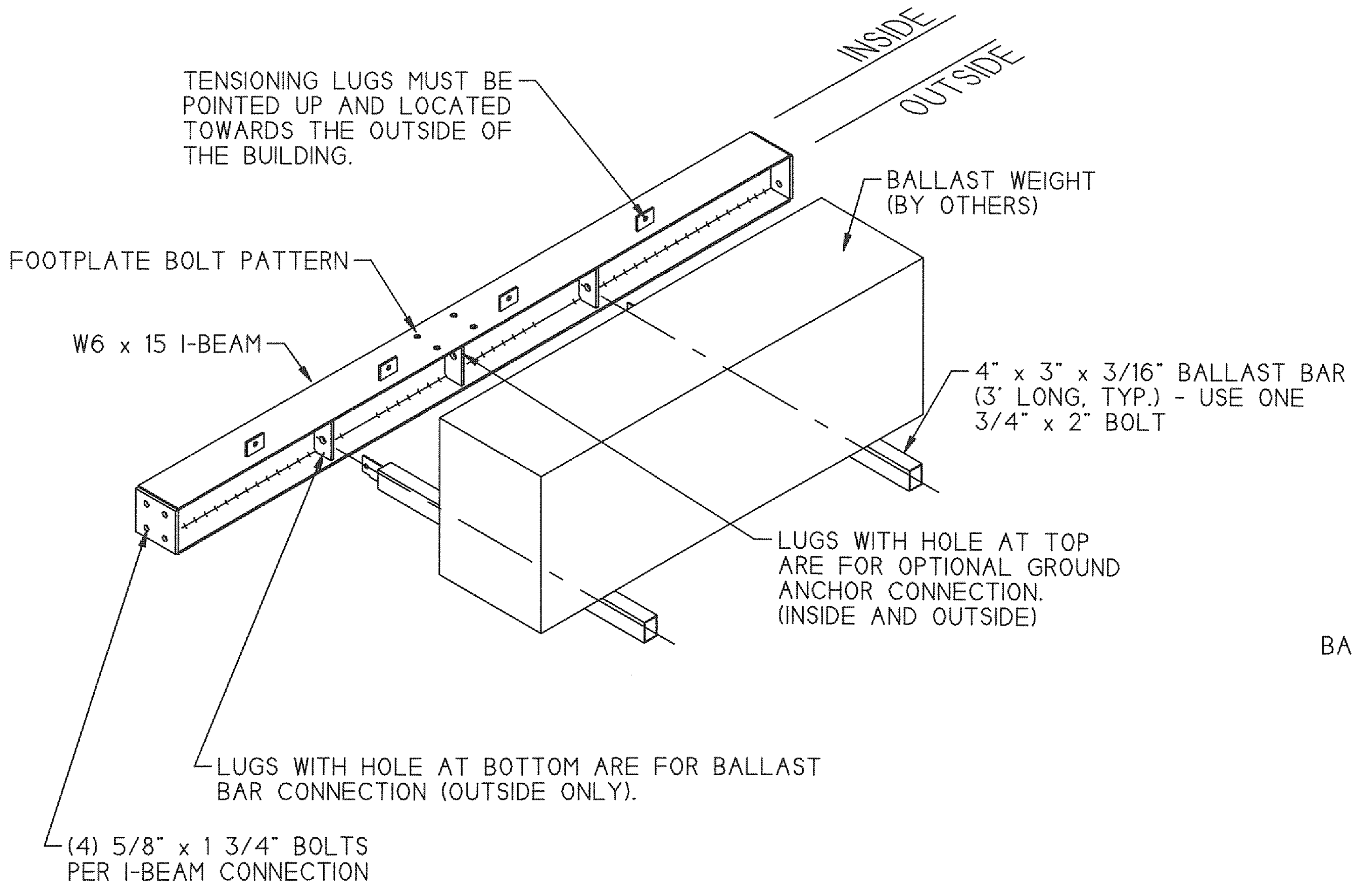
THIS SIDE TOWARDS GLENBROOK ROAD

NOTE:
FRONT, RIGHT AND LEFT SIDE ARE ALL AT APPROXIMATELY 322 ELEVATION. ELEVATION AT REAR GABLE IS ABOUT 332. REAR GABLE COLUMN TO BE FIELD CUT AS REQUIRED TO FIT.



FIELD WELDED LUGS DETAIL

NOT TO SCALE

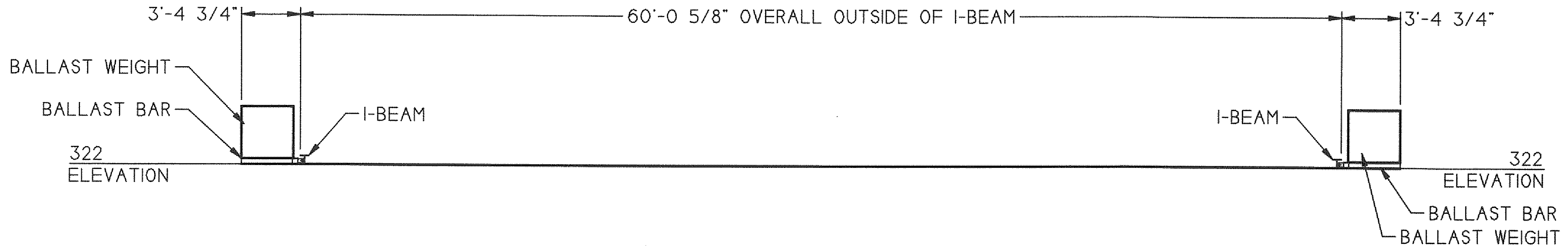


I-BEAM ORIENTATION DETAIL

NOT TO SCALE

NOTES:
1.) SEE DRAWING 50700 FOR I-BEAM FOUNDATION LAYOUT.
2.) EACH BALLAST WEIGHT IS SHOWN REPRESENTATIVE ONLY. ACTUAL DIMENSIONS OF WEIGHTS TO BE DETERMINED BY SPATIAL REQUIREMENTS.
3.) BALLAST WEIGHTS BY OTHERS.
4.) GRID LABELING SHOWN ON THIS DRAWING IS FOR BALLASTING PURPOSES ONLY AND MAY NOT COINCIDE WITH GRID LABELLING FOR STRUCTURAL LAYOUT.
5.) BALLAST WEIGHTS TO BE PLACED AS CLOSE TO STRUCTURE AS POSSIBLE.
6.) SEE DRAWING #50704 FOR INITIAL SETUP AND DRAWING #51161 FOR SECOND MOVE.

STRUCTURE LOADS: 25 PSF GROUND SNOW.
90 MPH 3 SEC. GUST.
IBC 2000



SECTION 'A-A'

NOTE:
THE USE AND DESIGN OF CRIBBING IS BY OTHERS. CRIBBING MUST BE PLACED SO THAT IT MEETS ALL DIMENSIONAL REQUIREMENTS AND MUST BE DESIGNED TO MEET ALL STRUCTURAL REQUIREMENTS.

REV.	DESCRIPTION	DRAWN	APP.	DATE
B	REVISED FOR CONSTRUCTION	MRB		10-31-12
A	REVISED FOR RESUBMITTALS.	MJG	AR	10/8/12

We Cover The World
RUBB
BUILDING SYSTEMS

TITLE
18.29m BVE / 5m LEG
BALLAST BAR LAYOUT
FOR THIRD MOVE - LOCATION #3

DRAWN MRB 9/23/12	SCALE 1 : 75	This drawing is the property of Rubb, Inc. and may not be reproduced or used for any manufacturing purpose without the express written consent of Rubb, Inc.
APP. AR 9-24-12	JOB # 12038	
DATE	JOB NAME PARSONS	

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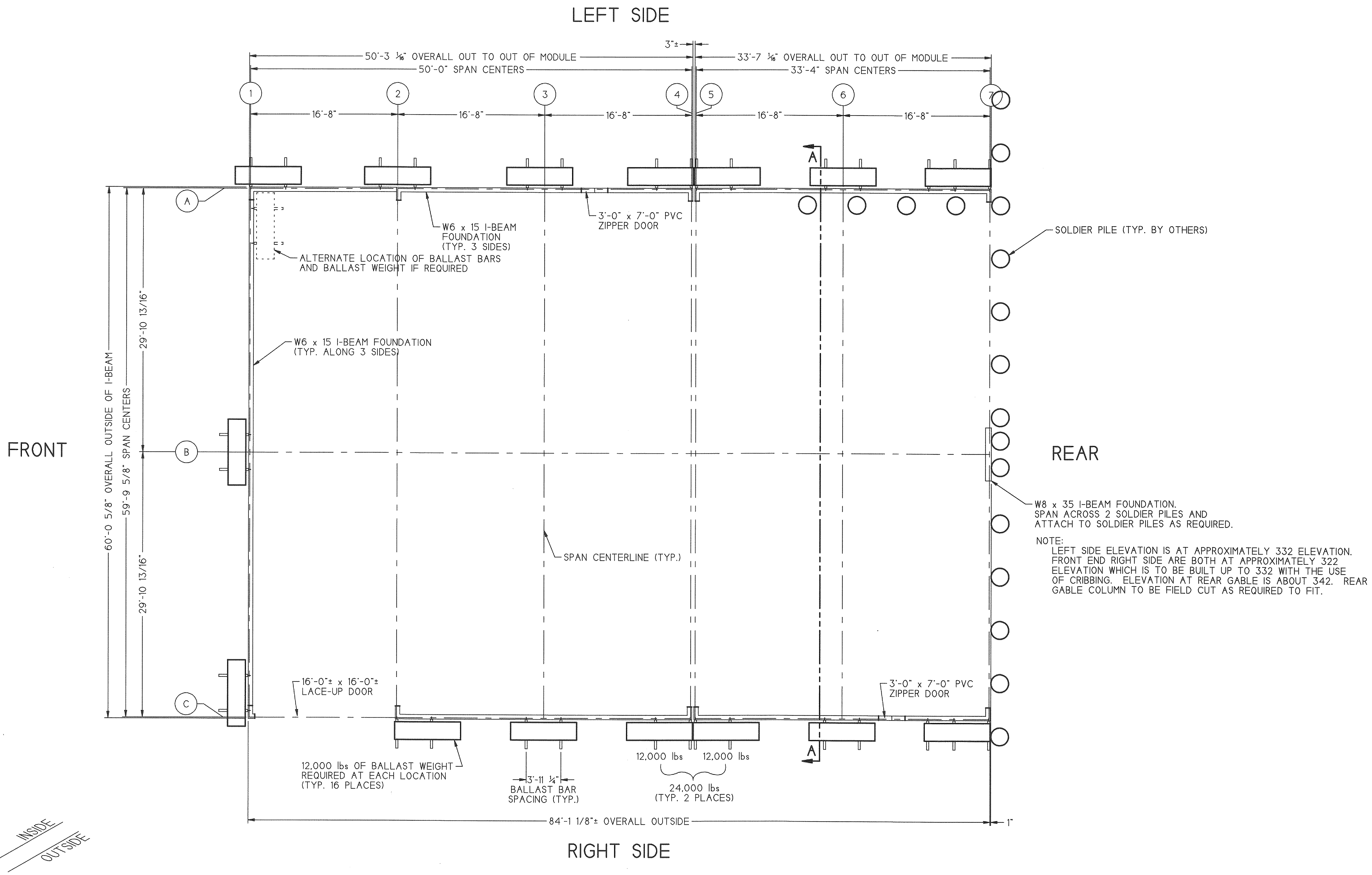
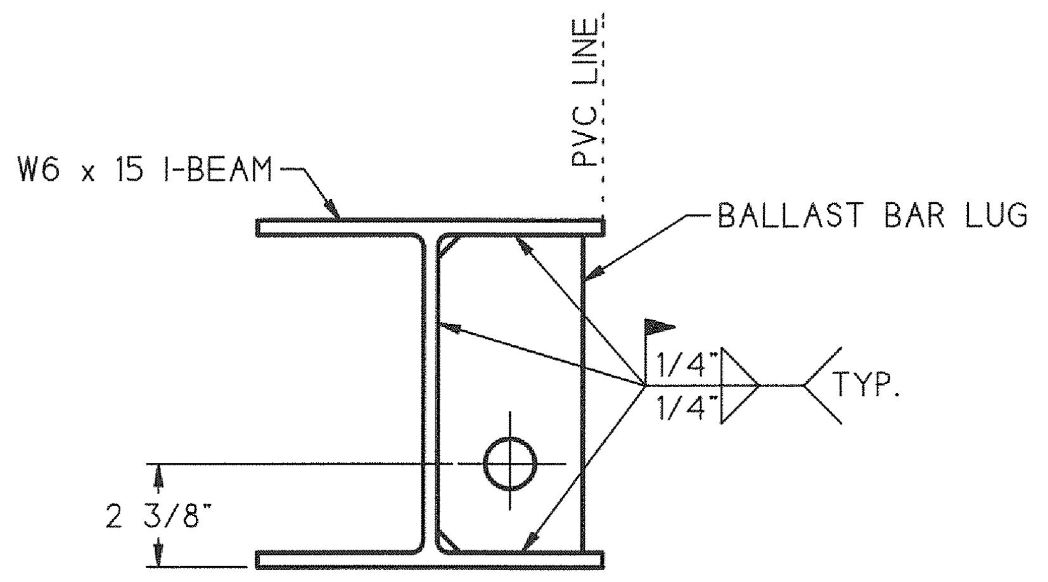
DRAWING NO. 51156



NOTE:
LEFT SIDE ELEVATION IS AT APPROXIMATELY 332 ELEVATION. FRONT END RIGHT SIDE ARE BOTH AT APPROXIMATELY 322 ELEVATION WHICH IS TO BE BUILT UP TO 332 WITH THE USE OF CRIBBING. ELEVATION AT REAR GABLE IS ABOUT 342. REAR GABLE COLUMN TO BE FIELD CUT AS REQUIRED TO FIT.

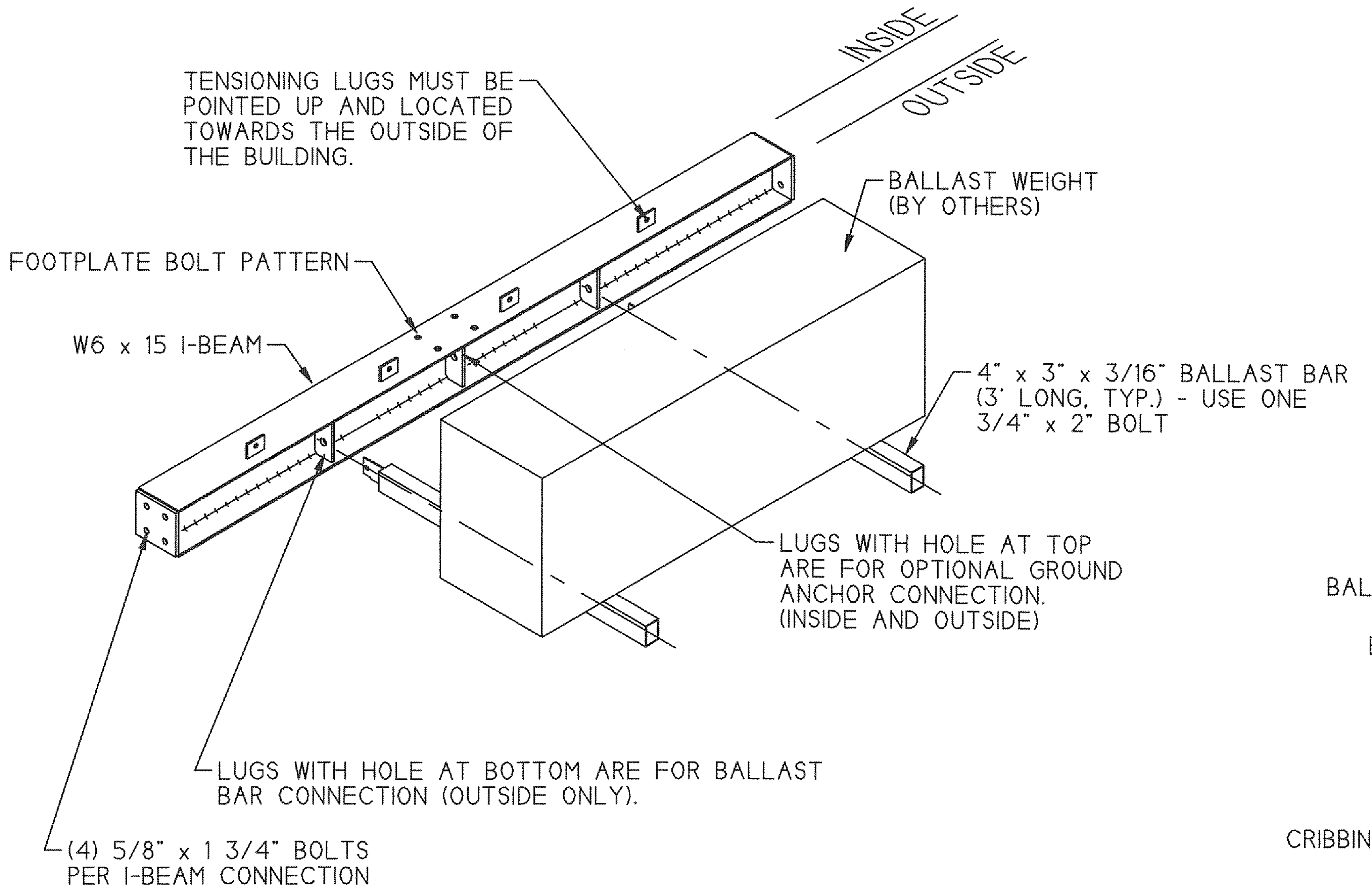
PLAN VIEW

THIS SIDE TOWARDS GLENBROOK ROAD



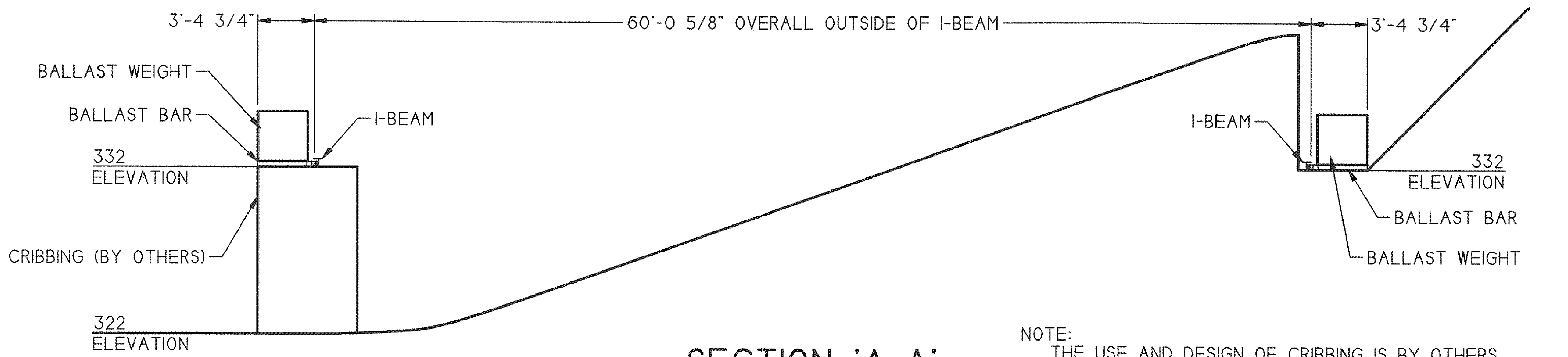
FIELD WELDED LUGS DETAIL

NOT TO SCALE



I-BEAM ORIENTATION DETAIL

NOT TO SCALE



SECTION 'A-A'

NOTE:
THE USE AND DESIGN OF CRIBBING IS BY OTHERS. CRIBBING MUST BE PLACED SO THAT IT MEETS ALL DIMENSIONAL REQUIREMENTS AND MUST BE DESIGNED TO MEET ALL STRUCTURAL REQUIREMENTS.

NOTES:
1.) SEE DRAWING 50700 FOR I-BEAM FOUNDATION LAYOUT.
2.) EACH BALLAST WEIGHT IS SHOWN REPRESENTATIVE ONLY. ACTUAL DIMENSIONS OF WEIGHTS TO BE DETERMINED BY SPATIAL REQUIREMENTS.
3.) BALLAST WEIGHTS BY OTHERS.
4.) GRID LABELING SHOWN ON THIS DRAWING IS FOR BALLASTING PURPOSES ONLY AND MAY NOT COINCIDE WITH GRID LABELLING FOR STRUCTURAL LAYOUT.
5.) BALLAST WEIGHTS TO BE PLACED AS CLOSE TO STRUCTURE AS POSSIBLE.
6.) SEE DRAWING #50704 FOR INITIAL SETUP AND DRAWING #51156 FOR THIRD MOVE.

STRUCTURE LOADS: 25 PSF GROUND SNOW.
90 MPH 3 SEC. GUST.
IBC 2000

REV.	DESCRIPTION	DRAWN	APP.	DATE
B	REVISED FOR CONSTRUCTION	MRB	AR	10-31-12
A	REVISED FOR RESUBMITTAL.	MJG	AR	10/8/12

We Cover The World
RUBB
BUILDING SYSTEMS

TITLE
18.29m BVE / 5m LEG
BALLAST BAR LAYOUT
FOR SECOND MOVE - LOCATION #2

DRAWN MRB 9/21/12
SCALE 1 : 75
APP. AR 9-24-12
JOB # 12038
DATE
JOB NAME PARSONS

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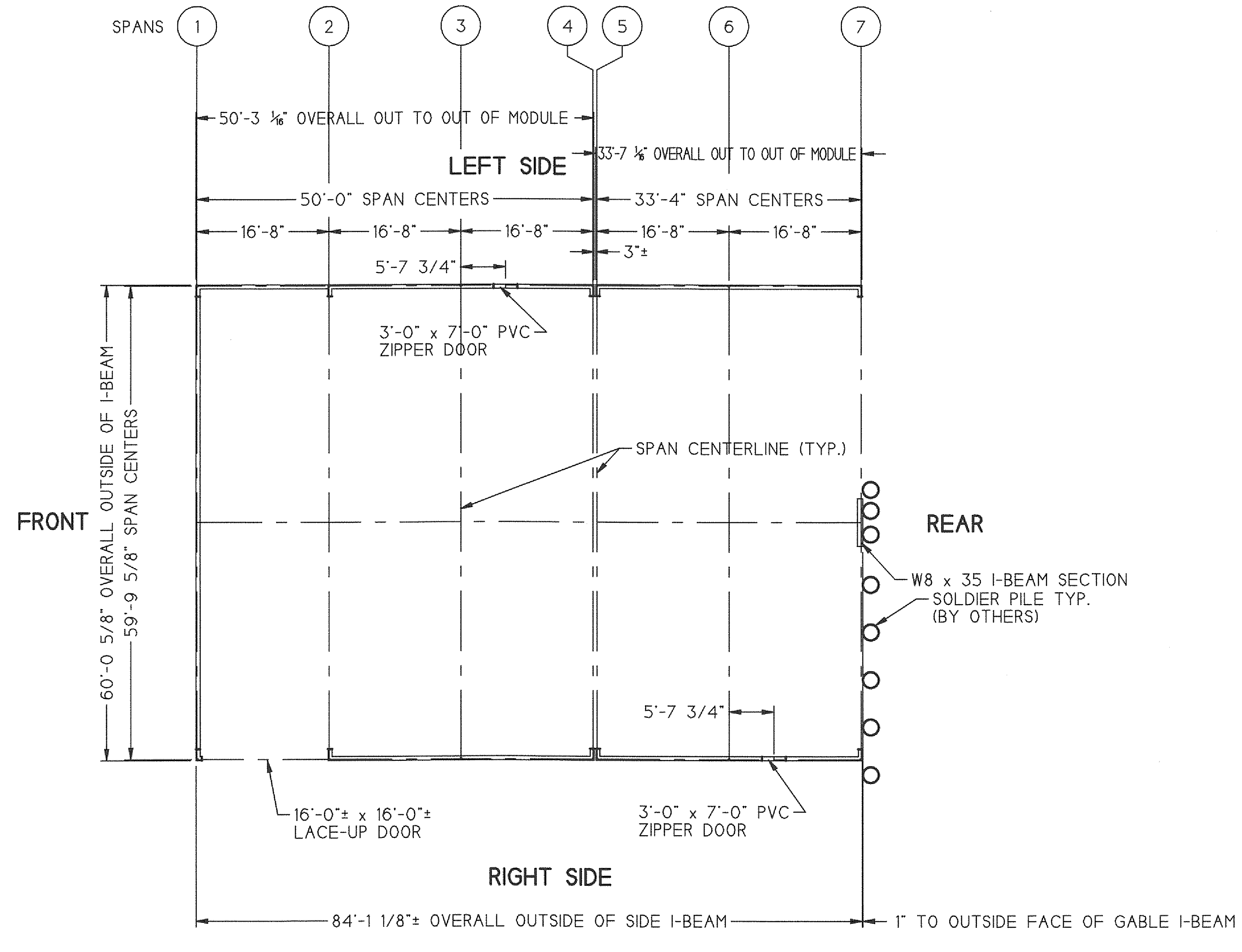
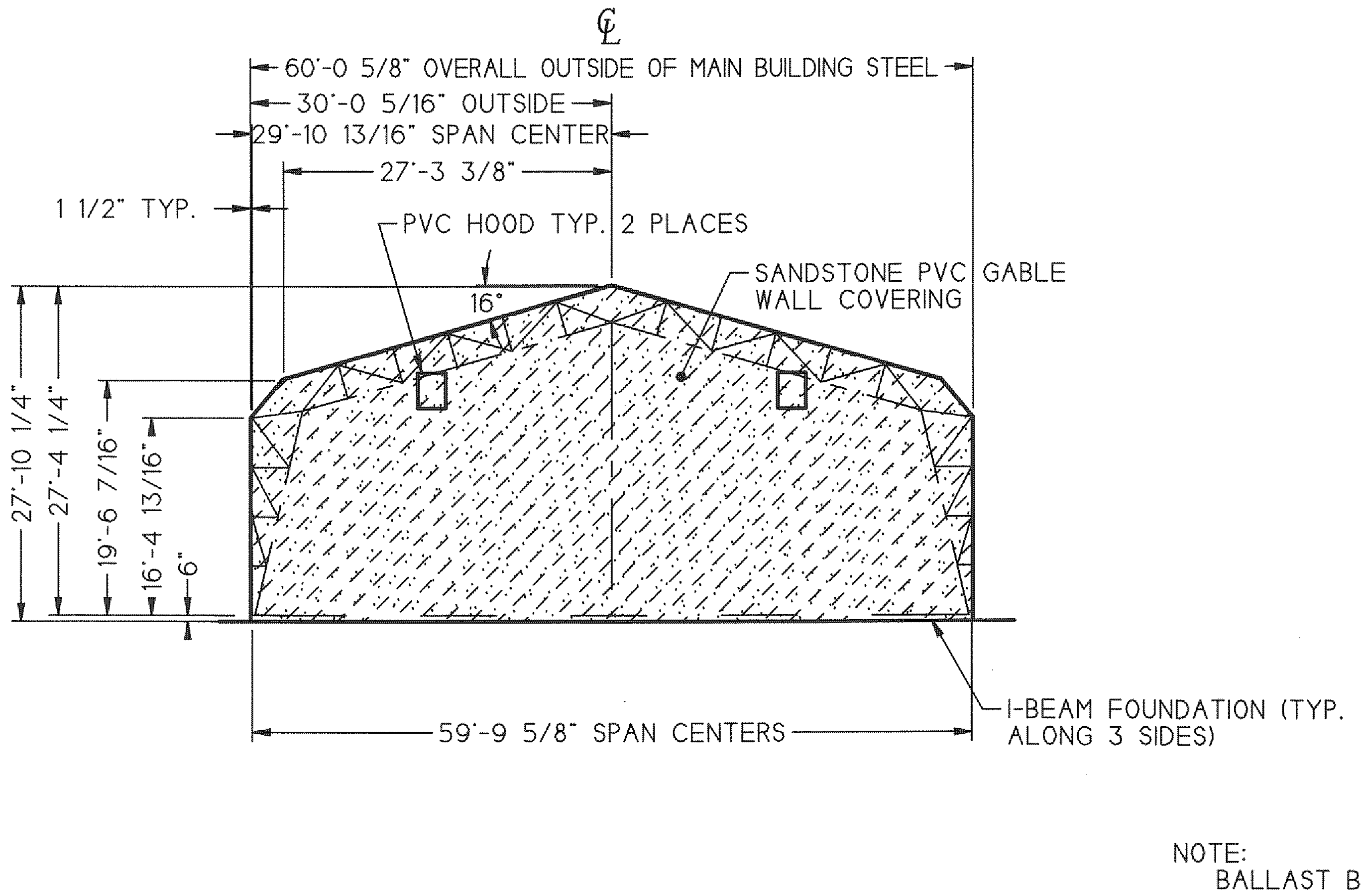
TEL: 207-324-2877 FAX 207-324-2347

DRAWING NO. 51161

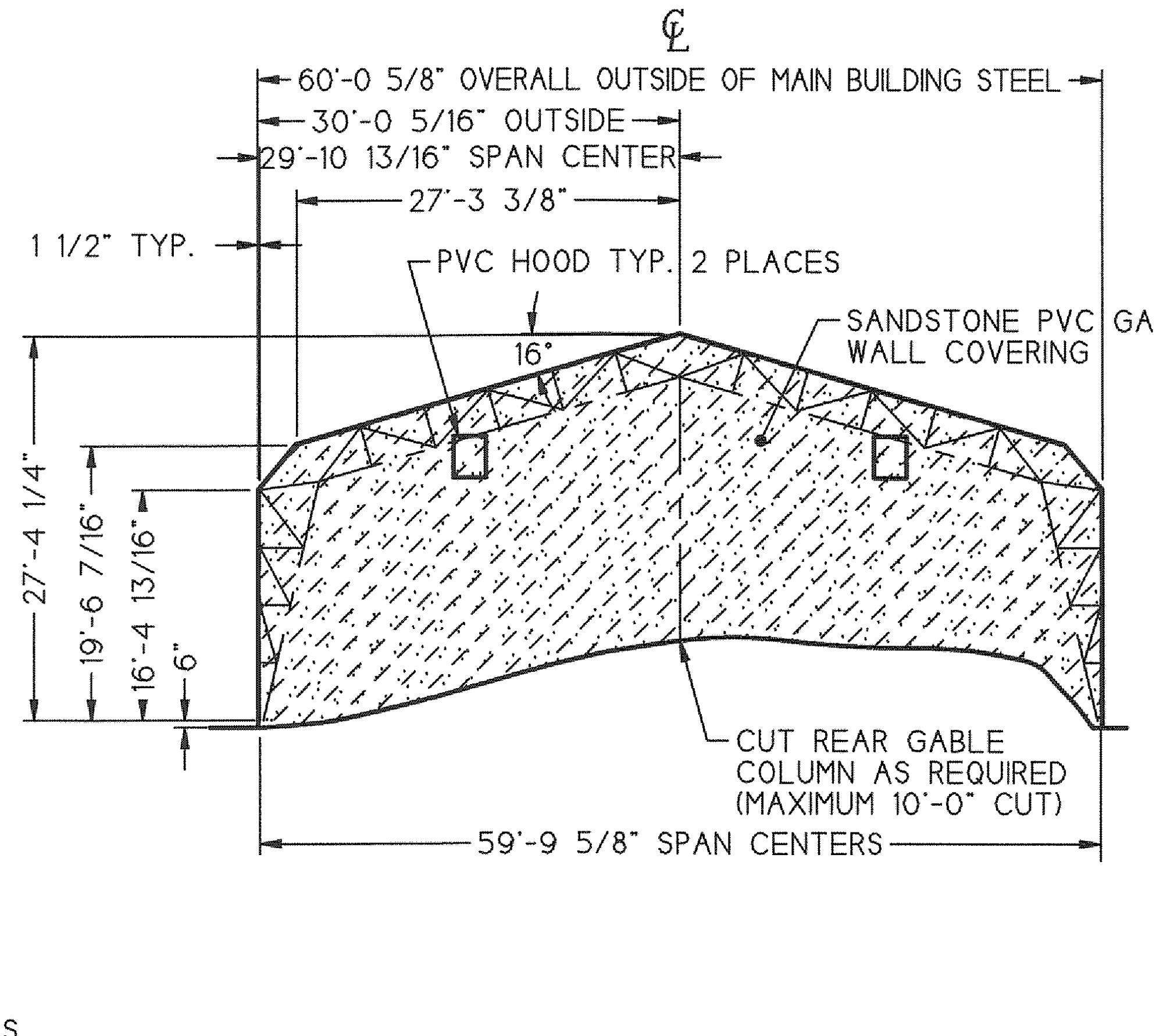


PLAN VIEW
2 MODULE CONFIGURATION
THIS SIDE TOWARDS GLENBROOK ROAD

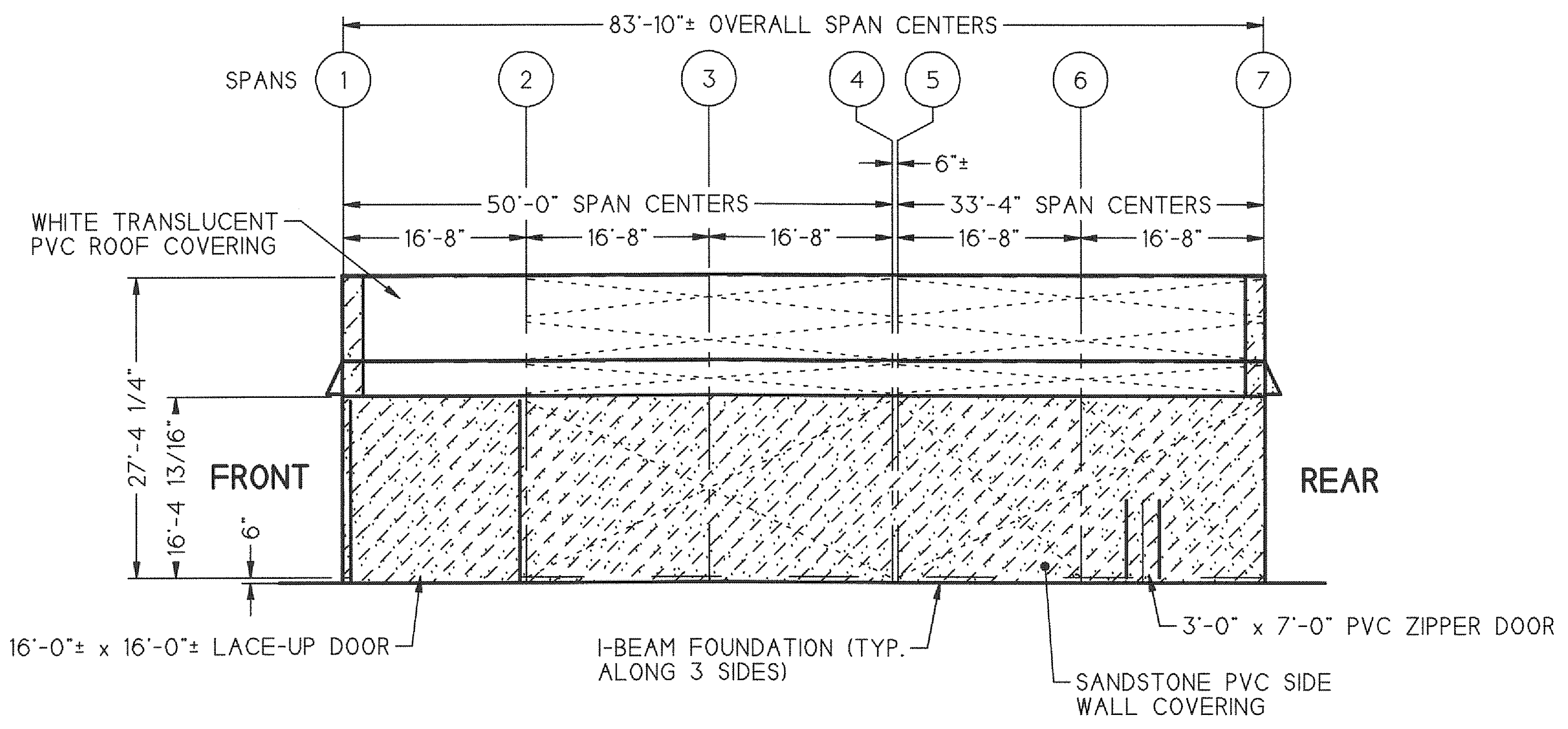


GABLE ELEVATION
FRONT GABLE

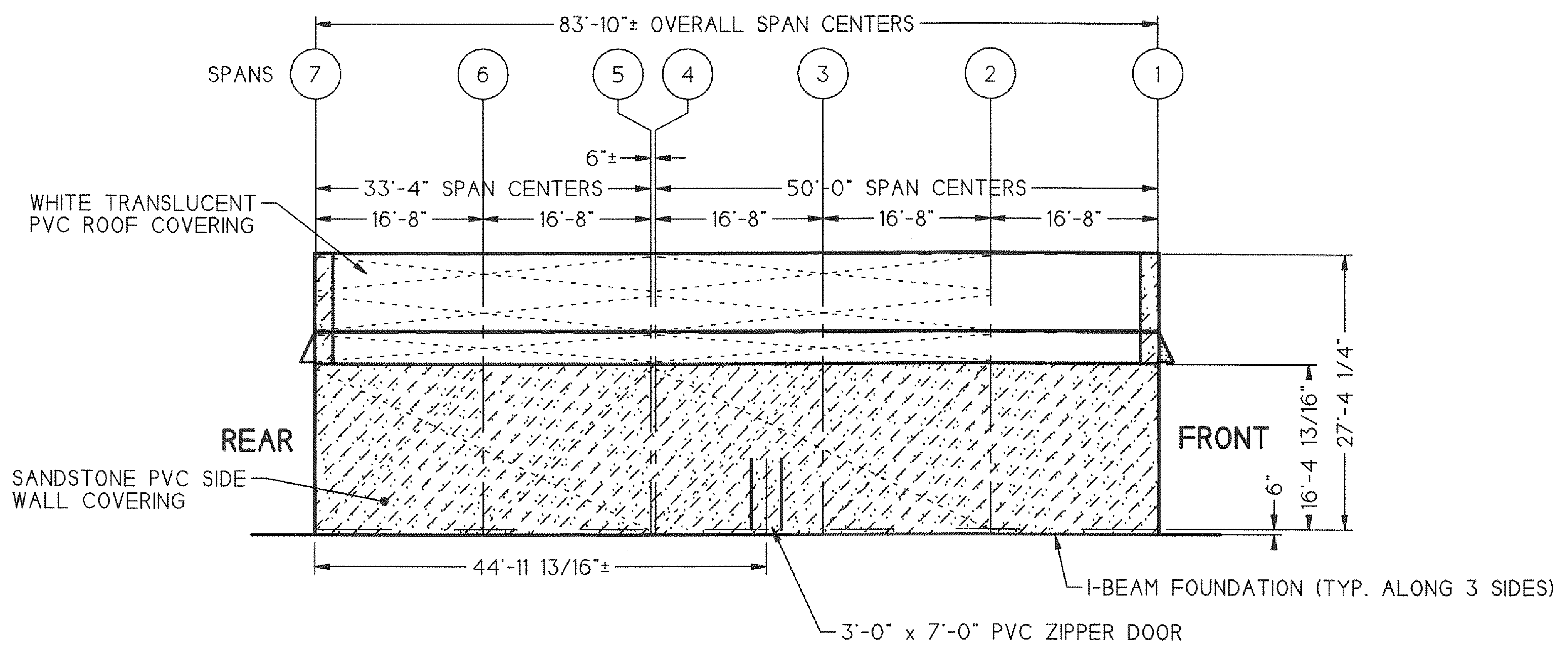
NOTE:
BALLAST BARS AND WEIGHTS NOT SHOWN FOR CLARITY.



GABLE ELEVATION
REAR GABLE



SIDE ELEVATION
RIGHT SIDE



SIDE ELEVATION
LEFT SIDE

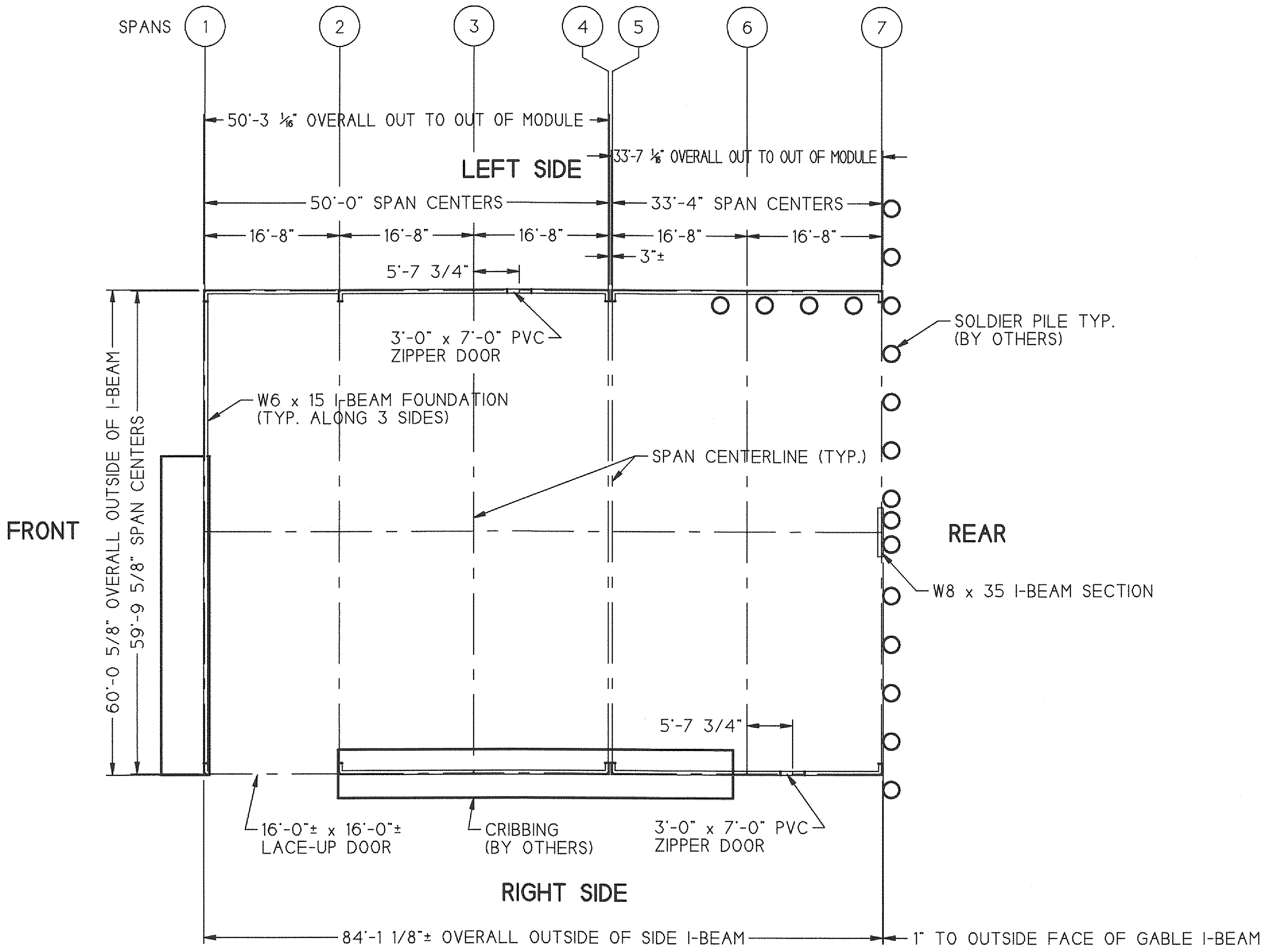
NOTES:
1.) COVERING MATERIAL IS A PVC IMPREGNATED POLYESTER WEAVE FABRIC SELF EXTINGUISHING TO FEDERAL TEST STANDARD 191 METHOD 5903 AND COMPLIES WITH NFPA STANDARD 701, UBC 55-1 AND CALIFORNIA STATE FIRE MARSHALL'S OFFICE.
2.) STRUCTURAL FRAMEWORK IS GALVANIZED TUBULAR STEEL TRUSS FRAMES INTERCONNECTED WITH GALVANIZED TUBULAR STEEL PURLINS. STEEL PLATE AND SHAPES ARE A36. STEEL TUBING IS A500.
3.) SEE DRAWING #50698 FOR INITIAL SETUP AND DRAWING #51163 FOR SECOND MOVE.

REV.	DESCRIPTION	DRAWN	APP.	DATE
B	REVISED FOR CONSTRUCTION	MRB	AR	10-31-12
A	REVISED FOR RESUBMITTAL.	MJG	AR	10/8/12

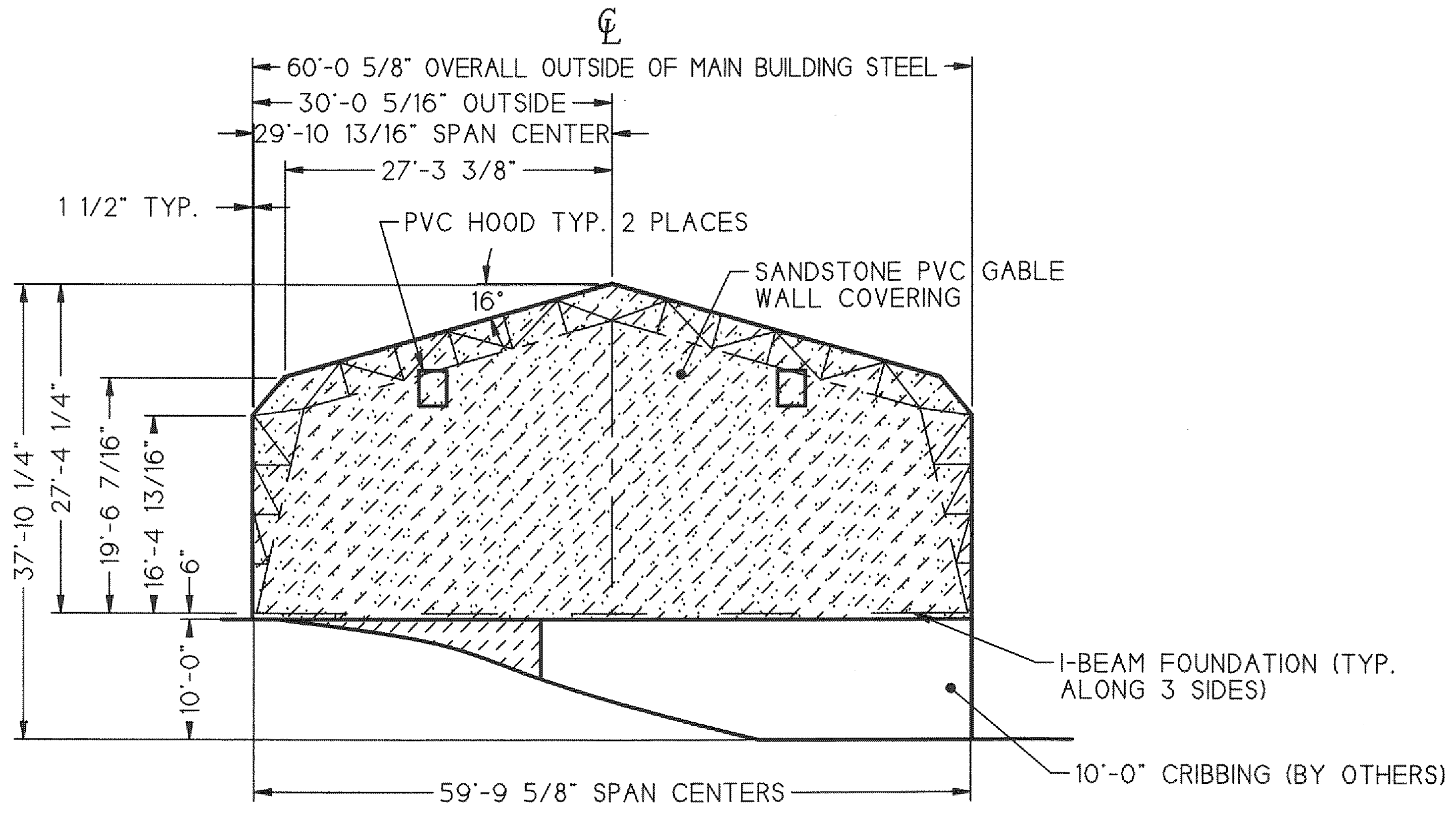
We Cover The World
RUBB
BUILDING SYSTEMS

TITLE
18.29m BVE / 5m LEG
PLAN VIEW & ELEVATIONS
THIRD MOVE - LOCATION #3

DRAWN MRB 9/23/12	SCALE 1 : 150	This drawing is the property of Rubb, Inc. and may not be reproduced or used for any manufacturing purpose without the express written consent of Rubb, Inc.
APP. AR 9-24-12	JOB # 12038	
DATE	JOB NAME PARSONS	
RUBB, INC. SANFORD MAINE 04073 TEL: 207-324-2877 FAX 207-324-2347		DRAWING NO. 51162

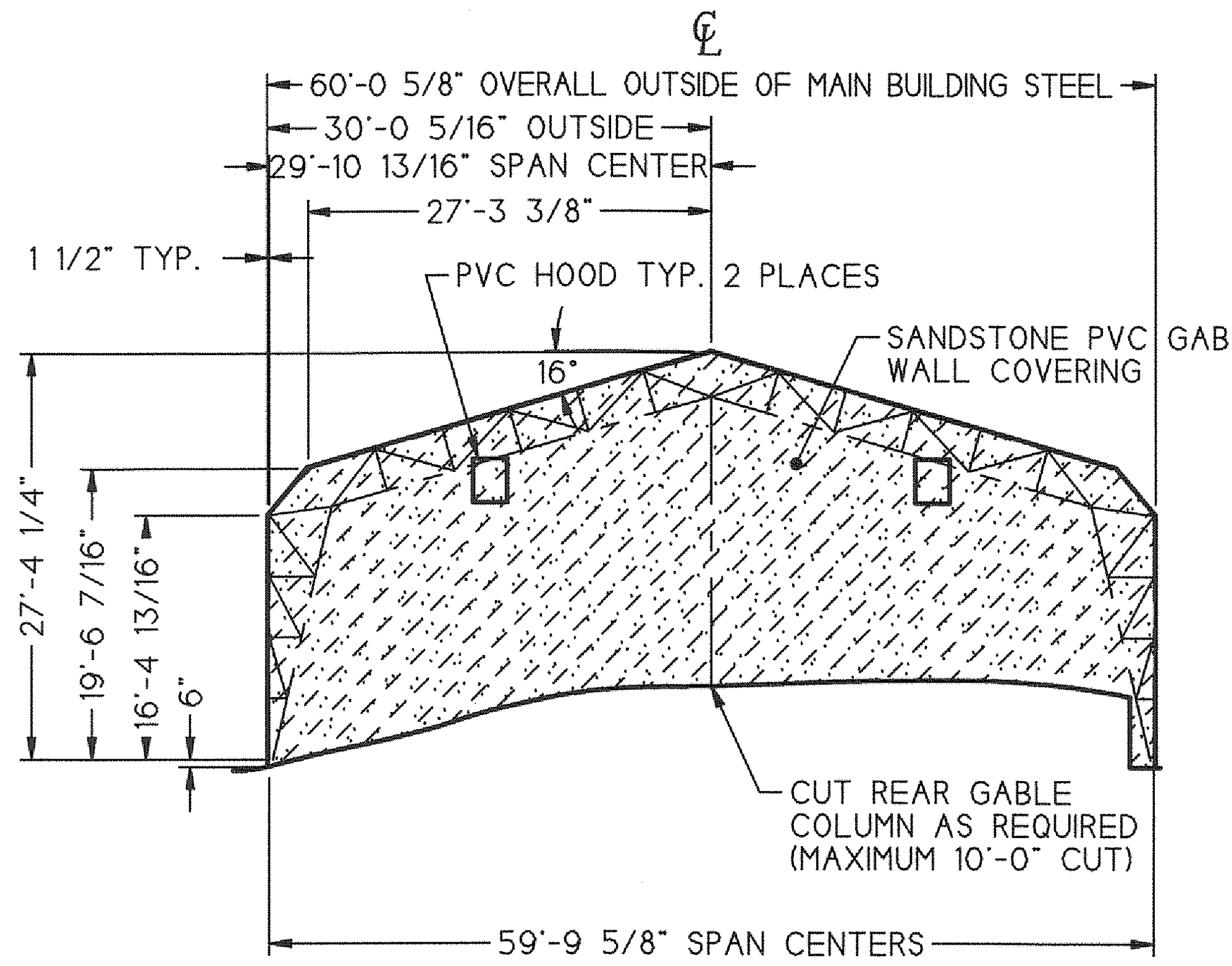


PLAN VIEW
2 MODULE CONFIGURATION
THIS SIDE TOWARDS GLENBROOK ROAD

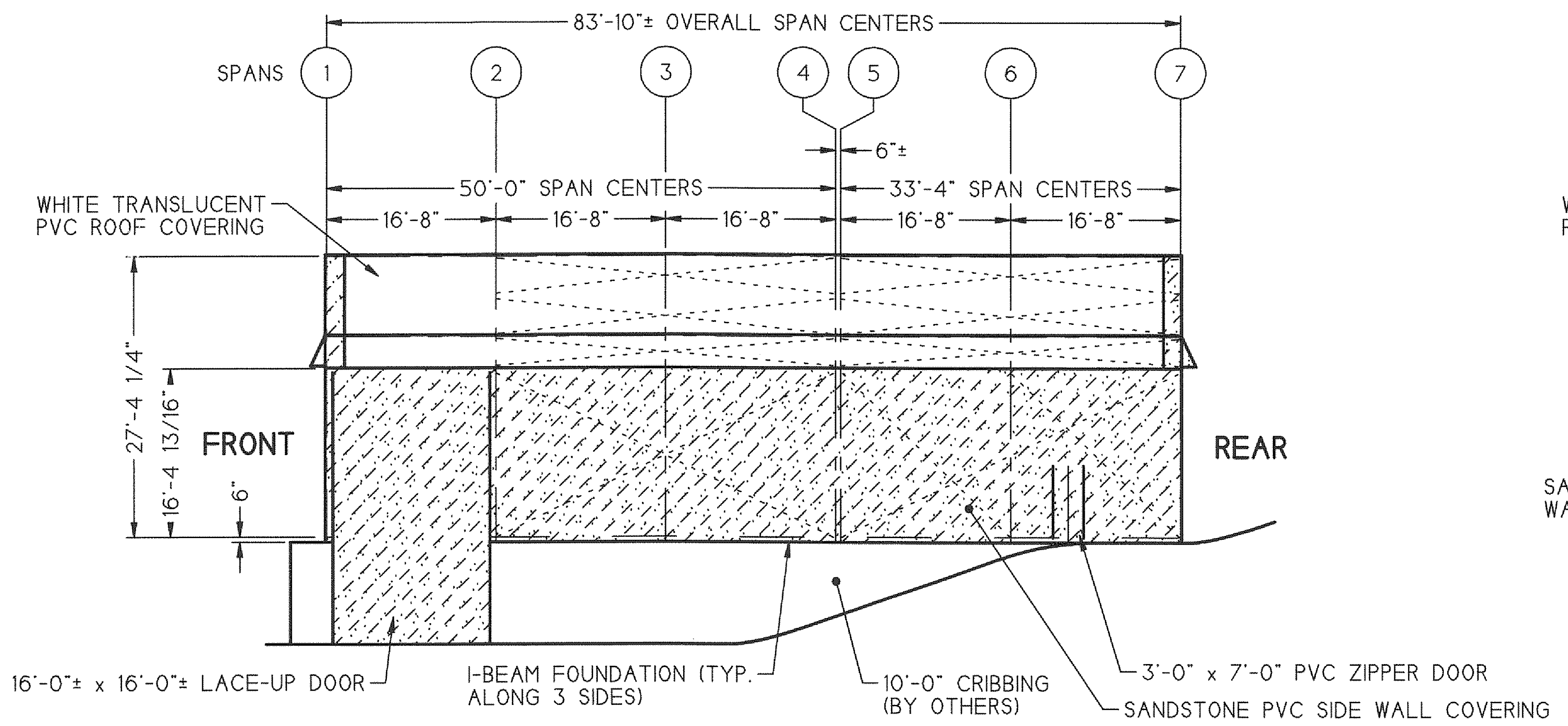


GABLE ELEVATION
FRONT GABLE

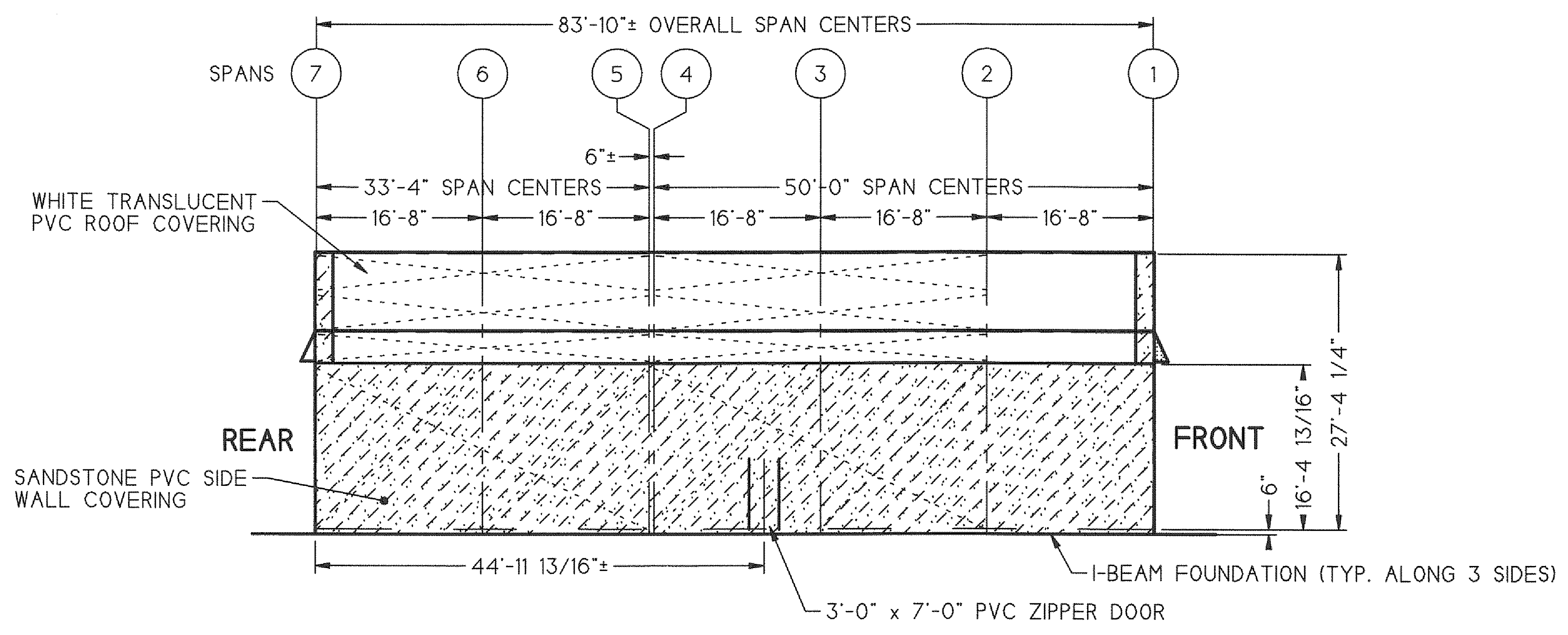
NOTE:
BALLAST BARS AND WEIGHTS
NOT SHOWN FOR CLARITY



GABLE ELEVATION
REAR GABLE



SIDE ELEVATION
RIGHT SIDE



SIDE ELEVATION
LEFT SIDE

NOTES:
1.) COVERING MATERIAL IS A PVC IMPREGNATED POLYESTER WEAVE FABRIC SELF EXTINGUISHING TO FEDERAL TEST STANDARD 191 METHOD 5903 AND COMPLIES WITH NFPA STANDARD 701, UBC 55-1 AND CALIFORNIA STATE FIRE MARSHALL'S OFFICE.
2.) STRUCTURAL FRAMEWORK IS GALVANIZED TUBULAR STEEL TRUSS FRAMES INTERCONNECTED WITH GALVANIZED TUBULAR STEEL PURLINS. STEEL PLATE AND SHAPES ARE A36. STEEL TUBING IS A500.
3.) SEE DRAWING #50698 FOR INITIAL SETUP AND DRAWING #51162 FOR THIRD MOVE.

REV.	DESCRIPTION	DRAWN	APP.	DATE
B	REVISED FOR CONSTRUCTION	MRB	AR	10-31-12
A	REVISED FOR RESUBMITTAL.	MJG	AR	10/8/12

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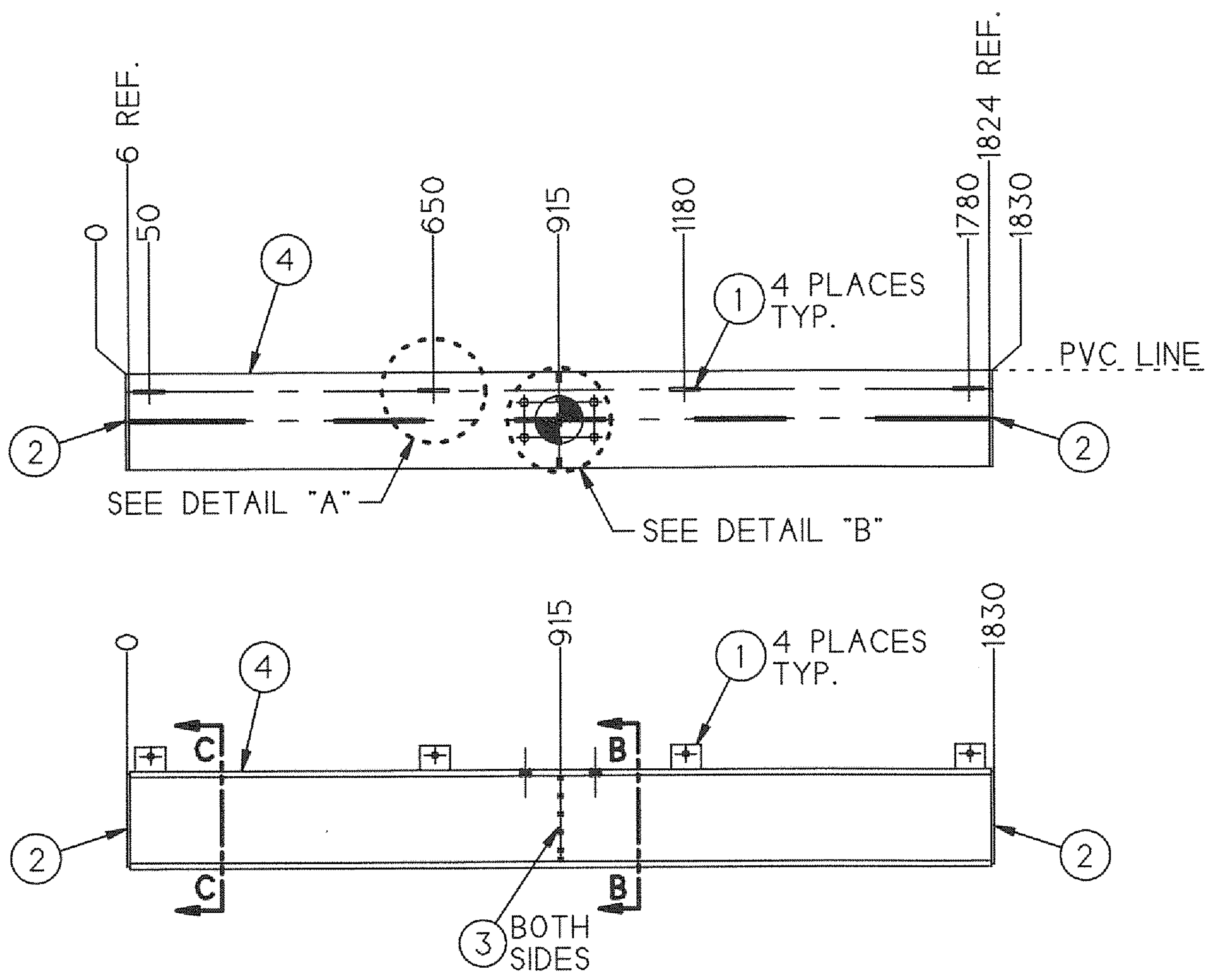
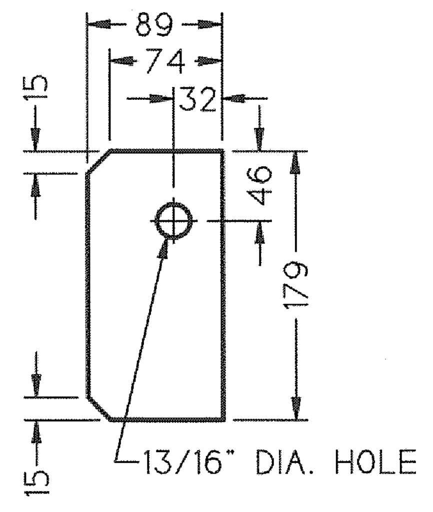
RUBB
BUILDING SYSTEMS

TITLE
18.29m BVE / 5m LEG
PLAN VIEW & ELEVATIONS
SECOND MOVE - LOCATION #2

DRAWN MRB 9/21/12	SCALE 1 : 150	This drawing is the property of Rubb, Inc. and may not be reproduced or used for any manufacturing purpose without the express written consent of Rubb, Inc.
APP. AR 9/24/12	JOB # 12038	
DATE	JOB NAME PARSONS	
RUBB, INC. SANFORD MAINE 04073 TEL: 207-324-2877 FAX 207-324-2347		DRAWING NO. 51163

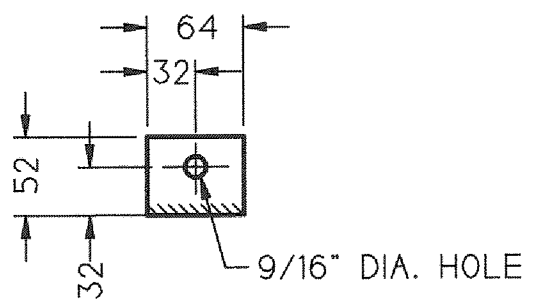


ASSEMBLY F6



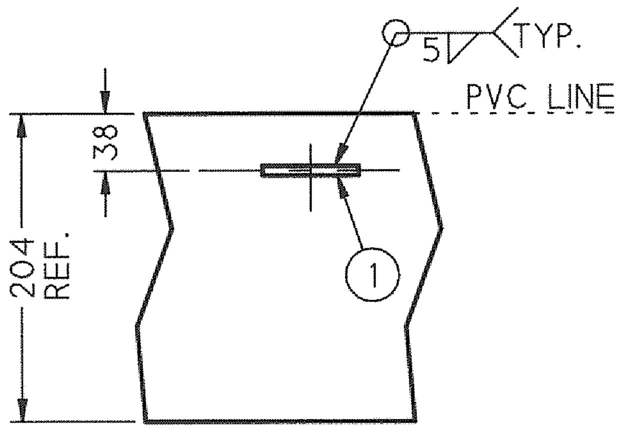
DETAIL ITEM 3

3x SCALE



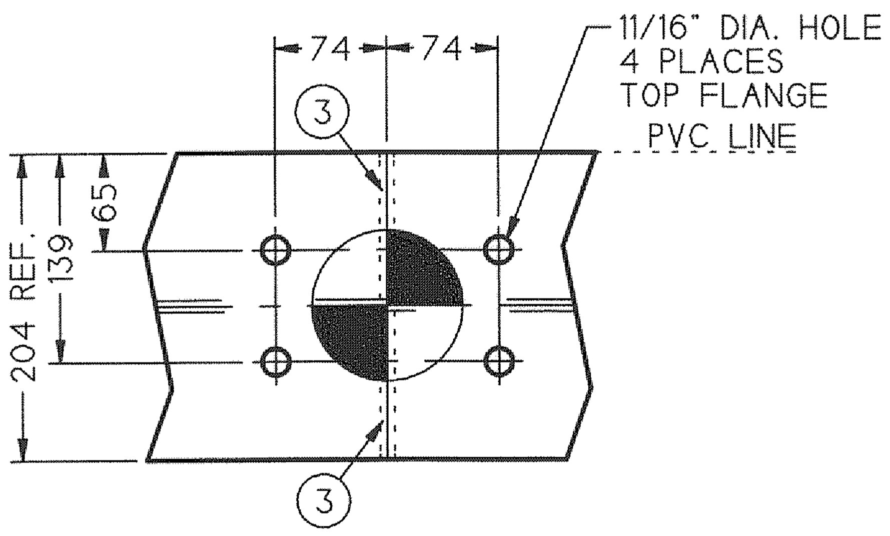
DETAIL ITEM 1

"52" LUG
3x SCALE



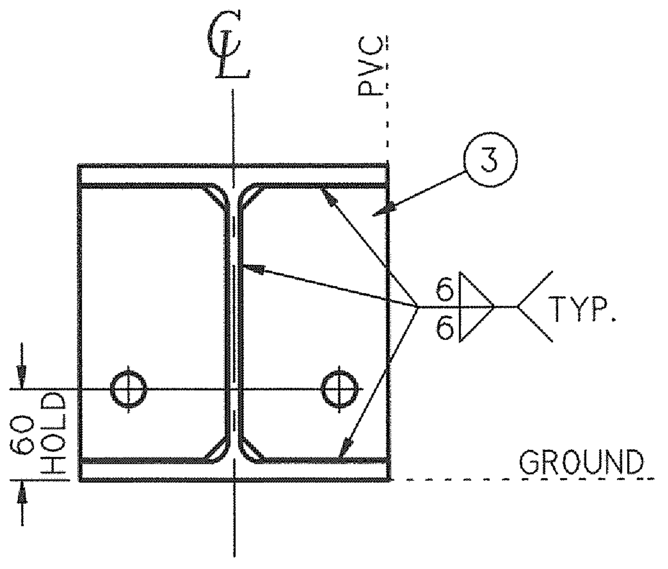
DETAIL "A"

3x SCALE



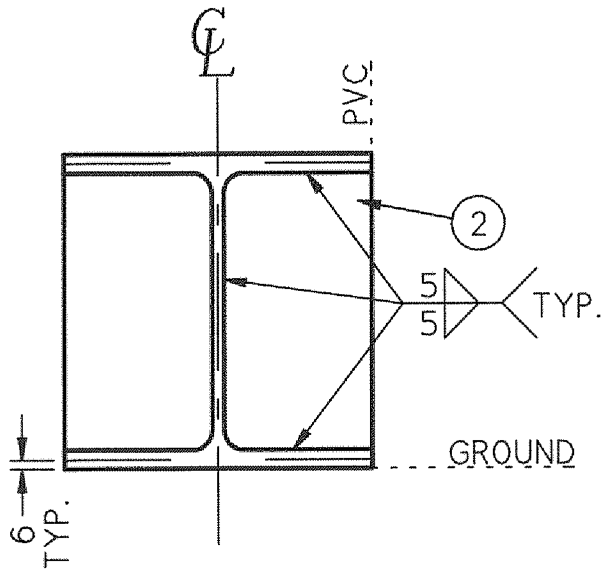
DETAIL "B"

3x SCALE



SECTION "B-B"

3x SCALE
BALLAST BAR LUG



SECTION "C-C"

3x SCALE

ITEM	QTY.	DESCRIPTION	SPEC.
1	4	FLAT 2 1/2" x 1/4" x 52	A36
2	2	FLAT 8" x 1/4" x 194	A36
3	2	FLAT 3 1/2" x 3/8" x 179	A36
4	1	W 8 x 35 x 1817	A992
5	-	-	-
6	-	-	-
7	-	-	-
8	-	-	-

NOTES:
1.) BREAK SHARP CORNERS FOR PVC.
2.) SEE DWG. 11006 FOR GENERAL WELD NOTES.
3.) BILL OF MATERIAL IS FOR ONE ASSEMBLY.
4.) SEE I-BEAM FOUNDATION LAYOUT FOR LOCATION.
5.) DIMENSIONS NOT LABELED WITH UNITS ARE IN MILLIMETERS.

REV.	DESCRIPTION	DRAWN	APP.	DATE

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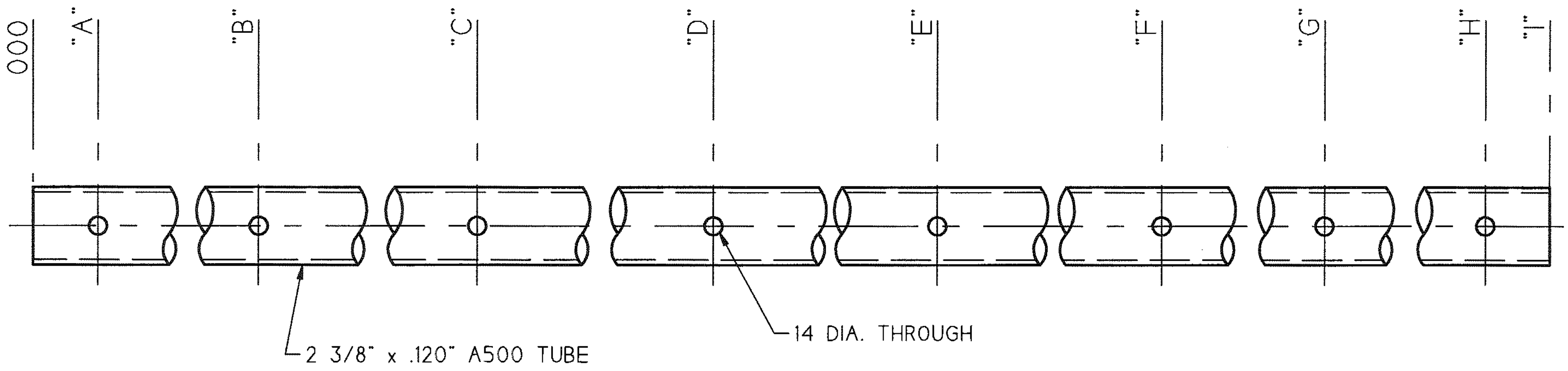
RUBB
BUILDING SYSTEMS

TITLE
18.29m BVE / 5m LEG
GABLE I-BEAM FOUNDATION
ASSEMBLY F6

DRAWN MRB 10/23/12	SCALE 1 : 15	This drawing is the property of Rubb, Inc. and may not be reproduced or used for any manufacturing purpose without the express written consent of Rubb, Inc.
APP. AR 10-21-12	JOB # 12038	
DATE 10/31/12	JOB NAME PARSONS	
RUBB, INC. SANFORD MAINE 04073 TEL: 207-324-2877 FAX 207-324-2347		DRAWING NO. 51232



NOTES:
1.) BREAK SHARP CORNERS FOR PVC.
2.) DIMENSIONS NOT LABELED WITH UNITS ARE IN MILLIMETERS.
3.) ALL A500 MATERIAL TO BE Fy = 50 ksi MINIMUM.
4.) BILL OF MATERIALS IS FOR ENTIRE JOB.

REV.	DESCRIPTION	DRAWN	APP.	DATE

We Cover The World
RUBB
BUILDING SYSTEMS

TITLE
18.29m BVE / 5m LEG
POCKET TUBES

DRAWN MRB 10/25/12
SCALE 1 : 5
APP. JR 10-29-12
JOB # 12038
DATE 11/5/12
JOB NAME PARSONS

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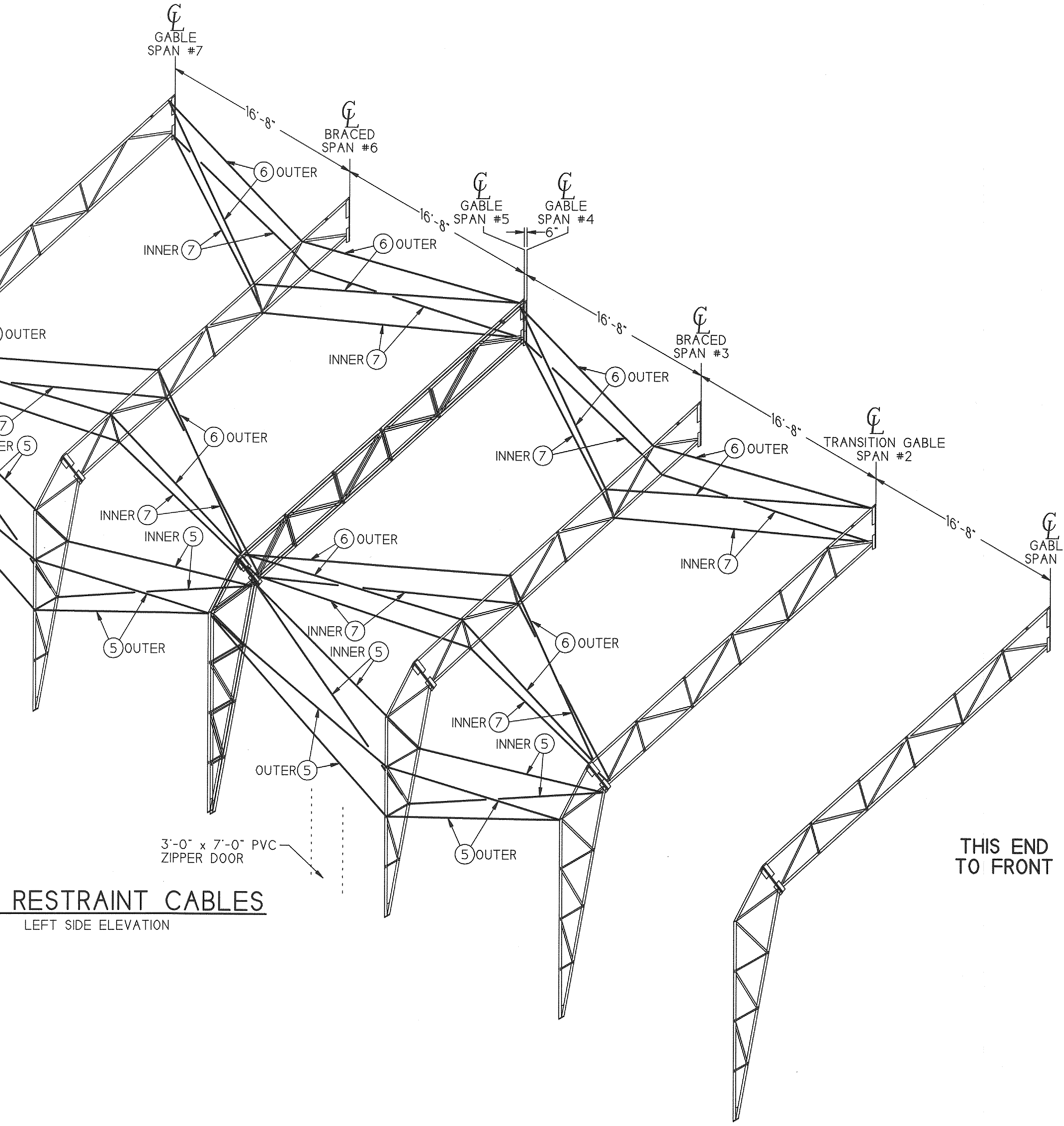
RUBB, INC. SANFORD MAINE 04073
TEL: 207-324-2877 FAX 207-324-2347

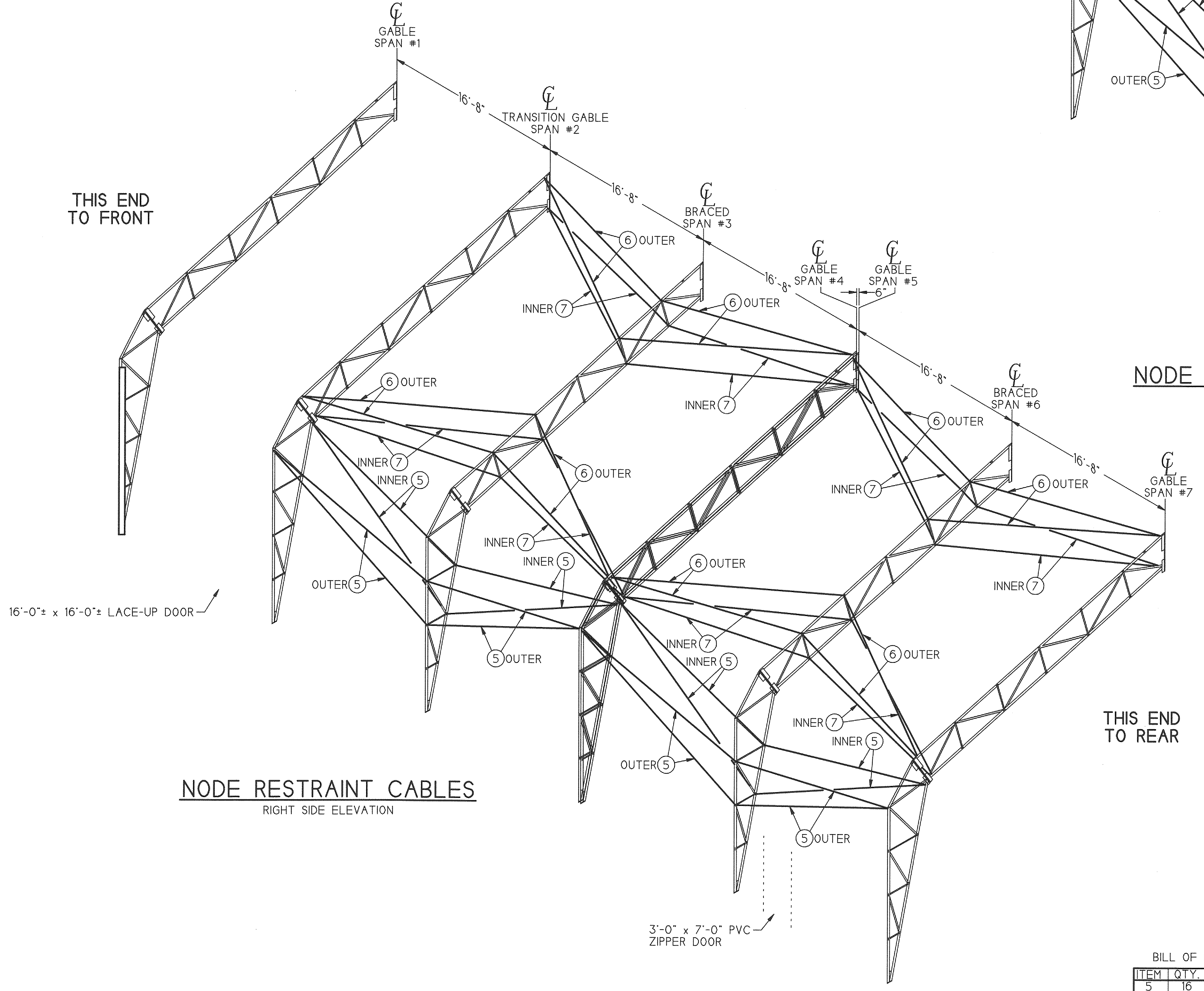
DRAWING NO. 51255

ITEM	QTY.	TYPE	"A"	"B"	"C"	"D"	"E"	"F"	"G"	"H"	"I"
TT7	15	SIDES AND GABLES	450	1450	2450	3450	4450	-	-	-	4900
-	-	-	-	-	-	-	-	-	-	-	-



NODE RESTRAINT CABLES

LEFT SIDE ELEVATION



NODE RESTRAINT CABLES

RIGHT SIDE ELEVATION

NOTE:
CRIBBING WALL, GABLE STEEL & AXIAL STEEL
NOT SHOWN FOR CLARITY.

BILL OF MATERIAL IS FOR TOTAL QUANTITY REQUIRED

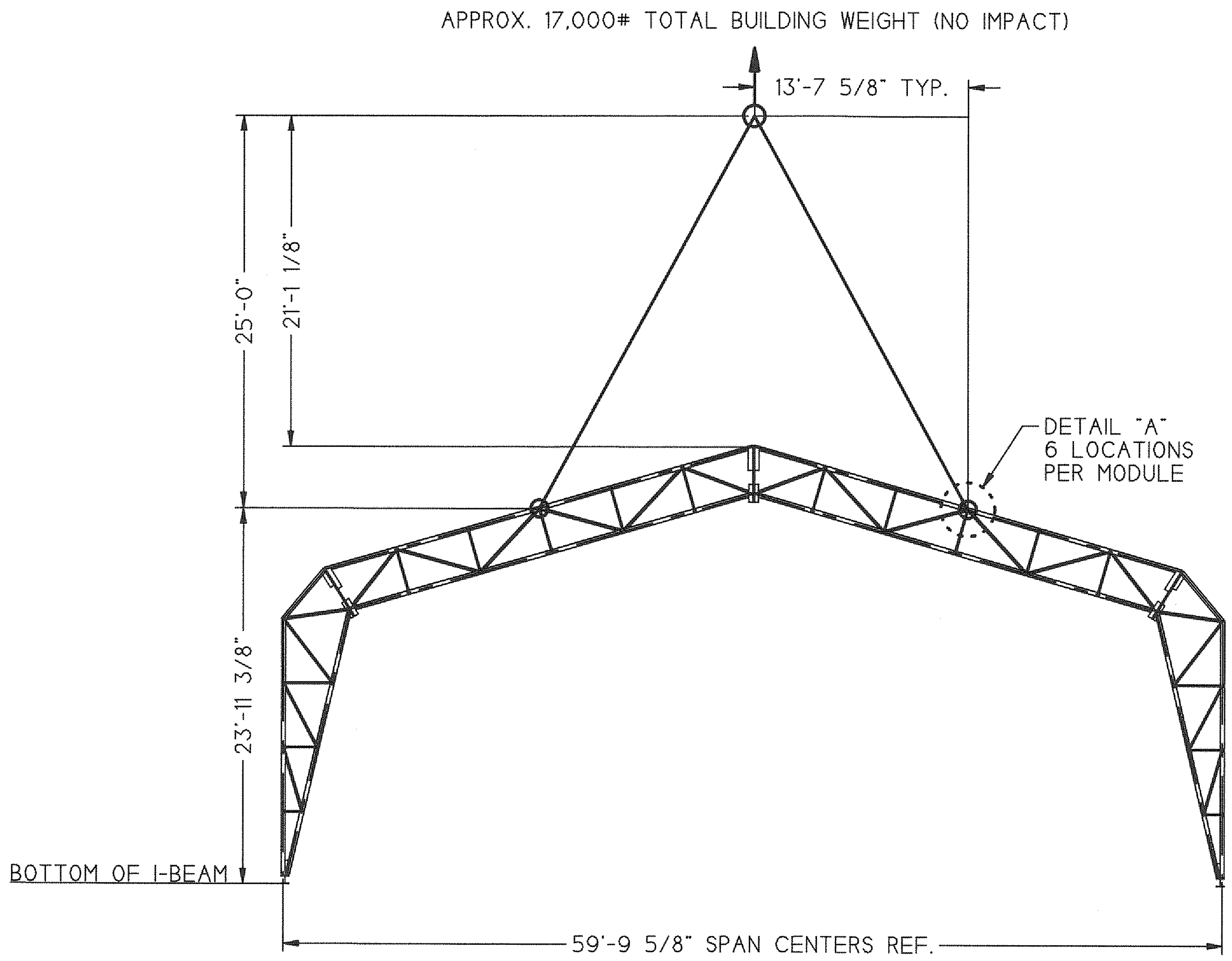
ITEM	QTY.	DESCRIPTION	DRAWING
5	16	UPPER LEG INNER & OUTER	40087
6	16	ROOF OUTER	40087
7	16	ROOF INNER	40087

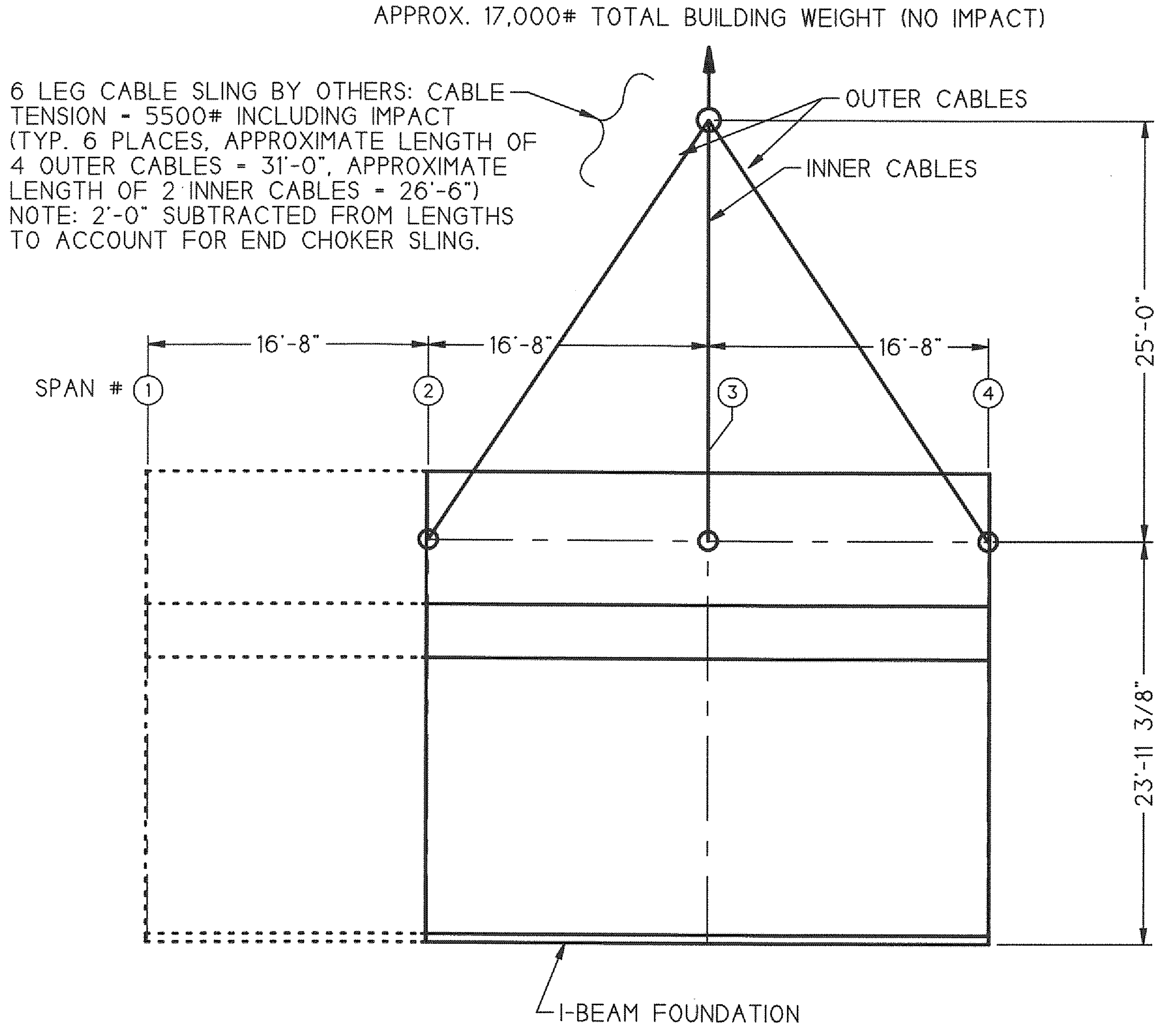
REV.	DESCRIPTION	DRAWN	APP.	DATE

We Cover The World
RUBB
BUILDING SYSTEMS

TITLE
18.29m BVE / 5m LEG
NODE RESTRAINT ISOMETRIC

DRAWN MRB 10/26/12	SCALE 1 : 75	This drawing is the property of Rubb, Inc. and may not be reproduced or used for any manufacturing purpose without the express written consent of Rubb, Inc.
APP. AR 11-1-12	JOB # 12038	
DATE GS 11/2/12	JOB NAME PARSONS	
RUBB, INC. SANFORD MAINE 04073 TEL: 207-324-2877 FAX 207-324-2347		DRAWING NO. 51265

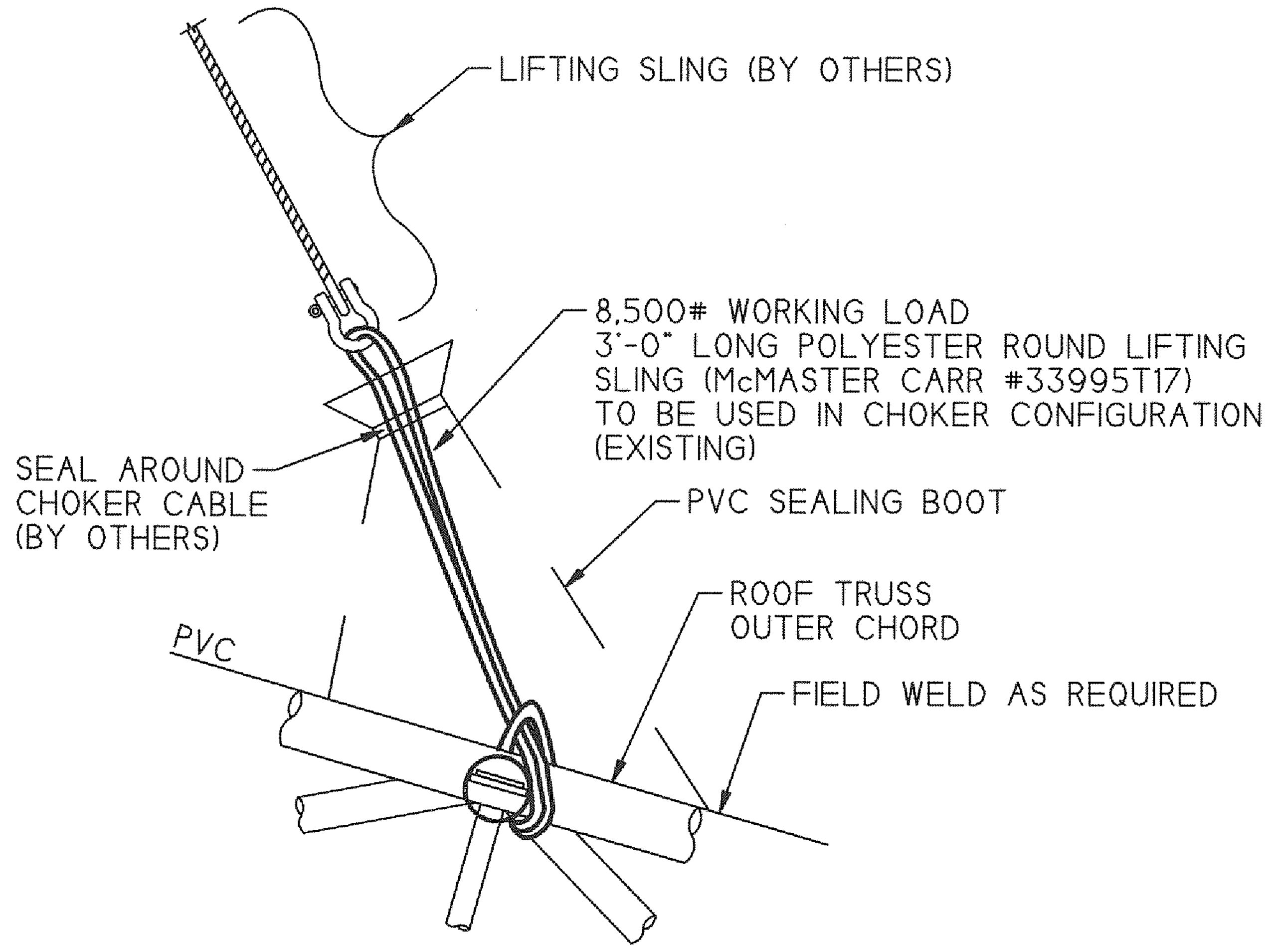




6 LEG CABLE SLING BY OTHERS: CABLE TENSION = 5500# INCLUDING IMPACT (TYP. 6 PLACES, APPROXIMATE LENGTH OF 4 OUTER CABLES = 31'-0", APPROXIMATE LENGTH OF 2 INNER CABLES = 26'-6")
NOTE: 2'-0" SUBTRACTED FROM LENGTHS TO ACCOUNT FOR END CHOKER SLING.

STRUCTURE NOT TO BE LIFTED WITH ANY SNOW PRESENT. REMOVE ALL SNOW PRIOR TO LIFTING.

3 BAY NORTH MODULE SHOWN.
2 BAY SOUTH MODULE SIMILAR.



8,500# WORKING LOAD 3'-0" LONG POLYESTER ROUND LIFTING SLING (McMASTER CARR #33995T17) TO BE USED IN CHOKER CONFIGURATION (EXISTING)

DETAIL "A"
10x SCALE
TYP. 6 PLACES

FIELD NOTE:
DISCONNECT ALL AXIAL STEEL AND I-BEAM BETWEEN SPANS 1 AND 2. FOLD 50'-0" PVC SHEET BACK ONTO ITSELF. LIFT REMAINING 3 SPANS (2 BAYS) AS SHOWN.

NOTE:
BUILDING IS DESIGNED TO BE LIFTED IN EXACT CONFIGURATION SHOWN. ANY CHANGES MUST BE APPROVED BY RUBB, INC. PRIOR TO LIFTING.

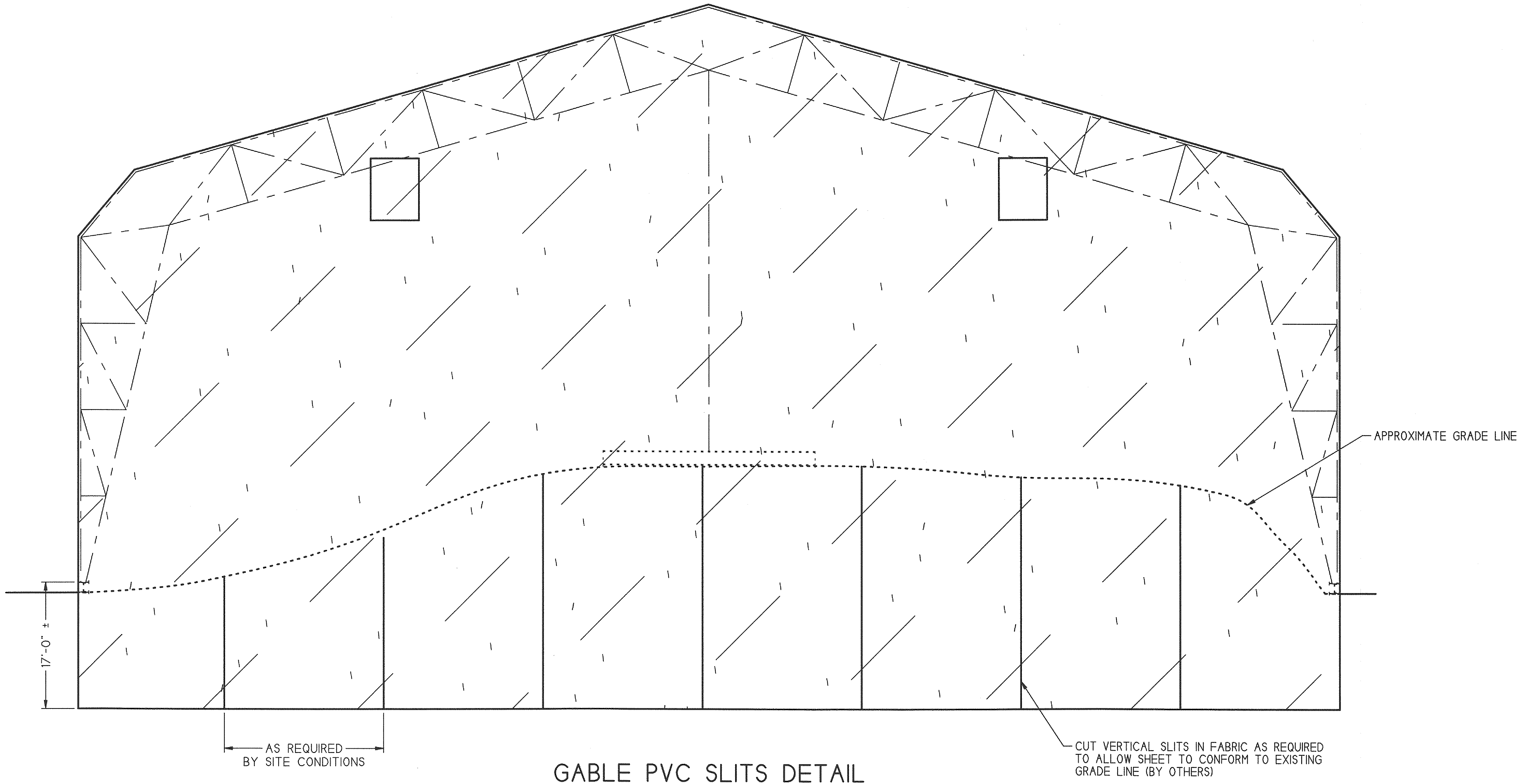
REV.	DESCRIPTION	DRAWN	APP.	DATE

We Cover The World
RUBB
BUILDING SYSTEMS

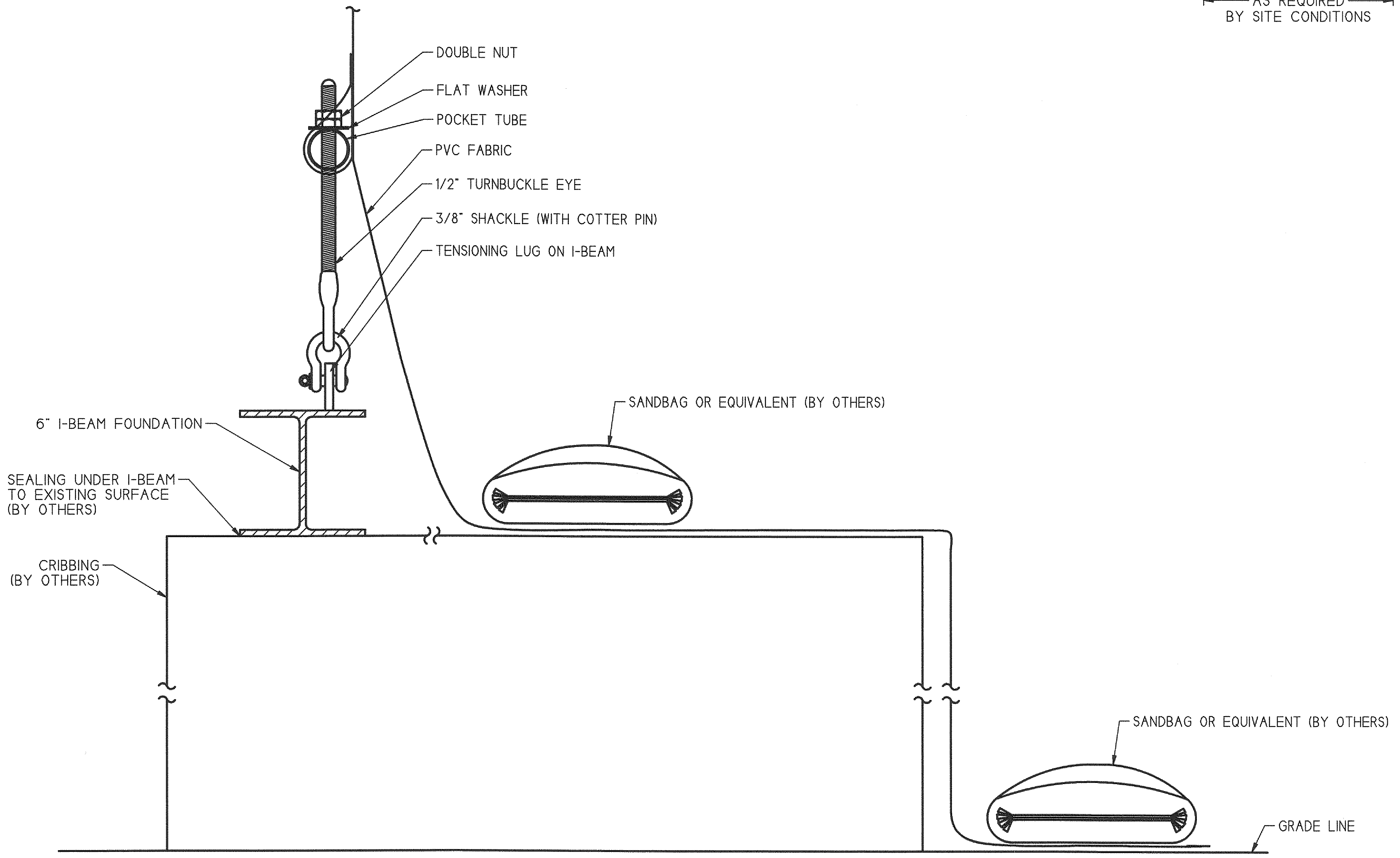
TITLE
18.29m BVE / 5m LEG
LIFTING CONFIGURATION

DRAWN MRB 10/31/12	SCALE 1 : 100	This drawing is the property of Rubb, Inc. and may not be reproduced or used for any manufacturing purpose without the express written consent of Rubb, Inc.	
APP. AR 10-31-12	JOB # 12038		
DATE 11/2/12	JOB NAME PARSONS	DRAWING NO. 51282	

RUBB, INC. SANFORD MAINE 04073
TEL: 207-324-2877 FAX 207-324-2347

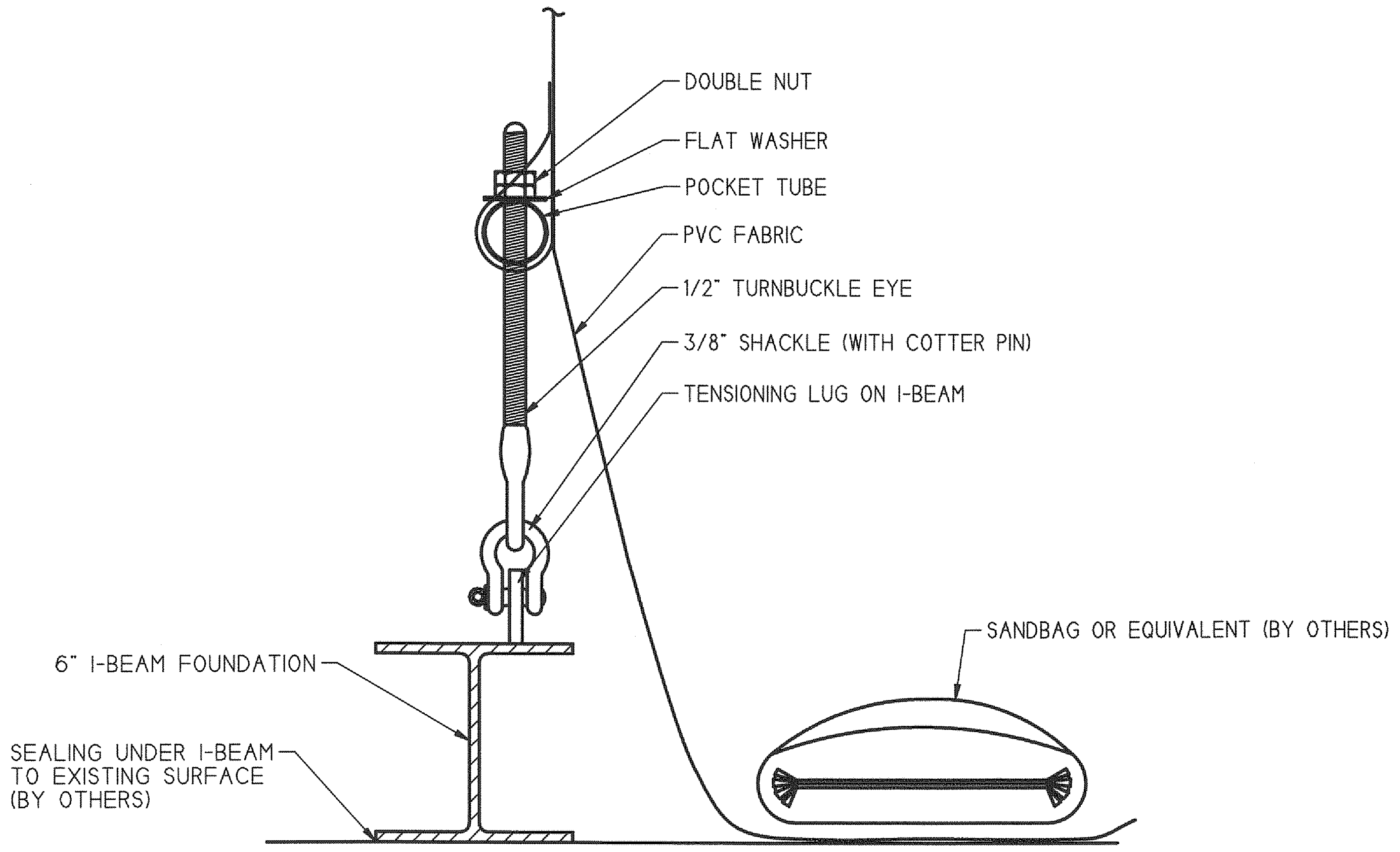


GABLE PVC SLITS DETAIL



TENSIONING & SEALING AT FOUNDATION

AT CRIBBING



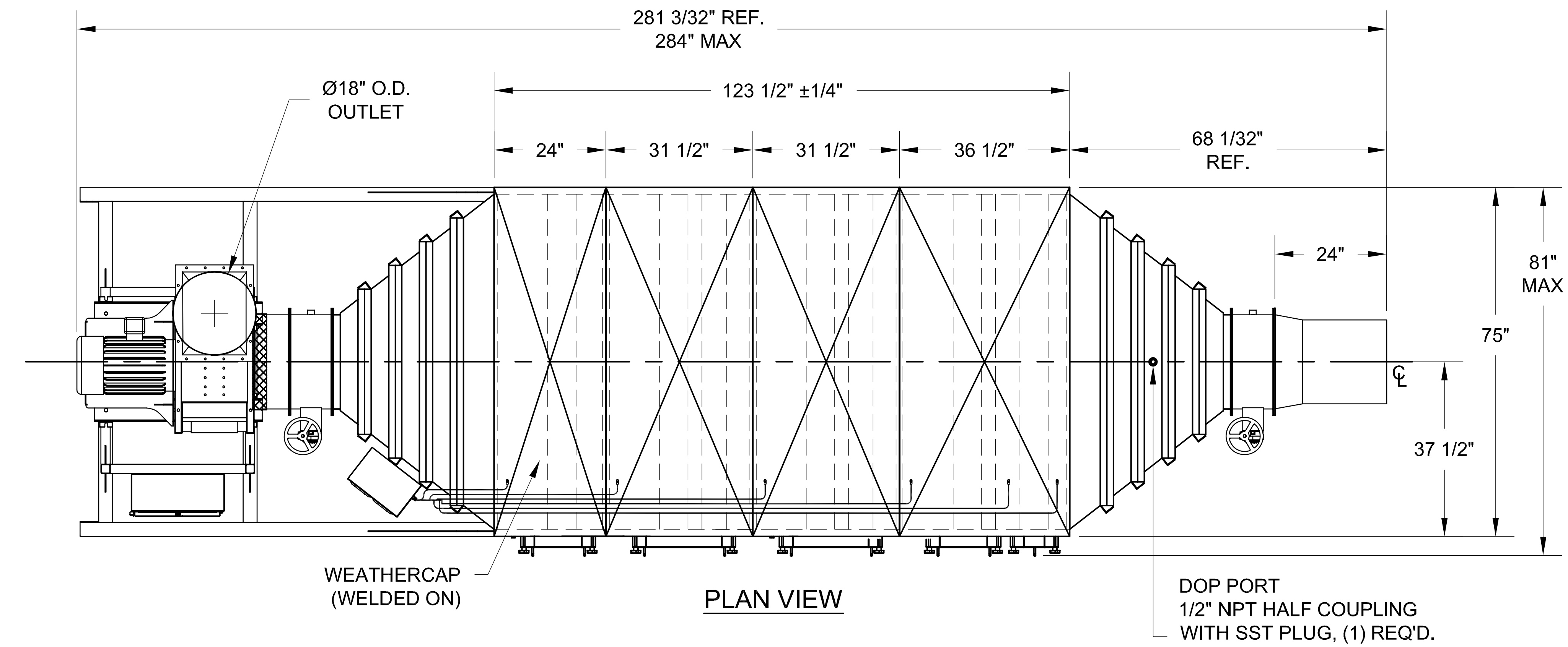
TENSIONING & SEALING AT FOUNDATION

AT GRADE

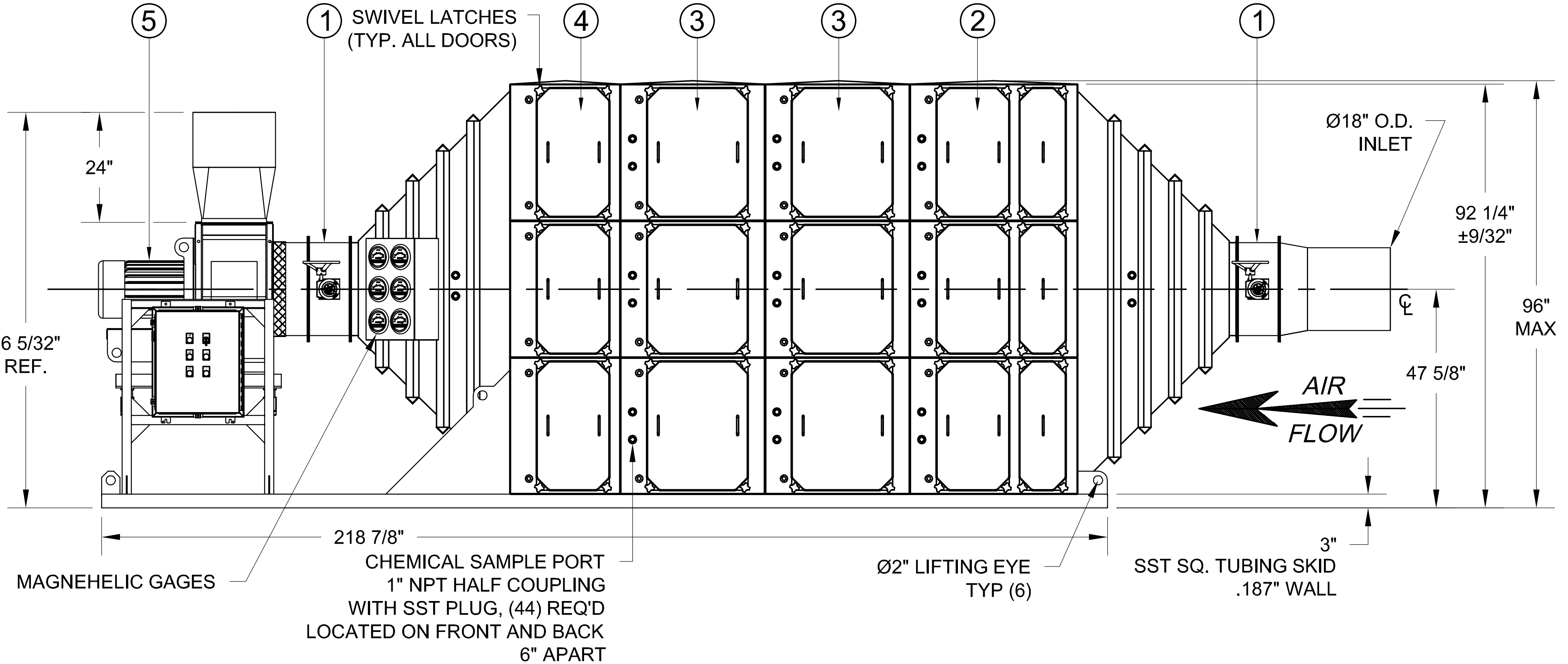
REV.	DESCRIPTION	DRAWN	APP.	DATE

We Cover The World RUBB BUILDING SYSTEMS	TITLE 18.29m BVE / 5m LEG TENSIONING AND SEALING DETAILS 2 OF 2 DRAWINGS	
DRAWN MRB 10/31/12	SCALE 1 : 4	This drawing is the property of Rubb, Inc. and may not be reproduced or used for any manufacturing purpose without the express written consent of Rubb, Inc.
APP. 11-5-12	JOB # 12038	
DATE 11/7/12	JOB NAME PARSONS	
RUBB, INC. SANFORD MAINE 04073 TEL: 207-324-2877 FAX 207-324-2347		DRAWING NO. 51283

ATTACHMENT M-4
CAFS CONFIGURATION



PLAN VIEW



ACCESS VIEW

SYSTEM COMPONENTS

ITEM	DESCRIPTION
①	DBT-M-20-304 FLAT BLADE DAMPER
②	GB3-612P-30H30W-304 PREFILTER/HEPA HOUSING
③	GB1-018C-30H30W-304 CARBON ADSORBER HOUSING
④	GB1-012P-30H30W-304 HEPA HOUSING
⑤	CINCINNATI FAN: MODEL SQBI-180, 15 HP 3450 RPM 230/460/3

GENERAL NOTES

1. ONE (1) UNIT REQUIRED, SHOWN AS RIGHT HAND ACCESS.
2. A MINIMUM FOUR (4) FEET OF CLEARANCE IN FRONT OF THE ACCESS DOOR IS RECOMMENDED FOR FILTER CHANGE-OUT.
3. UNIT IS DESIGNED TO ACCOMODATE THE FOLLOWING FILTERS:
   NINE (9) 24"X24"X6" (NOM.) PREFILTERS
   NINE (9) 24"X24"X18" (NOM.) CARBON ADSORBERS
   NINE (9) 24"X24"X11-1/2" FINAL FILTERS
4. AN INITIAL SET OF BAGS AND STRAPS SHALL BE INCLUDED.
5. HOUSING SHALL BE CONSTRUCTED FROM 12GA AND 14GA T-304 S/S. HARDWARE WILL BE 300 SERIES S/S EXCEPT FOR ALUMINUM STAR KNOBS AND BRASS LOCKING TRAY NUT.
6. UNIT TESTED BY ASME N510, 1989, 1995 REAFFIRMED TO ±10" W.G.
7. ONE (1) FILTER REMOVAL TRAY SHALL BE PROVIDED.
8. SPARE FAN TO SHIP SEPERATE.

GAGE INFORMATION

VENDOR:	DWYER
MODEL (PRE):	2001
RANGE:	0-1" W.G.
MODEL (HEPA):	2003
RANGE:	0-3" W.G.
MODEL (ADSORBER):	2005
RANGE:	0-5" W.G.
MODEL (OVERALL):	2015
RANGE:	0-15" W.G.
FITTINGS:	300 STAINLESS
TUBING:	1/4" STAINLESS

APPROVAL PRINT

☐ APPROVED
☐ APPROVED AS NOTED
☐ REVISE AND RESUBMIT

SIGNATURE: ____________________
DATE: ____________________

P&G MANUFACTURING

WASHINGTON N.C. 27889
PHONE NO.: 252-946-9110
FAX NO.: 252-946-4823

REV.	DRAWN BY DATE	DESCRIPTION:	APPR. BY DATE

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UNLESS OTHERWISE SPECIFIED
- ALL DIMENSIONS ARE IN INCHES
- TOLERANCES ARE: FRACTION: ±1/8" DECIMAL: ±.125" ANGULAR: ±1°

DRAWN BY: JWW	TITLE CHEMICAL WARFARE MATERIAL 5600 CFM AIR FILTER UNIT				
DATE: 4/1/09					
APPROVED BY: CWR	CONTROL NO.				DWG SCALE: NTS
DATE: 4/1/09	DRAWING NO.: 09-050	SHEET 1	OF 5	REV. 0	

DIMSCALE: 32 TEXT HEIGHT: 3

ATTACHMENT M-5
SOLDIER PILES AND LAGGING DESIGN

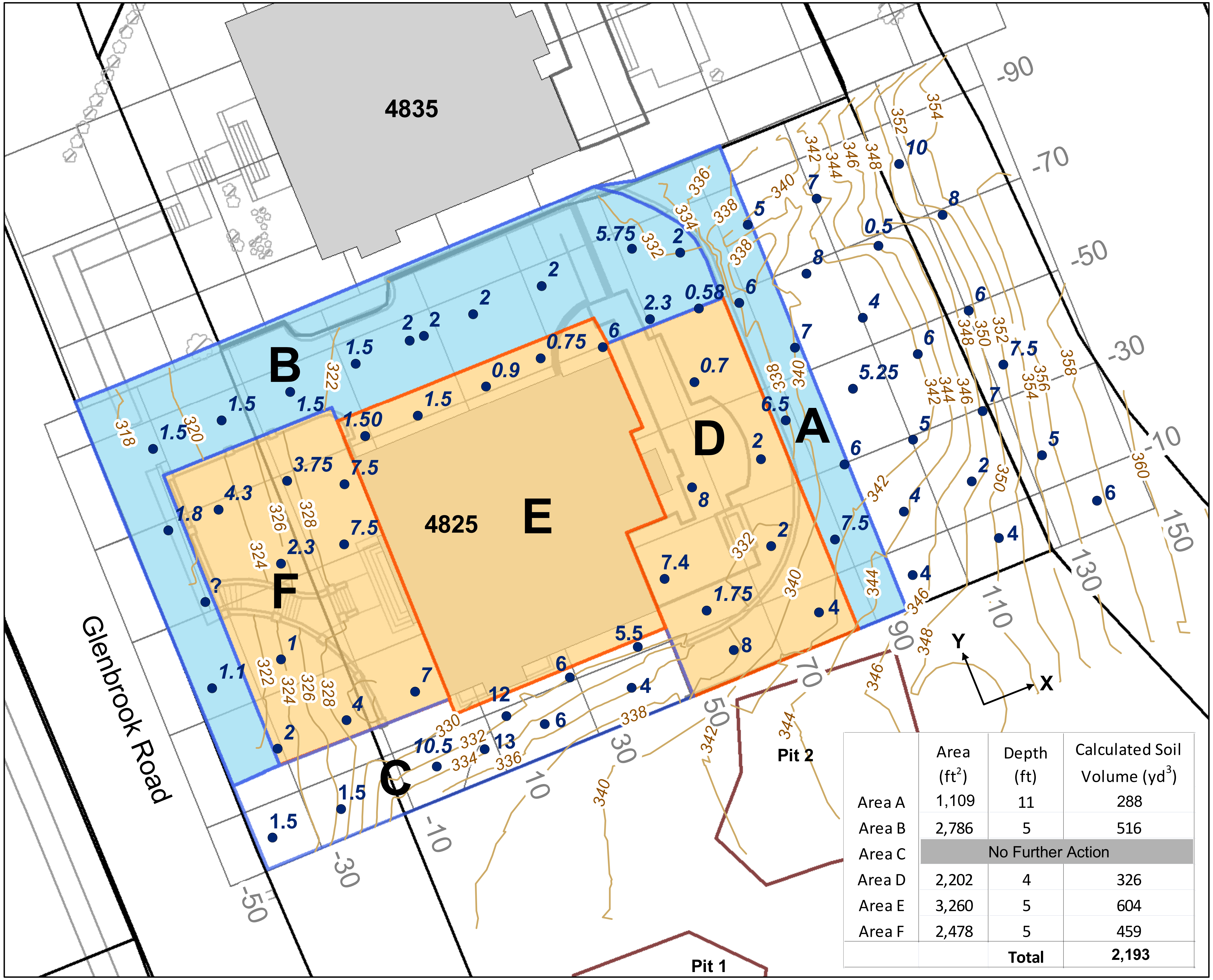
Soldier Piles and Lagging Design

Soldier piles and lagging will be installed to maintain the slope stability for the RA activities. The proposed locations of the soldier piles and lagging are illustrated in the Figure 3-2 of Appendix M.

Based on a site visit performed by Creative Concepts Group, Inc. (CCGI), crane will be used to install the soldier piles and lagging. If possible, the crane will be sitting in the basement slab of the demolished house for the installation. The crane may also need to sit at the back edge of the property in the AU parking lot if soldier piles are out of the crane reach.

The design was based on information collected from the geotechnical borings, saprolite information collected from test pits investigation, and excavation of Burial Pit 3 and its extensions. The estimated depth to saprolite for the site is included in Figure 1. The estimated length of the soldier piles are illustrated in Figure 2. A diagram of the soldier piles and lagging is included in Figure 3. For the piles along the 4825/4801 GR property line, a front face concrete recasting lagging will be used as a permanent solution for the slope stability for the 4801 Glenbrook Road. The soldier piles and lagging for the rest of the property will be temporary wood construction. An example of the installed concrete precast lagging is illustrated in the attached photo.

Holes that will be augered in for the piles will most likely be 24 inches in diameter, which may vary dependent on final design. Piles are typically 8 feet on center. Spoil gathering would be done with a mini excavator.



	Area (ft²)	Depth (ft)	Calculated Soil Volume (yd³)
Area A	1,109	11	288
Area B	2,786	5	516
Area C	No Further Action		
Area D	2,202	4	326
Area E	3,260	5	604
Area F	2,478	5	459
		Total	2,193

Figure 1
Estimated Depths to Saprolite
4825 Glenbrook Road

Spring Valley
Washington, D.C.

Legend

- ▨ Buildings
- ☐ Property Boundaries
- ☐ 20' Grid
- — Pits 1 and 2
- • Depth to Saprolite
- ⁄ Elevation Contours

Excavation Area

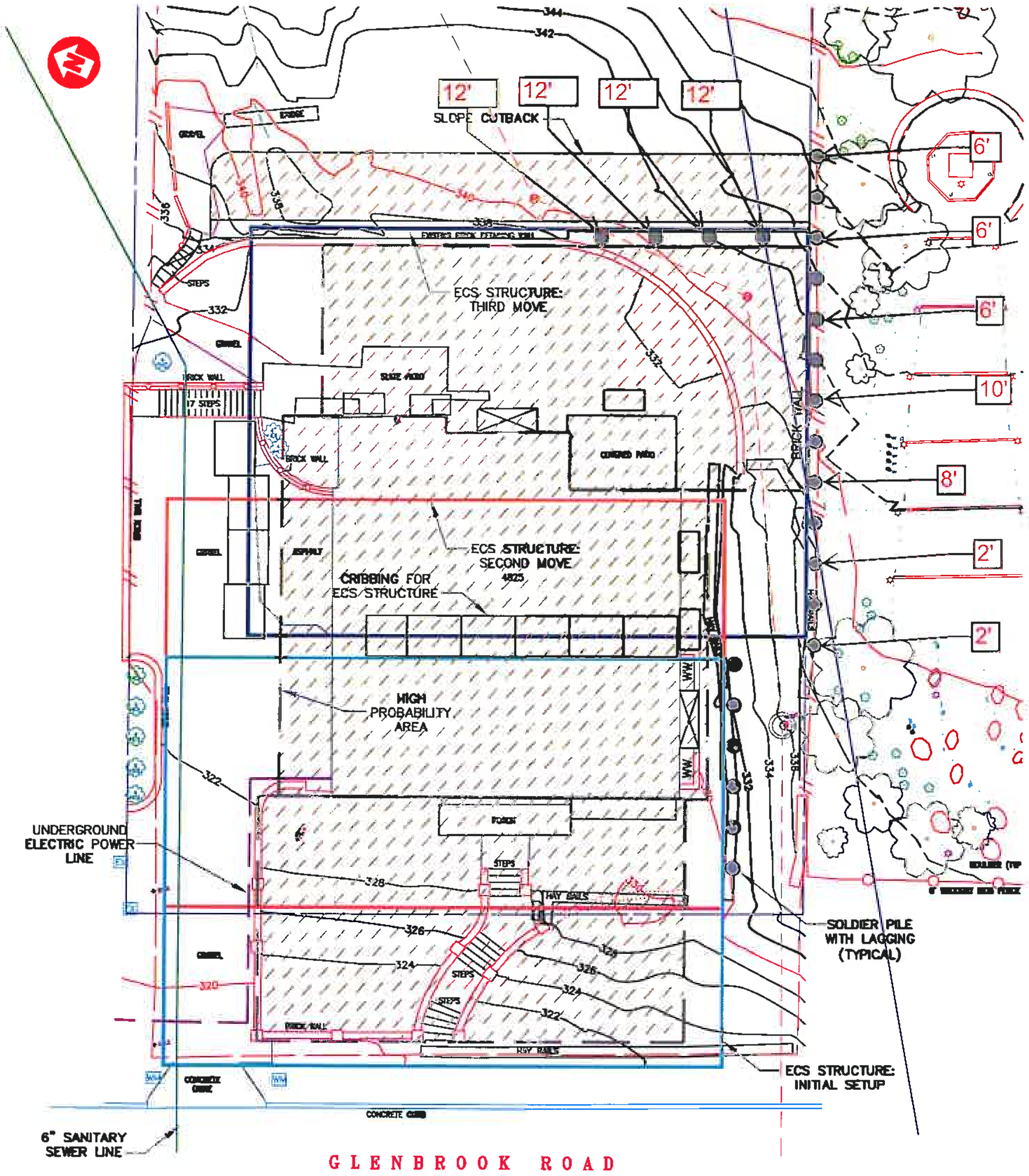
- 🟧 High-Probability
- 🟦 Low-Probability

0 10 20 40 Feet

1 inch = 20 feet

Scale:	1:245
Created By:	Parsons
File:	20120730 4825 Glenbrook Sample Depths.mxd
Date:	8/01/2012
Figure Number:	1
Page Number:	-

PARSONS



PLAN VIEW
SCALE: 1"=20'

LEGEND

⊘	SEWER MANHOLE
GT	STORM DRAIN GRATE
CO	CLEAN OUT
WW	WINDOW WELL
WM	WATER METER
EX	ELECTRIC BOX
—//—	WOOD FENCE
—x—	CHAIN LINK FENCE
— —	TEMPORARY CHAIN LINK FENCE
—o—o—	HAND RAIL
○	SPRINKLER HEAD
32" TRE	TREE WITH SIZE

SCALE: 1" = 20'
Approximate Scale in Feet
20' 10' 0 20'

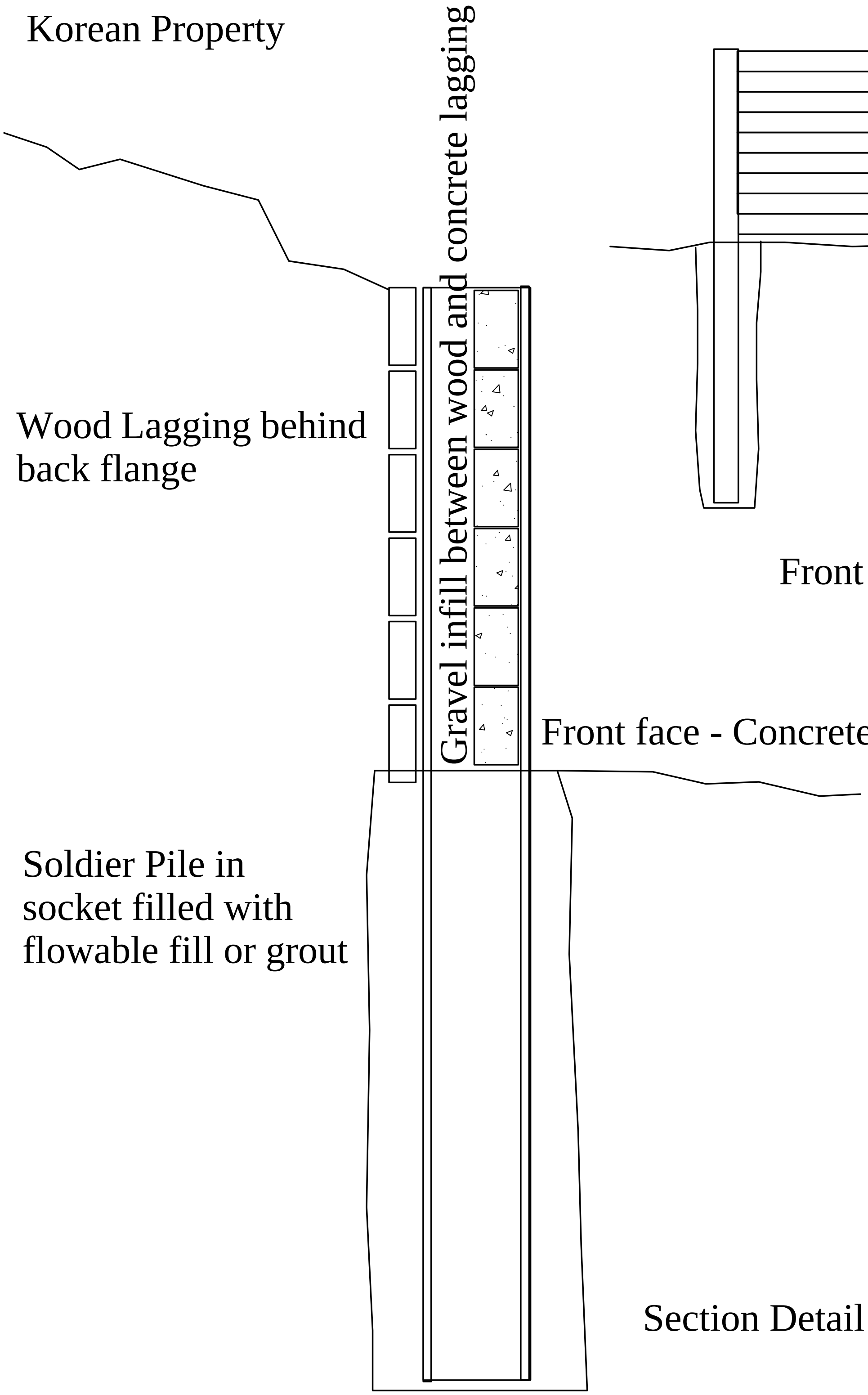
FIGURE 2
PROPOSED ECS LAYOUT
HIGH PROBABILITY
EXCAVATION
4825 GLENBROOK ROAD

SPRING VALLEY
WASHINGTON D.C.

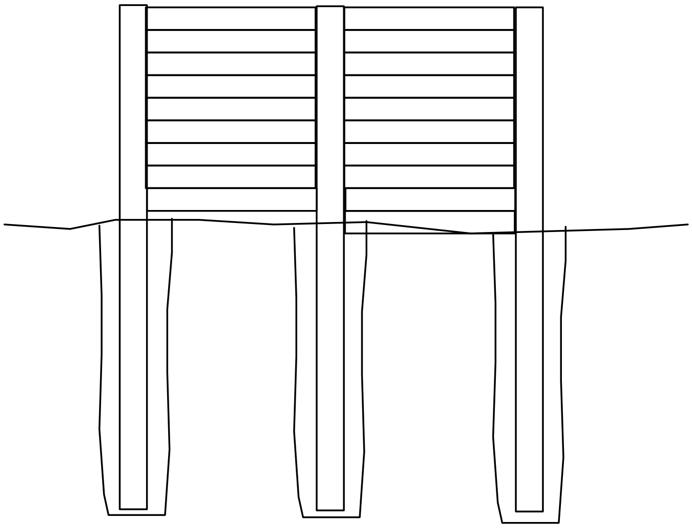
Figure 3

CCGI - Creative Concepts Group, Inc.

56 Pebble Drive Baltimore, MD 21225
Phone 410-760-7216, Fax 410-760-7217, CCGICORP.COM



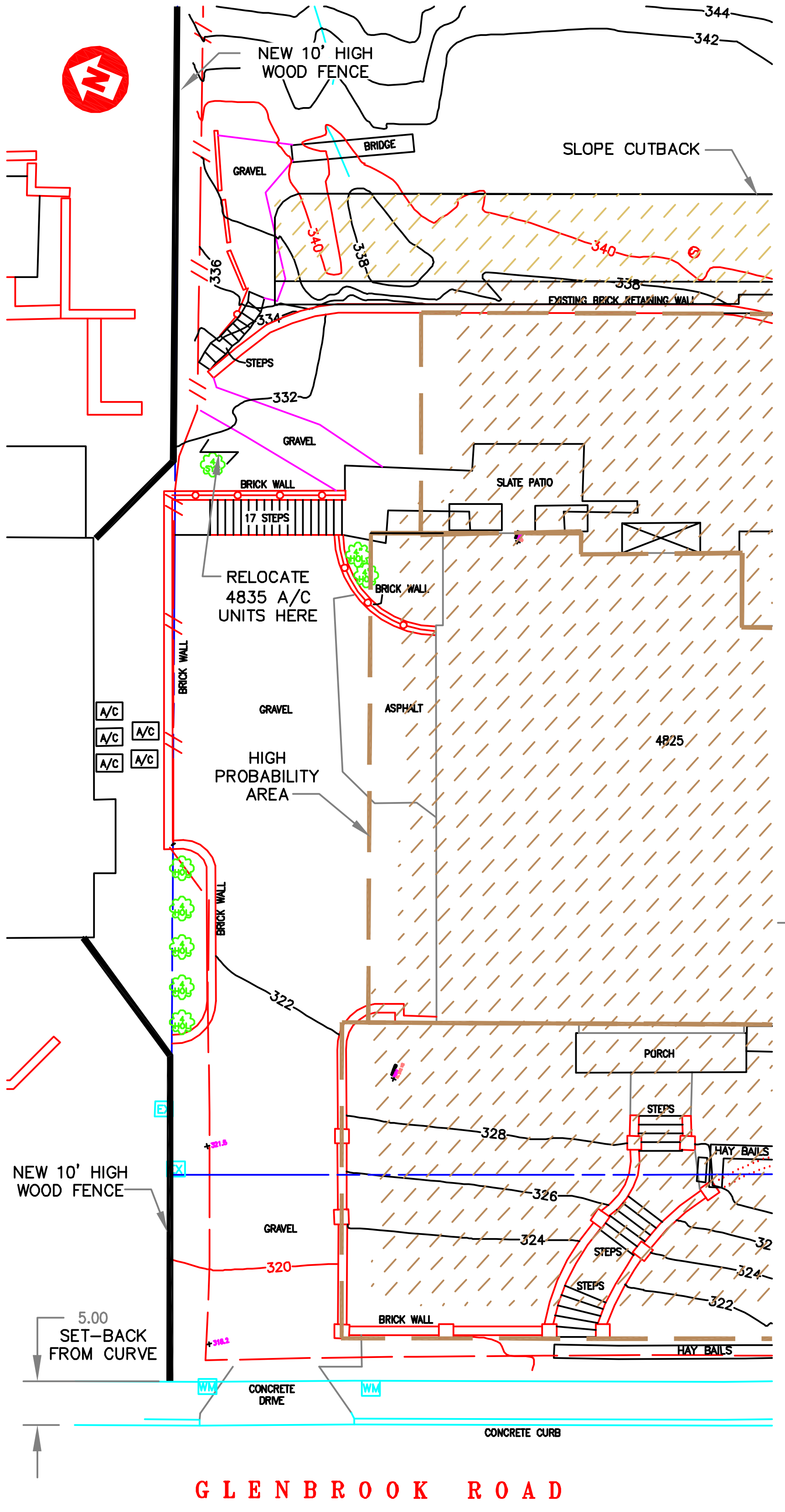
Section Detail



Front Face View

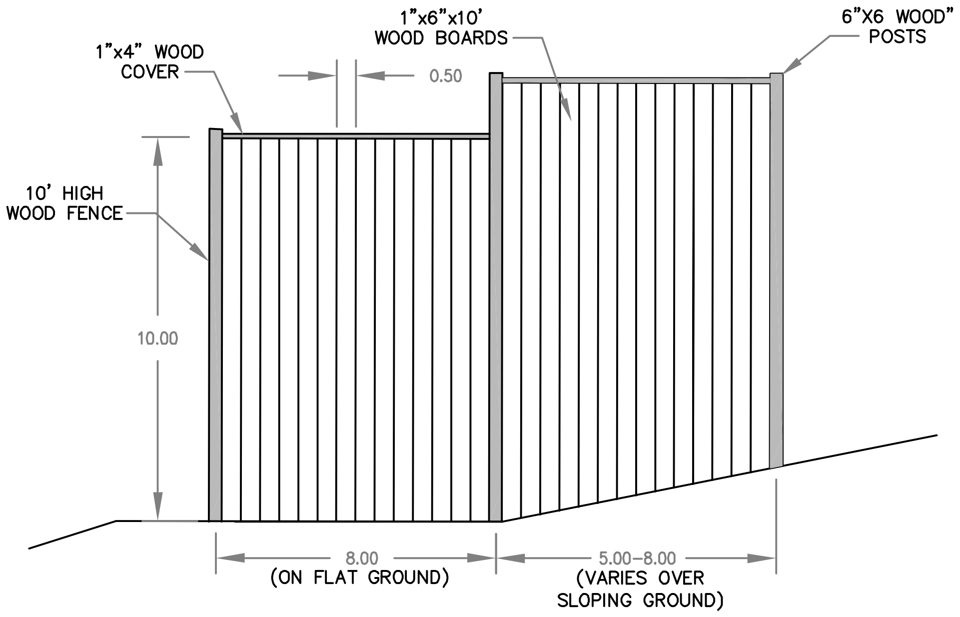
Glenbrook Retaining Wall		Details
Date: 9-12-12	Scale: None	

ATTACHMENT M-6
AC RELOCATION AND FENCE DESIGN



PLAN VIEW

SCALE: 1"=20'

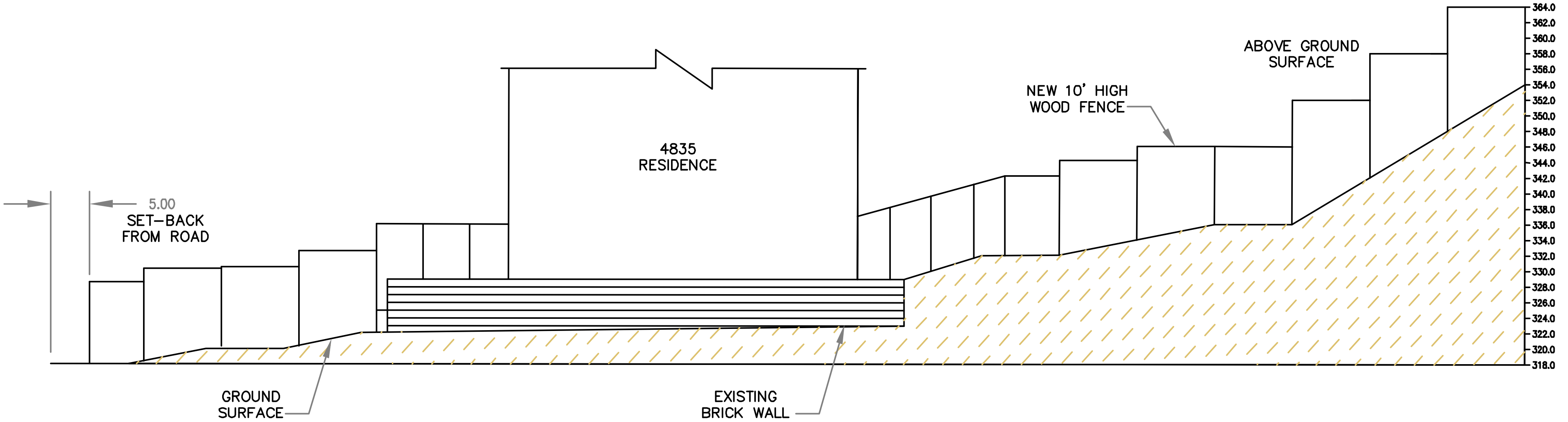


FENCE DETAIL

NOT TO SCALE

LEGEND

Ⓢ	SEWER MANHOLE
GT	STORM DRAIN GRATE
CO	CLEAN OUT
WW	WINDOW WELL
WM	WATER METER
EX	ELECTRIC BOX
—//—	WOOD FENCE
—X—	CHAIN LINK FENCE
— —	TEMPORARY CHAIN LINK FENCE
—○—○—○—	HAND RAIL
○	SPRINKLER HEAD
32" TRE	TREE WITH SIZE



CROSS SECTION–LOOKING NORTH

SCALE: 1"=20'

SCALE: 1" = 20'

Approximate Scale in Feet

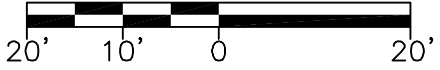


FIGURE X–X
PROPOSED FENCELINE
ALONG 4825/4835
GLENBROOK ROAD
PROPERTY BOUNDARY

SPRING VALLEY
WASHINGTON D.C.

ATTACHMENT M-7
NOISE STUDY

NOISE STUDY AT 4825 GLENBROOK ROAD, WASHINGTON, DC

SPRING VALLEY FORMERLY USED DEFENSE SITE (SVFUDS), OPERABLE UNIT 3, WASHINGTON, D.C.
CONTRACT W912DY-04-D-0005, D.O. 0007FUDS MEC/CWM
PROJECT NO. C03DC091801

PREPARED FOR:

U.S. ARMY
ENGINEERING AND SUPPORT CENTER, HUNTSVILLE

U.S. ARMY CORPS OF ENGINEERS,
BALTIMORE DISTRICT

PREPARED BY:

PARSONS
WASHINGTON, DC

MARCH 30, 2012

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Date: March 30, 2012

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APPENDIX D	NOISE MODEL CONTOURS

LIST OF ACRONYMS

CAFS	Chemical Agent Filtration System
dB	Linear decibels
dBA	A-weighted decibels
ECBC	Edgewood Chemical Biological Center
IAC	Industrial Acoustics Company
Leq	Equivalent Noise Level
Leq(h)	Equivalent Noise Level over one hour
Lmax	Maximum Noise Level
MINICAMS	Miniature Continuous Air Monitoring System
MDPS	Medical Personnel Decontamination Station
L_p	Sound Pressure Level
L_w	Sound Power Level

EXECUTIVE SUMMARY

A noise study was conducted to evaluate noise levels from the Chemical Agent Filtration System (CAFS) units and associated emergency generators located at 4825 Glenbrook Road during the remedial action and identify possible noise control measures to reduce the noise levels at the two adjacent properties, 4835 Glenbrook Road and 4801 Glenbrook Road. The primary goal was to evaluate options to reduce noise levels to not more than the District of Columbia's regulatory limit of 55 A-weighted decibels (dBA) or preferably 5 decibels (dB) above the lowest night time hourly average noise levels at the property lines of these adjacent residences. Achieving noise level of 5 dB above the lowest nighttime noise level is not a regulatory requirement. The District of Columbia's noise regulations indicate that the source sound level is measured at the property line of the property on which the noise source is located; however, due to the solid wood walls at the property lines, areas behind the property walls at the receiving sites were considered for the evaluation purposes.

Parsons' personnel conducted continuous noise level measurements in February of 2012 for a total of 80 hours at 4825 Glenbrook Road. These measurements were used to establish the lowest existing night time noise levels. Measurement results indicated that the lowest average hourly night time noise level in the backyard of 4825 Glenbrook Road was 38 dBA. Therefore, the secondary goal is for the CAFS unit noise to not exceed 43 dBA at the nearest residential property lines. Additional noise measurements were completed at Edgewood Chemical Biological Center (ECBC) facilities in Aberdeen, Maryland around the fan of each CAFS unit as well as the emergency backup generator. Measurement results also were used to calibrate the computer noise model.

A computer noise model was developed using SoundPLAN 7.0 to analyze possible noise impacts and control measures. Results of the model analysis indicated that the noise level with three CAFS units running close to the property line of 4835 Glenbrook Road, without noise control, would achieve the goal of 55 dBA near the property line. Noise reduction provided by the existing property wall was considered in the calculation. Furthermore, the noise level at the property line of 4835 Glenbrook Road could be reduced to 44 dBA with the use of acoustic enclosures at each fan and further reduced to as low as 40 dBA with the use of acoustic enclosures and silencers at the outlet of each fan. However, without any noise mitigation, the noise level near the property line of 4801 Glenbrook Road would be 78 dBA, which could be reduced to 63 dBA with a soundwall curtain, reduced to 59 dBA with acoustical enclosures for the CAFS unit fans, or reduced to as low as 54 dBA with acoustical enclosures and silencers depending on which silencer is used at the outlet of each fan. In only the case with acoustic enclosures and silencers manufactured by Industrial Acoustics (IAC) could the noise level at the property line of 4801 Glenbrook Road achieve the 55 dBA goal near the property line. The backup generator will be running for short time once a week; therefore, noise control measures for the backup generator were not the main objective.

The recommended noise control measure is the use of acoustical enclosures and IAC silencers, or equivalent, at an anticipated cost of $38,000 for each fan or a total of $114,000 for materials and installation.

INTRODUCTION

The purpose of the noise study was to evaluate noise levels from the three Chemical Agent Filtration System (CAFS) units and associated emergency backup generators and determine possible noise control measures to reduce the noise levels at the two residences adjacent to 4825 Glenbrook Road. Detailed noise measurements were conducted to assess existing ambient noise levels at the property line of the project site as well as to evaluate the noise levels of the fans and backup generator associated with the CAFS units. The resulting noise measurements were used to develop a computer noise model to determine possible noise impacts and analyze effects of various noise control measures.

The goal was to reduce the noise level no more than 55 dBA, which is the District of Columbia's nighttime maximum noise level (Title 20, Chapter 27, Noise Control, District of Columbia Municipal Regulations) and to not more than 5 dB above the lowest night time hourly average noise levels (L_{eq}) at the property line. The analysis assumed the future scenario of all three fans simultaneously operating 24 hours a day, seven days a week. The backup generator noise was included in the analysis and was assumed to be running for a period of approximately 15 to 30 minutes per week for the purpose of this analysis.

NOISE MEASUREMENTS

Parsons' personnel completed noise level measurements on February 21st and 23rd and February 27th and 28th, 2012 using Larson Davis Integrating Sound Level Meter Models 824 and 870 (ANSI Type 1). Appendices A and B respectively include field notes and site photos. One Model 870 sound level meter was installed and operated continuously for 80 hours and was located in the backyard of 4825 Glenbrook Road in Washington, DC. Figure 1 shows the location of the long term noise measurement site LT. This measurement was used to determine the lowest night time existing ambient noise levels.

Octave band sound pressure level measurements also were conducted at the Aberdeen Proving Grounds in Maryland using Model 824 on February 23, 2012. Appendices A and B respectively include field notes and site photos[1]. These measurements were conducted at one location away from the fans and generator to measure the ambient noise level of the area, eight locations around the fan of the CAFS units without filters (Fans 38, 42, and 43), and five locations around the backup generator, both of which will be relocated to 4825 Glenbrook Road. These measurements were used to determine the noise emission levels of the fans and generator and calibrate the computer noise model. Figure 2 shows the locations of these measurements. The measurements were conducted in the following manner:

- Measurement Position Ambient – A measurement was conducted away from all obstructions to capture the noise levels without the fans or generator running.
- Measurement Position 1, Fan 38 – An ambient measurement was conducted with the fan off and the generator on followed by a measurement at the same position with both the fan and generator on.

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[1] Photos of the Aberdeen noise testing currently are under review by the security team to confirm the acceptability of their inclusion in this report. If released, these photos will be incorporated into the final report.

- Measurement Positions 2, 3, and 4, Fan 43 – Ambient measurements were conducted with the fan off and the generator on followed by measurements at the same position with both the fan and generator on.
- Measurement Positions G1, G2, G3, G4, and G5, Backup Generator – Measurements were conducted with the generator on at the five positions.
- Measurement Position A, Fan 42 – A measurement was conducted with the fan and generator on at this position.
- Measurement Positions A and B, Fans 42 and 38 – Measurements were conducted with the two fans and generator on at these positions.
- Measurement Positions A, B, C, and D, Fans 42, 38, and 43 – Measurements were conducted with the three fans and generator on at these positions.

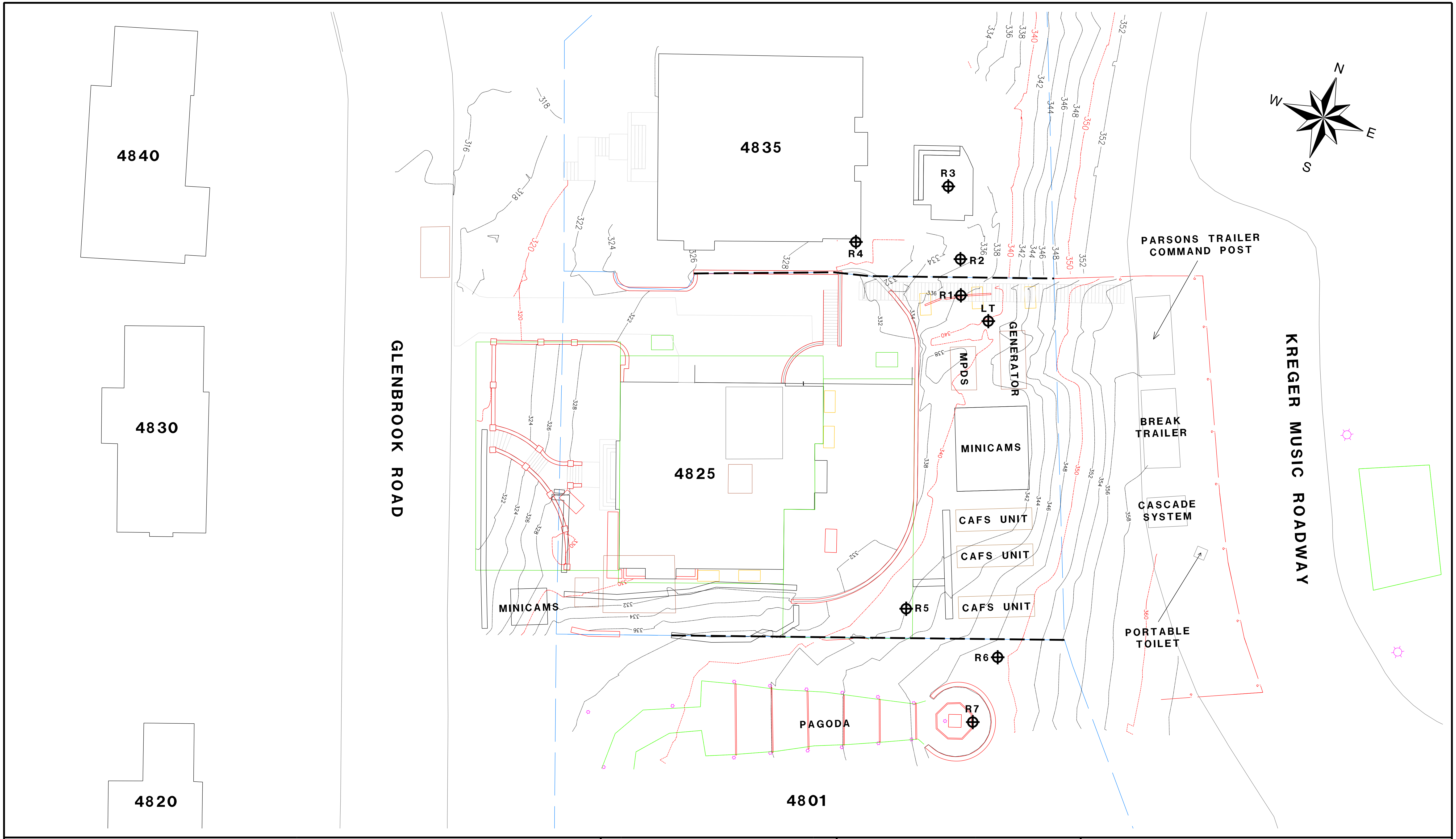
Ambient measurements were first taken at Measurement Positions 1, 2, 3, and 4 with just the backup generator running before the measurements with the fans running were obtained so that the noise levels of the generator could later be subtracted from the combined noise levels of the fan and generator. It was not possible to turn off the generator because the electricity generated by the generator was used to operate the fans.

Results of long-term noise measurement are shown in Figure 3 graphically and in Table C1 of Appendix C. Results of the measurements without generator noise of fans 38 and 43 at Measurement Positions 1, 2, and 3 are shown graphically in Figure 4. Results of the fan and generator noise measurements at all positions are presented in Table C2 of Appendix C. The results are expressed in the units of A-weighted decibels (dBA) and linear decibels (dB). A-weighted decibels refer to the A-scale weighting network which approximates the frequency response of the human ear and is the accepted unit for environmental noise levels. Decibels (dB) are the un-weighted sound pressure levels.

Based on the measured noise levels long-term site LT, which is representative of both 4825 Glenbrook Road and the two adjacent properties, the lowest night time hourly Leq at the residential property was determined to be 38 dBA; therefore, the secondary goal was for the fan noise to not exceed 43 dBA at the adjacent residential property lines, even though this is not a regulatory requirement.

STUDY METHODOLOGY AND PROCEDURE

A computer noise model was developed using SoundPLAN 7.0 to analyze possible noise impacts and mitigation measures. SoundPLAN is a three-dimensional noise modeling program that utilizes ray-tracing techniques to predict noise levels. SoundPLAN not only considers sound propagation over distance from multiple sources, but also considers shielding from intervening structures and barriers, reflections off of buildings and walls, atmospheric absorption of sound, as well as ground effects on the sound propagation between sources and receivers. The three-dimensional model was developed using topographic data, architectural drawings, and site visit data to include parameters for the terrain, buildings, and ground types. The noise measurement data was used to model the noise sources to create the future scenario at 4825 Glenbrook Road. Specifically, the measurement data of the fan motor housing, fan exhaust, and generator was converted from sound pressure level (L_p) to sound power level (L_w) and entered into the model as point and plane sources.



LEGEND

⊕RXX – RECEIVER SITE

⊕LT – LONGTERM MEASUREMENT

—o———o— – SOUNDWALL

— — — — – EXISTING PROPERTY WALL

1in : 25ft

0ft 10ft 20ft 40ft

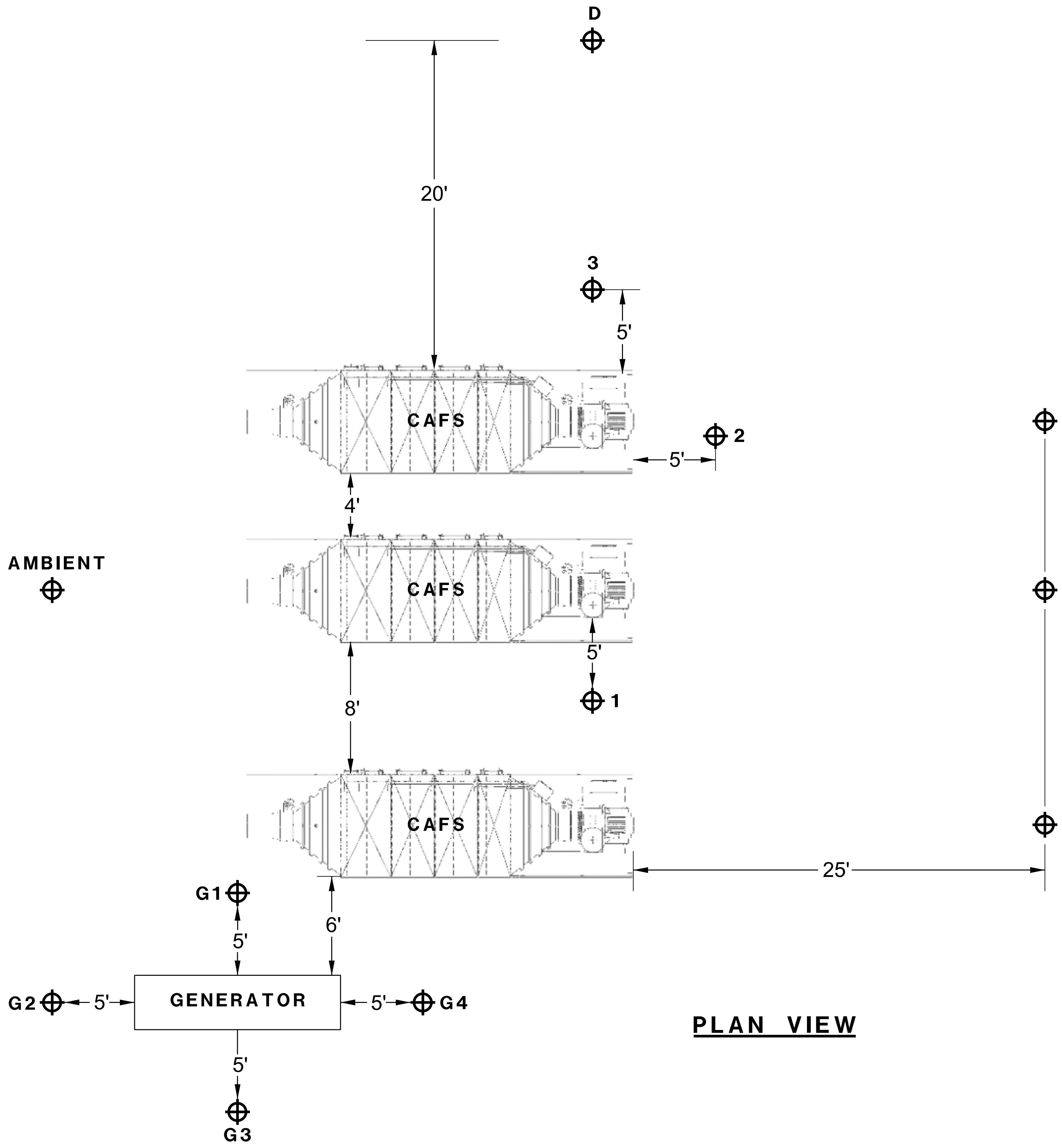
PARSONS

100 WEST WALNUT ST.
PASADENA, CA 91124
(626) 440-6100

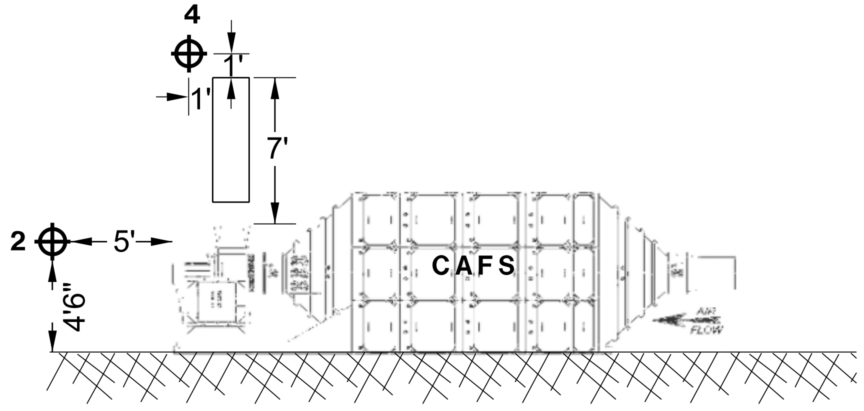
SPRING VALLEY PROJECT
NOISE STUDY
4825 GLENBROOK ROAD SITE

MARCH 30, 2012

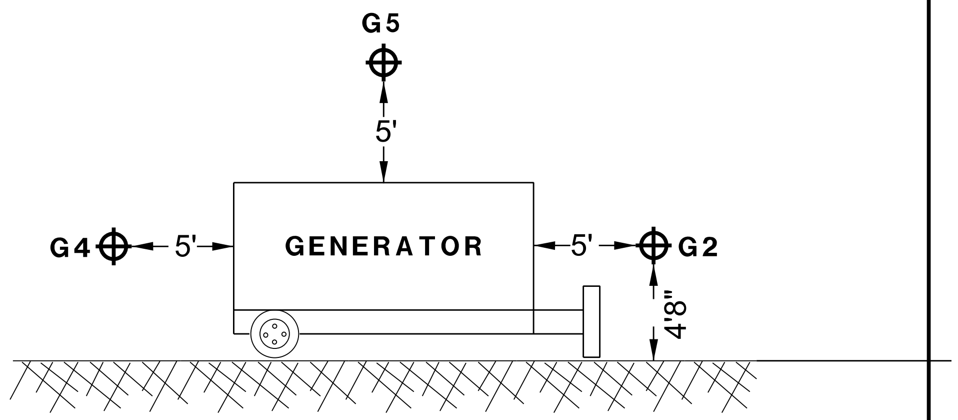
FIGURE 1



PLAN VIEW



SIDE VIEW



SIDE VIEW

LEGEND

⊕ – MEASUREMENT LOCATION / POSITION

1in : 8ft

0 ft 4ft 8ft 12ft

PARSONS

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(626) 440-6100

SPRING VALLEY PROJECT
NOISE STUDY
ABERDEEN NOISE MEASUREMENTS

MARCH 30, 2012

FIGURE 2

Figure 3
Long Term Measurement Results at 4825 Glenbrook Road

Site LT Hourly Noise Levels, Leq(h)

Location: 4825 Glenbrook Road
Position: Backyard
Sources: Local Environment
Dates: 2/21/12 - 2/23/12 and 2/27/12 - 2/28/12

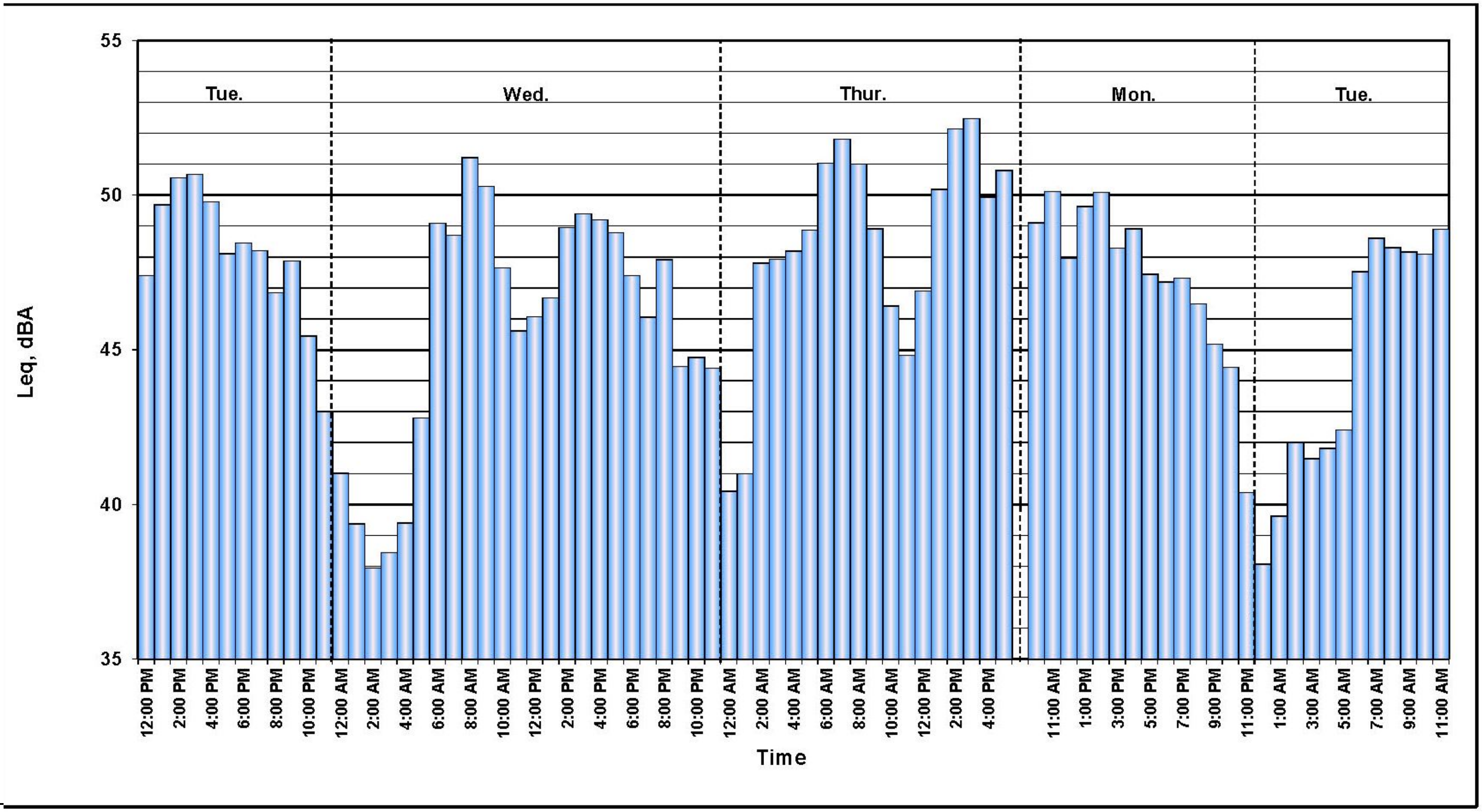
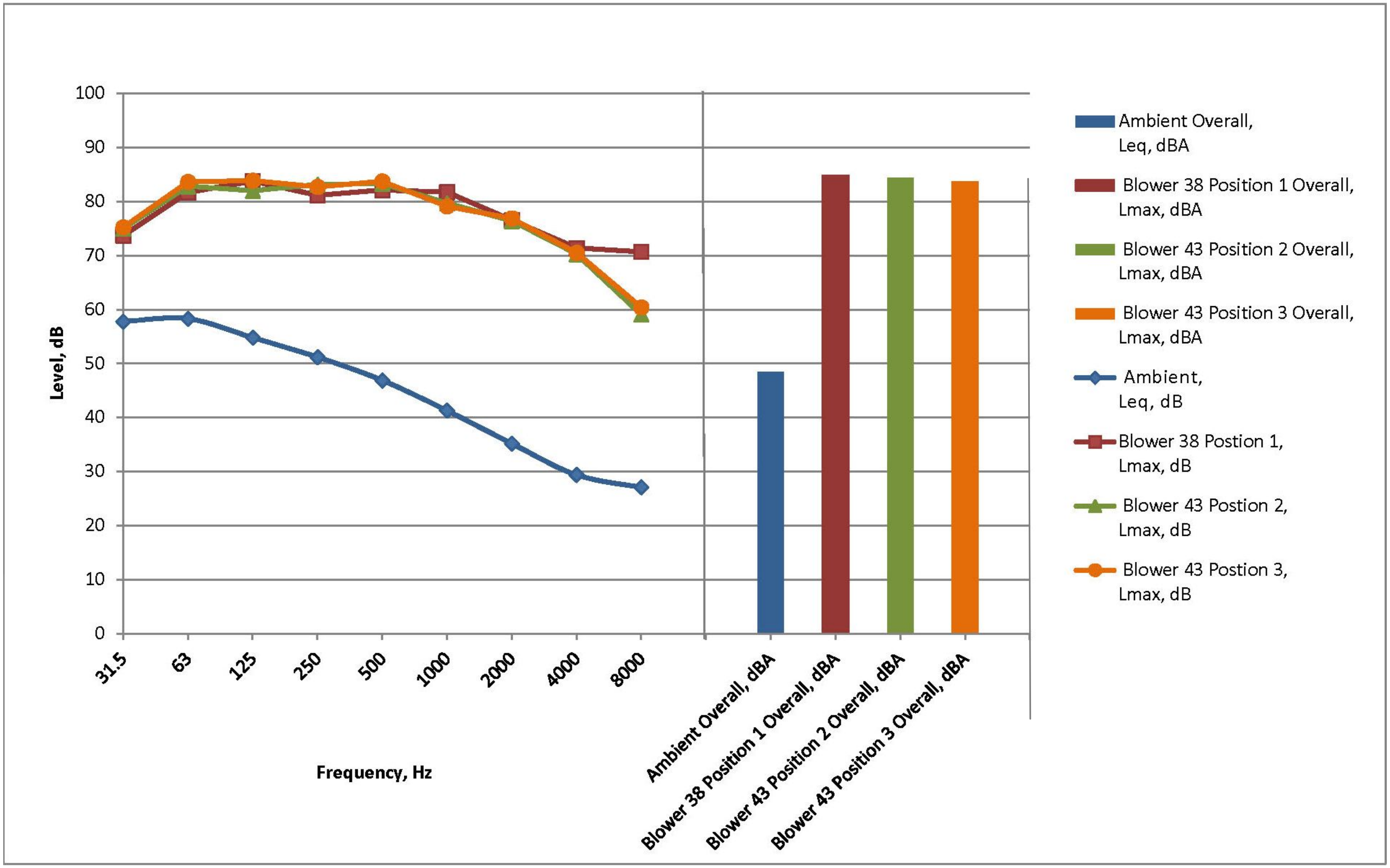


Figure 4
Aberdeen CAFS Fan Measurement Results



The following assumptions were made in developing the noise model:

- Dimensions of CAFS are: 19’ 8” x 6’9” x 8’
- Dimensions of the MINICAMS Trailer are: 23’ x 20’ x 12’
- Dimensions of the Medical Personnel Decontamination Station (MPDS) are: 11’10” x 7’ x 7’
- The generator used at the Aberdeen site will be the same generator used at 4825 Glenbrook Road.
- Dimensions of the Backup Generator are: 12’6” x 3’4” x 5’4”

The calculated results were then compared to the measured noise levels, and adjustments were made to calibrate the model to be within an average of ±1 dB of the measured noise levels at measurement positions and for different fan/generator scenarios when all scenarios are averaged together. Table 1 shows the results of the model calibration.

Table 2 shows the results of the eight future scenarios with soundwall at heights of 20, 25, and 30 feet. Figure 1 shows the locations of the modeled noise receivers listed in Table 2. Figures in Appendix D show the locations of the modeled soundwalls. The property line of the resident at 4835 Glenbrook Road is represented by Receivers R1 and R2 where R1 is inside the property of 4825 Glenbrook Road and R2 is inside the property of 4835 Glenbrook Road. Receiver R3 represents a patio area and Receiver R4 represents a second story window of 4835 Glenbrook Road. The property line of the resident at 4801 Glenbrook Road is represented by Receivers R5 and R6 where R5 is inside the property of 4825 Glenbrook Road and R6 is inside the property of 4801 Glenbrook. Receiver R7 represents the pagoda area of 4801 Glenbrook Road.

The calibrated future noise model was then run with and without various noise control techniques to analyze the effectiveness of each mitigation method at the nearby property lines. The future scenarios analyzed include four model runs without noise mitigation and eight runs with noise control techniques. Noise control by means of a soundwall, which could be made of solid material, such as plywood or acoustical curtains, was first considered. Designing acoustical enclosures for the fans and the installation of a silencer at the outlet of each fan was also considered. The existing property walls were used in predicting future noise levels on either side of the properties. Figure 5 shows a 30-foot high soundwall made of acoustical curtain.

Figure 5 – Soundwall Made of Acoustical Curtain

Noise levels were predicted by considering U-shaped and boxed soundwalls for only the area where three CAFS unites are located. Then U-shaped soundwalls were considered to cover the entire area where three CAFS units and generator will be located. Separate U-shaped soundwalls were also considered only for the generator.

Noise contours were developed showing noise levels with and without noise control measures. Case 3 through 8 present cases where soundwalls were used. Noise levels were calculated using soundwall heights of 20, 25, and 30 feet. Case 9 shows results with acoustical enclosures and silencers. The following are details of the nine scenarios:

- Case 1 – Three CAFS fans running, backup generator off, without noise mitigation.
- Case 2 – Three CAFS fans running, backup generator running, without noise mitigation.
- Case 3 – Three CAFS fans running, backup generator off, U-shaped soundwall wrapping around CAFS units (Soundwall Option 1).
- Case 4 – Three CAFS fans running, backup generator off, U-shaped soundwall wrapping around CAFS units and backup generator (Soundwall Option 2).
- Case 5 – Three CAFS fans running, backup generator running, U-shaped soundwall wrapping around CAFS units only (Soundwall Option 1).
- Case 6 – Three CAFS fans running, backup generator running, U-shaped soundwall wrapping around CAFS units and backup generator (Soundwall Option 2).
- Case 7 – Three CAFS fans running, backup generator running, U-shaped soundwall wrapping around CAFS units and second soundwall wrapping around backup generator (Soundwall Option 3).
- Case 8 – Three CAFS fans running, backup generator off, soundwall completely enclosing CAFS units only (Soundwall Option 4).
- Case 9 – Three CAFS fans running, backup generator off, acoustic enclosure around each fan, silencer at outlet of each fan (Case 9a used IAC silencer, Case 9b used dBNR silencer).

An acoustical enclosure will reduce noise of the fan and associated motor but not the outlet noise while a silencer will reduce noise at the outlet only. Therefore, calculations were conducted to determine noise levels generated by fans and outlets separately. When the noise from the fans is reduced to a level which is 10 dB below the level of the noise emanating from the stacks, the stacks would become the dominant noise sources and when the noise from the stacks is reduced to a level which is 10 dB below the level of the noise emanating from the fans, the fans would become the dominant noise sources. Results of Cases 1a and 1b were utilized to determine noise reduction that an acoustical enclosure needs to provide to eliminate the contribution for the fan to the overall noise level. Results of Cases 1a and 1b were further utilized to determine noise reduction that a silencer needs to provide to meet the Municipal Regulations. The following are details of these two cases:

- Case 1a – Three CAFS fans running, backup generator off, fan stack noise only, without noise mitigation.
- Case 1b – Three CAFS fans running, backup generator off, fan noise only, without noise mitigation.

RESULTS

Per Title 20, Chapter 7, Noise Control, of the District of Columbia Municipal Regulations, the maximum daytime noise level is 60 dBA and nighttime noise level is 55 dBA measured at the property line of the residence on which the noise source is located. Therefore, the main goal of this study was to reduce the noise levels at the adjacent property line of 4825 Glenbrook Road to not more than 55 dBA considering that the CAFS would be operating 24 hours a day, seven days a week. Because there are solid wood walls at the property lines, areas behind the property walls at the receiving sites were considered for the evaluation purpose (Locations R2 and R6 in Figure 1).

Based on the results of the long term (ambient noise) measurements, the secondary goal was for the CAFS units noise to not exceed 43 dBA at the adjacent property lines, which is 5 dB above the lowest measured nighttime existing ambient level. The measured ambient noise levels at measurement site LT were assumed to be the same for the adjacent residential properties (4835 Glenbrook Road and 4801 Glenbrook Road) represented by Receivers R2 through R4 and R6 and R7, respectively.

Results of the analysis shown in Table 2 indicated that noise levels at 4835 and 4801 Glenbrook Road near the property line (Receivers R2 and R6) would be 54 and 70 dBA without any noise control when three CAFS are operating (Case 1), respectively. This level meets the goal of not more than 55 dBA at the property line of 4835 Glenbrook Road but not 4801 Glenbrook Road. Noise levels can be reduced to 47 and 63 dBA near the property lines of 4835 and 4801 Glenbrook Road, respectively by using soundwalls that enclose the three CAFS units (Case 8). However, noise levels near the property line of 4835 Glenbrook Road would not be reduced to 43 dBA and the noise level at 4801 Glenbrook Road would not be reduced to 55 dBA even by entirely enclosing CAFS units with a 30-foot high soundwall (Case 8). The recommended soundwalls could be constructed by installing a foundation pile which would use steel H-beam piles, spaced about 20 feet apart. Noise curtains would then be attached to the pile supports at multiple locations to hold the curtains in place.

Noise levels at 4835 and 4801 Glenbrook Road near the property lines of these two properties could be theoretically reduced to as low as 43 and 58 dBA, respectively with use of only an acoustical enclosure with at least 21 dB noise reduction capacity. These values were determined by the future model run that included noise from the stacks, but not the fans (Case 1a). The results of model indicated that once the noise from the fans was reduced by 21 dB, the noise emanating from the stacks would become the dominant noise source.

Results of the noise model with manufacturer provided specifications of acoustic enclosures for each fan yielded total noise levels of 44 and 59 dBA near the property lines of 4835 and 4801 Glenbrook Road, respectively. The reduced noise level with the acoustic enclosures meets the City noise limits near the property line of 4835 Glenbrook Road but not the secondary goal of not more than 5 dB above the lowest nighttime measure existing noise level. However, the same enclosure would not reduce noise level near the property line of 4801 Glenbrook Road to 55 dBA or less to meet City noise limit.

Further noise reduction can be achieved with the use of outlet silencers for each fan as long as the pressure drop at the outlet is not greater than 1.09 in. H_2O (Todd Air Solutions). It was determined from the noise model that a minimum of 16 dB noise reduction would be required to achieve a noise level of 55 dBA near the property line of 4801 Glenbrook Road. Two outlet silencers from different manufacturers, Industrial Acoustics (IAC) and dB Noise Reduction (dBNR), have been considered. The results of analysis with both the acoustic enclosure and the two different silencers are presented in Table 2 (Cases 9a and 9b).

Noise levels at 4835 and 4801 Glenbrook Road near the property lines of these two properties could be reduced to as low as 40 and 54 dBA, respectively with the use of acoustical enclosures and IAC outlet silencers and as low as 44 and 57 dBA, respectively with the use of acoustical enclosures and dBNR outlet silencers. The reduced noise level with both acoustic enclosures and IAC silencers meets the City noise limits near the property line of both 4835 and 4801 Glenbrook Road while the secondary goal of not more than 5 dB above the lowest nighttime measured existing noise level is only met near the property line of 4835 Glenbrook Road. The reduced noise level with both acoustic enclosures and dBNR silencers meets both City noise limits but not the secondary goal of not more than 5 dB above the lowest nighttime measure existing noise level near the property line of 4835 Glenbrook Road. However, the same configuration would not reduce noise level near the property line of 4801 Glenbrook Road to 55 dBA or less to meet City noise limit.

The backup generator will be running for short time once a week; therefore, noise control measures for the backup generator were not the main objective. However, there are generators that run at reduced noise levels. Based on available information, a comparable “Quietsource” series generator is not available with the same required power capacities. The assumed backup generator used for the future site is already enclosed; therefore, noise reduction by means of an acoustical enclosure was not considered. Soundwalls were considered for noise control measures for the backup generator (Cases 6 and 7); however, the 55 dBA goal could not be met at adjacent property line in these scenarios. A variance from District of Columbia noise standards may be necessary given that noise levels, with controls, would not be within the 55 dBA limit for the nighttime operations.

In support of this analysis, Parsons proposed revisions to the CAFS and generator layout at 4825 Glenbrook Road, including relocating the generator, and possibly moving the entire setup to a location near the Parsons trailer/command post and break trailer outside and east of the residence. ECBC indicated potential problems with access to the equipment and safety concerns. Impacts to system performance would have to be evaluated if the entire system were to be relocated because of additional ductwork, etc. Therefore, CAFS and generator configuration changes were not evaluated further during this analysis.

The calculated noise contours of the future scenarios of the CAFS units operating with and without the backup generator running with and without noise control measures are included in Appendix D.

The material and installation cost for each acoustic enclosure around the fan units was estimated to be $32,000. The material and installation cost for each IAC silencer and supports were estimated to be $6,000. The price total for each dBNR silencer is estimated to be $2,200. The dBNR silencer extends to over 7 feet in length; therefore, it is recommended that external support for this silencer as opposed to just supporting from the fan flange. The recommended noise control measure is the use of acoustical enclosures and IAC silencers, or equivalent.

Detailed design specifications and system layout will be provided by the selected vendor. Design will be reviewed with USACE and ECBC to confirm the concept will not interfere with CAFS operations.

Table 1
Noise Model Calibration Results

Scenerio	Measurement Position	Measured Noise Level, dBA	Modeled Noise Level, dBA	Model vs. Measured, dB
1 Blower Without Generator Noise	1	85.6	86.6	1.0
	2	86.8	86.3	-0.5
	3	83.9	86.6	2.7
	4	98.9	100.2	1.3
Blower 42, and Generator	A	80.3	76.6	-3.7
	4	98.9	100.2	1.3
Blowers 42 and 38, and Generator	A	81.8	81.1	-0.7
	B	81.4	81.3	-0.1
Blowers 42, 38, and 43, and Generator	A	83.4	80.9	-2.5
	B	83.3	81.4	-1.9
	C	81.6	80.7	-0.9
	D	78.5	80.6	2.1
Generator	G1	86.0	87.2	1.2
	G2	91.3	92.6	1.3
	G3	87.1	88.1	1.0
	G4	89.4	89.5	0.1
	G5	93.5	94.3	0.8

Source: Parsons

Table 2
Noise Control Analysis for CAFS and Backup Generator

Receiver	Receiver Location	Modeled Noise Level, dBA																							
		Case / Scenerio																							
		Case 1 / CAFS Running, No Soundwall	Case 1a / Stacks only, No Soundwall	Case 1b / Fans only, No Soundwall	Case 2 / CAFS and Generator Running, No Soundwall	Case 3 / CAFS Running, Soundwall Option 1 (U-Shaped Wall around CAFS)			Case 4 / CAFS Running, Soundwall Option 2 (U-Shaped Wall around CAFS and Generator)			Case 5 / CAFS and Generator Running, Soundwall Option 1 (U-Shaped Wall around CAFS)			Case 6 / CAFS and Generator Running, Soundwall Option 2 (U-Shaped Wall around CAFS and Generator)			Case 7 / CAFS and Generator Running, Soundwall Option 3 (U-Shaped Wall around CAFS and Wall around Generator)			Case 8 / CAFS Running, Soundwall Option 4 (Wall enclosing CAFS)			Case 9a / CAFS Running, Acoustic Enclosure and IAC Silencer, No Soundwall	Case 9b / CAFS Running, Acoustic Enclosure and dBNR Silencer, No Soundwall
						20 ft	25 ft	30 ft	20 ft	25 ft	30 ft	20 ft	25 ft	30 ft	20 ft	25 ft	30 ft	20 ft	25 ft	30 ft	20 ft	25 ft	30 ft		
1	4825/4835 Property Line Inside 4825	59	48	59	83	57	57	57	53	53	53	82	82	82	65	65	65	66	65	65	53	53	53	45	49
2	**4825/4835 Property Line Inside 4835**	**54**	**43**	**54**	**73**	**50**	**50**	**50**	**52**	**52**	**52**	**73**	**73**	**73**	**63**	**63**	**63**	**63**	**63**	**63**	**48**	**47**	**47**	**40**	**44**
3	4835 Patio	53	46	52	70	51	51	51	48	48	48	70	70	70	58	58	58	58	58	58	50	50	50	38	44
4	4835 2nd Story Window	58	51	58	75	53	53	53	52	52	52	75	75	75	59	58	58	59	59	59	51	51	51	43	48
5	4801/4825 Property Line Inside 4825	78	64	78	78	61	60	60	60	60	60	62	62	61	61	61	60	61	61	61	59	58	58	58	60
6	**4801/4825 Property Line Inside 4801**	**70**	**58**	**69**	**70**	**65**	**65**	**65**	**65**	**65**	**65**	**66**	**66**	**66**	**66**	**66**	**66**	**66**	**66**	**66**	**63**	**63**	**63**	**54**	**57**
7	4801 Pagoda Area	64	55	63	64	60	60	59	60	60	60	62	61	61	61	61	60	61	61	60	59	58	57	48	53

APPENDIX A

NOISE MEASUREMENT FIELD FORMS

FIELD SURVEY FORM

PROJECT: Spring Valley Noise Test

ENGINEER: George Jin, Greg Berg

DATE: 2-25-2012

MEASUREMENT ADDRESS: 4825 Glenbrook Rd NW DC

CITY: Washington

☑ Single-Family ☐ Recreational
☐ Multi-Family ☐ Commercial

SITE NO.:

SOUND LEVEL METER:
☑ LD-870 ☐ LD-820
☐ LD-824 ☐ LD-812
☐ B&K-2250 ☐ ________

SERIAL #: 0555

MICROPHONE: ☑ WIND SCREEN
☐ NON-POLAR ☐ POLARIZED
☐ 1/2-INCH ☐ FREEFIELD
☐ 1-INCH ☐ RANDOM

SERIAL #: 2029

PRE AMP:
☐ LD-900
☐ LD-828
☑ LD-900B

SERIAL #: 3075

CALIBRATOR:
☑ LD CA250
☐ B&K 4231
S/N 2480

Freq, Hz.
☑ 250
☐ 1000
☐ ________

CALIBRATION RECORD:
Input, dB / Reading, dB / Offset, dB / Time
Before 114 / 114.0 / 22.8 / 1221 21 Feb 2012
After 114 / 114.4 / – / 1016 25 Feb 2012

METER SETTINGS:
☒ A-WTD ☐ LINEAR ☒ SLOW ☐ 1/1 OCT ☒ INTERVALS 20 - MINUTE
☐ C-WTD ☐ IMPULSE ☐ FAST ☐ 1/3 OCT ☒ L_N PERCENTILE VALUES

NOTES:
SYSTEM PWR: ☑ BAT ☐ AC
(observations at start of measurement)
TEMP: 43 °F R.H.: 53 %
WIND SPEED: 20 MPH
TOWARD (DIR): SW
SKIES: Cloudy
CAMERA ________
PHOTO NOs. ________

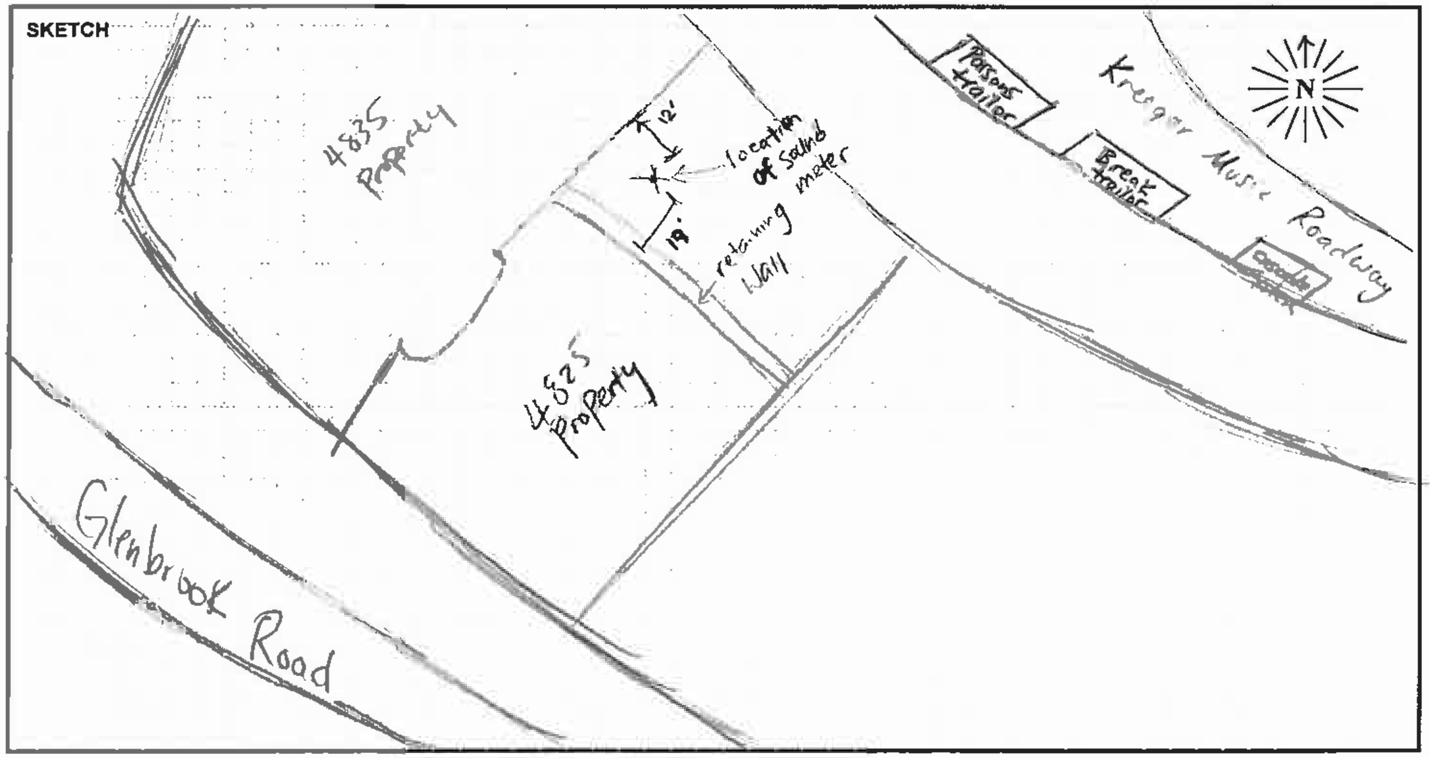
NOTES:
Height of mic 54in. from ground

Dist. to Center of Nearest Lane ________
☐ Video
☐ Radar
Counts AT MT HT

MEAS. TYPE:
☑ Long Term
☐ Short Term

DATE	START TIME	STOP TIME	L_{MIN}	L_{99}	L_{90}	L_{50}	L_{25}	L_{10}	L_{01}	L_{MAX}	L_{EQ}	NOTES:
2/25/2012	1028	–										
2/28/2012	–	1155										

SKETCH



PARSONS

FIELD SURVEY FORM

PROJECT: Spring Valley Noise Test

ENGINEER: George Jin, Greg Berg

DATE: 2-21-2012

MEASUREMENT ADDRESS: 4825 Glenbrook Rd NW DC

CITY: Washington

☒ Single-Family ☐ Recreational
☐ Multi-Family ☐ Commercial

SITE NO.: LT

SOUND LEVEL METER:
☒ LD-870 ☐ LD-820
☐ LD-824 ☐ LD-812
☐ B&K-2250 ☐ ________

SERIAL #: 0555

MICROPHONE: ☒ WIND SCREEN
☒ NON-POLAR ☐ POLARIZED
☒ 1/2-INCH ☐ FREEFIELD
☐ 1-INCH ☐ RANDOM

SERIAL #: 2029

PRE AMP:
☐ LD-900
☐ LD-828
☒ LD-900B

SERIAL #: 3075

NOTES:

SYSTEM PWR: ☒ BAT ☐ AC

(observations at start of measurement)

TEMP: 45 °F R.H.: 56 %

WIND SPEED: 12 MPH

TOWARD (DIR): S

SKIES: Cloudy

CAMERA ________

PHOTO NOs. ________

CALIBRATOR:
☒ LD CA250
☐ B&K 4231
S/N 2480

Freq, Hz.
☒ 250
☐ 1000
☐ ______

CALIBRATION RECORD:

Input, dB / Reading, dB / Offset, dB / Time

Before 114.0, 114.0, 22.8, 1221 21 Feb 2012

After 114.0, 114.00, –, 1222 21 Feb 2012

METER SETTINGS:
☒ A-WTD ☐ LINEAR ☒ SLOW ☐ 1/1 OCT ☒ INTERVALS 20 - MINUTE
☐ C-WTD ☐ IMPULSE ☐ FAST ☐ 1/3 OCT ☒ L_N PERCENTILE VALUES

NOTES: Height of mic: 54in. from ground

Dist. to Center of Nearest Lane ______

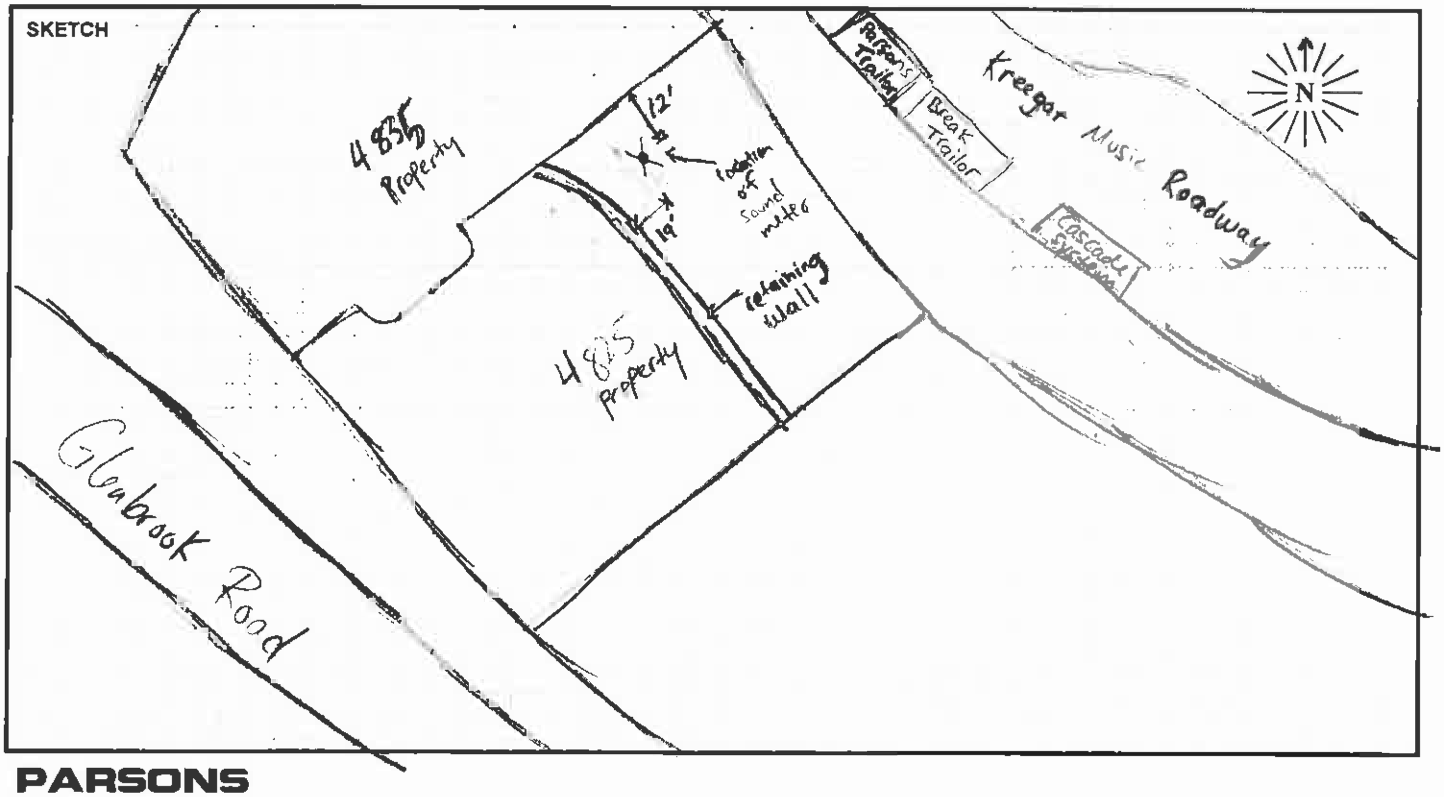
☐ Video
☐ Radar

Counts: AT MT HT

MEAS. TYPE:
☒ Long Term
☐ Short Term

DATE	START TIME	STOP TIME	L_{MIN}	L_{99}	L_{90}	L_{50}	L_{25}	L_{10}	L_{01}	L_{MAX}	L_{EQ}	NOTES:
2/21/2012	12:35	–										
2/23/2012	–	17:09										

SKETCH



GJ

GJ

4825 Glenbrook Rd
Washington DC NW

2-21/2012

On Site: 1145

J. Kaputa
G. Jin

Weather: cloudy, @ 45°F

Scope: Sound Monitoring
4825 Glenbrook Road

1150 Contact Areg Gharabegian & Greg Berg

1210 calibrating instrument and
setting up equipment
12' south of 4835 property fence
20' east of retaining wall

Calibrated to level 114.00 @12:21
offset - 22.8

Begin logging at 12:35

Off site: 12:45

GJ

GJ

GJ

4825 Glenbrook Rd
Washington DC NW

2-23-2012

Arrive 至 17:05

Weather: sunny 60

Scope: sound monitoring
4825 Glenbrook Rd

G Jin
G. Berg

Stop at 17:09

height of microphone
X amount of feet + height of
microphone above ground
X=54 in.

17:24. dissassemble microphone.

GJ

GJ

GJ

4825 Glenbrook Rd
Washington DC NW

2-25-2012

Arrive 10:15 AM
Start 10:28 AM
Scope: Sound Monitoring
4825 Glenbrook Rd

weather: 43°F
20 mph wind SW

G. Jin
J. Kaputa

~~Start 10:28 AM~~
~~calibrated~~ 10:25 AM: cal~~ibrated~~ checked
to 114.00 offset 22.8
~~test 54~~

Start 10:28 AM
off site 10:35 AM

GJ

GJ

GJ

4825 Glenbrook Rd
Washington DC NW

2-27-2012

10:13 AM
Scope: Sound Monitoring
4825 Glenbrook Rd

weather 48°F
10mph SW winds

J. Kaputa
G. Jin

Start 10:13AM: Stand noise meter back up

- background noise measures 46dB
- battery at 172%

All done with J. Kaputa over the phone. J. Kaputa was on site. George Jin was at 100 M ST SE DC

GJ

GJ

4825 Glenbrook Rd
Washington DC NW

2-28-2018

G. Jin

Arrive 11:49 AM

weather 48°F

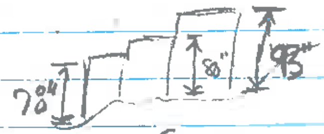
Scope: Sound Monitoring 4825

6mph wind SW

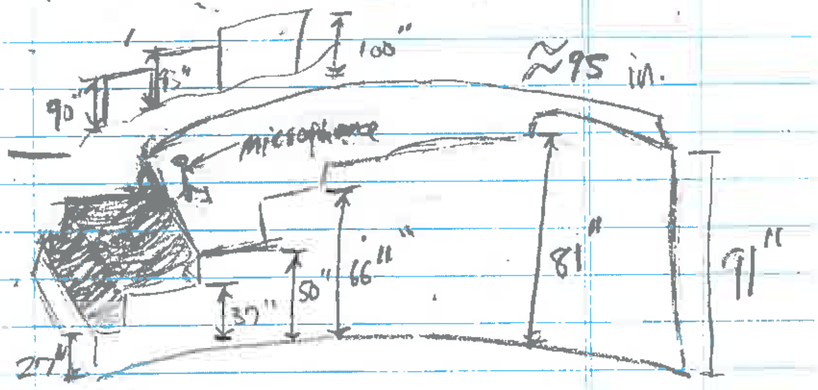
4 girls lacrosse game going on in background.

Stop: 11:55 AM noise meter 138% Battery 66°F

- Height of AU President fence ≈ 84 in.



- Height of Korean Ambassador fence



↳majority of retaining wall height 81"

GJ

2-28-2012

- 1300: take pictures & sketch fences, retaining wall
- 1323: pack up microphone & equipment
- 1335: off site

FIELD SURVEY FORM

PROJECT: Spring Valley

ENGINEER: Greg Berg

DATE: 2/23/12

MEASUREMENT LOCATION / ADDRESS: Aberdeen Proving Grnd

CITY: Aberdeen, MD

☐ Single-Family ☐ Multi-Family ☐ Recreational ☒ Commercial

SITE NO.:

SOUND LEVEL METER:
☐ LD-870 ☐ LD-820
☒ LD-824 ☐ LD-812
☐ LD-2900 ☐ ________

SERIAL #: 3119

MICROPHONE: ☒ WIND SCREEN
☐ NON-POLAR ☒ POLARIZED
☒ 1/2-INCH ☐ FREEFIELD
☐ 1-INCH ☐ RANDOM

SERIAL #: 377A02 /52820

PRE AMP:
☐ LD-900
☒ LD-902
☐ ________

SERIAL #: 3274

CALIBRATOR:
☒ LD CA250
☐ ________
S/N 2480

Freq, Hz.
☒ 250
☐ 1000
☐ ________

CALIBRATION RECORD:

Input, dB / Reading, dB / Offset, dB / Time
Before 114.0, 114.0, -48.1, 10:04
After 114.0, 114.1, —, 11:39

METER SETTINGS:
☒ A-WTD ☐ LINEAR ☐ SLOW ☐ 1/1 OCT ☒ INTERVALS 01 - MIN
☐ C-WTD ☐ IMPULSE ☒ FAST ☒ 1/3 OCT ☐ L$_N$ PERCENTILE VALUES

NOTES:

SYSTEM PWR: ☒ BAT ☐ AC

(observations at start of measurement)

TEMP: 62 °F **R.H.:** 46 %

WIND SPEED: 1.0 MPH

TOWARD (DIR): ________

SKIES: Clear

CAMERA X

PHOTO NOs. X

Fan **NOTES:**
#38 – pos 1
Fan #43 pos 2, 3, 4

Dist. to Center of Nearest Lane ________

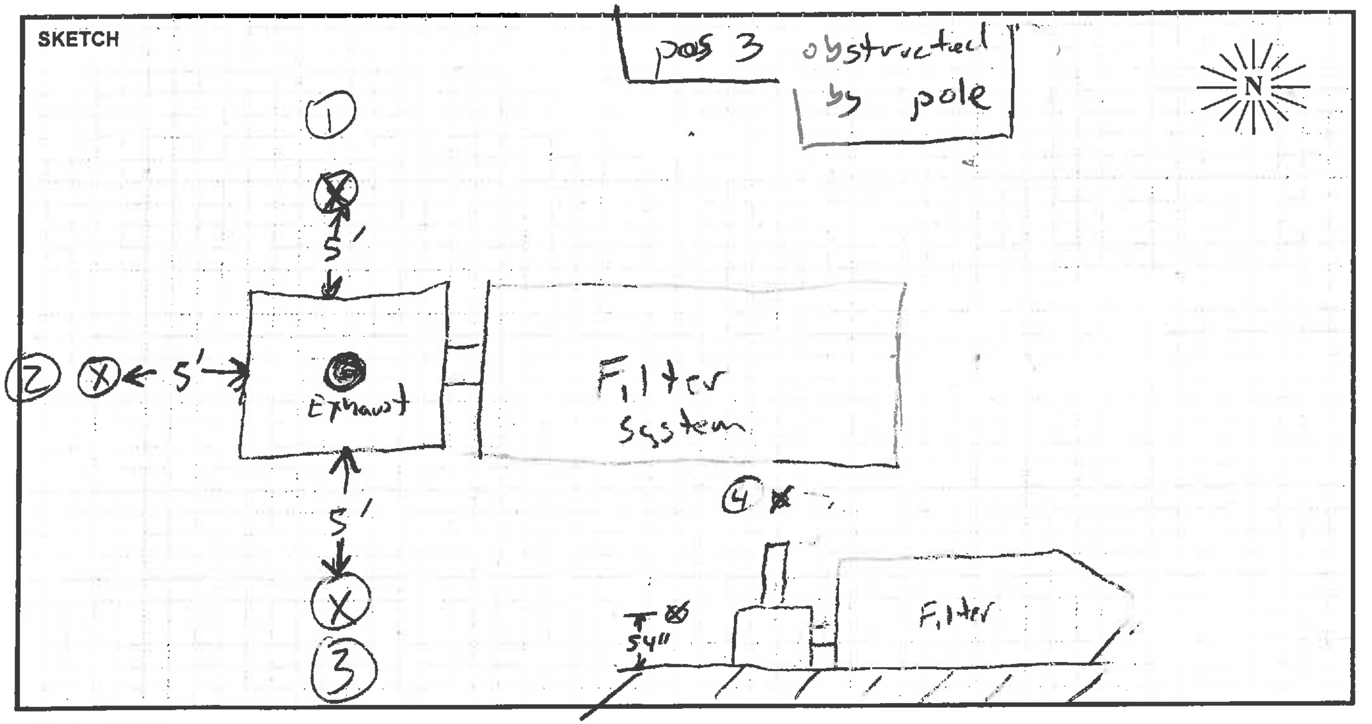
☐ Video ☐ Radar

Counts AT MT HT

MEAS. TYPE:
☐ Long Term
☒ Short Term

DATE	START TIME	Octave Band Center Frequency, Hz									Overall Level, dB	NOTES:
		31.5	63	125	250	500	1000	2000	4000	8000		
2/23	10:07	53.5	51.9	50.7	46.6	40.8	34.5	27.0	20.2	19.0	48.4	Ambient ⁽Str 1⁾

SKETCH



FIELD SURVEY FORM

PROJECT: Spring Valley

ENGINEER: Greg Berg

DATE: 2/23/12

MEASUREMENT LOCATION / ADDRESS: Proving Grounds

CITY: Aberdeen, MD

☐ Single-Family ☐ Multi-Family ☐ Recreational ☒ Commercial

SITE NO.:

SOUND LEVEL METER:
☐ LD-870 ☐ LD-820
☒ LD-824 ☐ LD-812
☐ LD-2900 ☐ ________

SERIAL #: 3119

MICROPHONE: ☒ WIND SCREEN
☐ NON-POLAR ☒ POLARIZED
☒ 1/2-INCH ☐ FREEFIELD
☐ 1-INCH ☐ RANDOM

SERIAL #: 377A02 / 52820

PRE AMP:
☐ LD-900
☒ LD-902
☐ ________

SERIAL #: 3274

NOTES:

SYSTEM PWR: ☐ BAT ☐ AC

(observations at start of measurement)

TEMP: 62 °F **R.H.:** 46 %

WIND SPEED: 1.0 MPH

TOWARD (DIR): ____________

SKIES: Clear

CAMERA X

PHOTO NOs. ____________

CALIBRATOR:
☒ LD CA250
☐ ________
S/N 2480

Freq, Hz.
☒ 250
☐ 1000
☐ ______

CALIBRATION RECORD:

	Input, dB	Reading, dB	Offset, dB	Time
Before	114.0	114.0	-48.1	10:04
After	114.0	114.0	–	12:53

METER SETTINGS:
☒ A-WTD ☐ LINEAR ☐ SLOW ☐ 1/1 OCT ☐ INTERVALS ______ - MIN
☐ C-WTD ☐ IMPULSE ☒ FAST ☒ 1/3 OCT ☒ L_N PERCENTILE VALUES

NOTES:

Dist. to Center of Nearest Lane ______

☐ Video
☐ Radar

Counts
AT MT HT

MEAS. TYPE:
☐ Long Term
☒ Short Term

DATE	START TIME	31.5	63	125	250	500	1000	2000	4000	8000	Overall Level, dB	NOTES:

(Octave Band Center Frequency, Hz: 31.5 – 8000)

SKETCH