



Project Execution Plan  
Time Critical Removal Action  
Beech Creek Superfund Site  
Wayne County, Tennessee

Prepared for  
**GMO Threshold Timber Tennessee LLC**  
**International Paper Company**  
**Battery Properties, Inc**

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Date  
**May 2015**

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## Acronyms and Abbreviations

AOC	administrative settlement agreement and order on consent
BMP	best management practice
cy	cubic yards
DBH	diameter at breast height
EDWP	excavation and disposal work plan
ENVIRON	ENVIRON International Corporation
EU	exposure unit
HASP	health and safety plan
µg/L	microgram(s) per liter
mg/kg	milligram(s) per kilogram
mg/L	milligram(s) per liter
OSC	on-scene coordinator
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyl
PEP	project execution plan
PPE	personal protective equipment
Ramboll Environ	Ramboll Environ US Corporation
RML	removal management level
Site	Beech Creek Superfund Site
SOW	statement of work
TCRA	time-critical removal action
TDEC	Tennessee Department of Environment and Conservation
USEPA	United States Environmental Protection Agency

# 1 Introduction

This Project Execution Plan (PEP) provides additional details for implementing the construction phase of the time-critical removal action (TCRA) at the Beech Creek Superfund Site (Site) in Wayne County, Tennessee that will be performed in accordance with the approved excavation and disposal work plan (EDWP). With approval of the EDWP, USEPA requested that additional details on the execution of the construction phase be provided once a contractor was selected. This PEP provides those additional details including a contractor-specific health and safety plan (HASP); a general Site layout showing the soil/sediment staging pad, haul roads, water treatment plant equipment configuration, and decontamination areas; water treatment plant operating procedures; a security plan; decontamination procedures; design for the surface water flow transition area; erosion control measures; and dust control measures.

The construction work will be conducted by Severson Environmental Services, Inc. (Severson) under management by Ramboll Environ US Corporation (Ramboll Environ). Ramboll Environ was formerly known as ENVIRON International Corporation (ENVIRON) and is implementing the TCRA on behalf of GMO Threshold Timber Tennessee LLC; International Paper Company; and Battery Properties, Inc. as signatory parties (Respondents) to the administrative settlement agreement and order on consent (AOC) with the United States Environmental Protection Agency (USEPA), effective February 20, 2014. Ramboll Environ's management of this TCRA will include communications with the USEPA and coordination with Severson and other subcontractors to Ramboll Environ (e.g., surveying and analytical laboratory). Regulatory agency oversight will be provided by the USEPA on-scene coordinator (OSC; Mr. Steve Spurlin) or his designee.

The Site is located near and to the north of the intersection of Clifton Turnpike and U.S. Highway 64, west of the city of Waynesboro, in unincorporated Wayne County, Tennessee. The Site location is shown on Figures 1 and 2. The Site is north of the Old Waynesboro City Dump. Downstream of the Site, Beech Creek continues approximately 17 miles to the Tennessee River. A history of the Site is included in the AOC.

This PEP provides additional details to supplement the scope of work described in the EDWP (ENVIRON 2014) and is focused on the removal and off-site disposal of soils and sediment containing polychlorinated biphenyls (PCBs). The AOC specifies a removal management level (RML) for total PCBs of 22 milligrams per kilogram (mg/kg) with a post-removal cleanup goal of less than 10 mg/kg. The soil and sediment removal areas presented in this PEP also include portions of the creek and adjoining creek banks that have PCB concentrations less than 22 mg/kg. The additional removal actions for these areas are being conducted on a voluntary basis and will follow the procedural elements of the AOC. This includes a post-removal PCB concentration requirement for soils and sediments of less than 10 mg/kg.

## 2 Project Organization and Responsibilities

The various responsibilities of key project personnel and entities are defined below.

### 2.1 Key Project Personnel

Key project personnel have been identified by Ramboll Environ, Severson, and USEPA. Their identities and roles are described in more detail in the following subsections.

#### 2.1.1 Ramboll Environ Personnel

Alan Fowler, the Ramboll Environ project coordinator, will serve as the primary point of contact with USEPA and Tennessee Department of Environment and Conservation (TDEC). He will approve all changes in scope prior to implementation. Alan will be supported by the field construction supervisor (Bryan Arndt and others) with office-based project management support provided by Angela DeDolph.

The Ramboll Environ field construction supervisor (Bryan Arndt) or his designee will be in the field on a daily basis and will be the primary point of contact with Severson in the field. The Ramboll Environ field construction supervisor will be kept informed of all planned and accomplished activities and will supervise the work conducted in the field. The Ramboll Environ field construction supervisor must be present for any discussions between Severson and the USEPA field oversight representative. For contractual purposes, changes in scope, field conditions, sequencing or approaches to work, or other circumstances will be communicated through Bryan Arndt, Alan Fowler, or Angela DeDolph, and approved by Alan Fowler prior to implementation. These contract reporting requirements do not in any way limit the authority of the USEPA OSC or his designee to halt or direct work at the Site as described below in Section 2.1.3.

#### 2.1.2 Severson Personnel

Primary Severson field personnel will include Tim White, the On-Site Project Manager; Michael Weidner, the On-Site Health and Safety Officer; and Randy Campbell, the Site Superintendent. These personnel (or their designees) will be the primary Severson points of contact in the field.

#### 2.1.3 Regulatory Personnel

The USEPA OSC has the authority vested in an OSC by the National Contingency Plan, including the authority to halt, conduct, or direct any work required by the AOC, or to direct any other removal action undertaken at the Site. Absence of the OSC from the Site shall not be cause for stopping work unless specifically directed by the OSC. The TDEC may also be on-site but will only be present in an observatory capacity. The Ramboll Environ field construction supervisor must be present for any discussions between Severson and representatives of TDEC.

### 2.2 Responsibilities of Severson

Severson will plan and implement the TCRA project as described below.

- Mobilize equipment and materials to the Site

- Build and operate a support facility at the Site, including office trailers and a parking area
- Improve existing construction roads and construct creek crossings to access the work areas
- Construct a flow transition structure (riprap lined channel) to convey surface water runoff from the landfill to Beech Creek
- Construct and operate a temporary materials handling pad for dewatering, staging, and loading removed contaminated materials
- Construct and operate a temporary water treatment system to treat water that collects on the materials handling pad
- Remove trees and brush from Site work areas
- Excavate soils and sediments
- Transport and dispose of removed materials to an off-site facility, based on waste characterization results collected/analyzed by Ramboll Environ
- Backfill and restore excavated areas, stabilize creek banks, and seed floodplain areas
- Remove the materials handling pad and restore the area
- Decontaminate all vehicles and materials leaving the Site, and demobilize and decontaminate all equipment and materials at the end of the project

These items are discussed in more detail on a task-specific basis below. Severson is responsible for implementing the TCRA in a safe and effective manner following all applicable regulations and guidance and using best management practices (BMPs). Severson has developed and will implement a health and safety plan (HASP) for their work in accordance with USEPA and Occupational Safety and Health Administration (OSHA) guidelines. An electronic version of the Severson HASP is included in Appendix A. A printed copy of the HASP will be maintained at the Site while work is being performed.

### **2.3 Responsibilities of Ramboll Environ**

Ramboll Environ and the Respondents will provide access to the Site. Ramboll Environ will also be responsible for the following:

- Developing the overall plan to implement the TCRA
- Conducting construction management and oversight
- Collecting samples
- Subcontracting the laboratory that will perform sample analysis
- Evaluating laboratory data
- Providing surveying services through a subcontractor
- Acting as primary point of contact for communications with the Contractor, USEPA, TDEC, and the Respondents

Ramboll Environ will perform sample collection to monitor the progress of the remediation and to provide information needed for the appropriate disposal of excavated materials and treated water, including post-excavation sampling, waste characterization, and treated-water sampling prior to discharge. Ramboll Environ will be responsible for the laboratory(ies) performing all soil, sediment, and water analyses. Ramboll Environ will act as the Respondents' representative and will sign waste manifests on their behalf.

## 3 Project Implementation

The TCRA will be implemented as described in the EDWP (ENVIRON 2014) and this PEP. A summary of the work that will be implemented is provided below including additional details on a task-level basis.

### 3.1 Mobilization and Site Meetings

Mobilization includes all efforts to ready and transport equipment, personnel, and materials to the Site in order to implement the work. Mobilization will be phased for the different aspects of work (e.g., tree removal, construction of the water treatment plant, excavation, etc.).

The Ramboll Environ field construction supervisor and the Severson Onsite Health & Safety Officer will hold site-specific orientation meetings with all on-site personnel, craft labor, and subcontractor personnel at the beginning of this project with specific refreshers at the beginning of each major work task. When new personnel or subcontractors arrive at the project site, the Severson Onsite Health & Safety Officer will conduct additional orientation meetings and safety training as necessary. Daily tailgate meetings will be held each morning to review the activities scheduled for each crew, the hazards associated with each task, and the safety mitigation associated with each task.

There will also be weekly construction meetings held on Monday afternoon (or other agreed time) of each week. The weekly construction meetings will include a summary of:

- All work activities completed in the prior week
- A two week look-ahead forecast
- Plan changes/amendments
- Safety status reports
- Waste disposal quantities removed/shipped off-site

### 3.2 Establishment of Work Zones

Work zones including a site support facility, decontamination areas, exclusion zones, and a laydown area will be established at the beginning of the construction activities. The details for each area are included below.

#### 3.2.1 Site Support Facility

The site support facility will be established in the location shown on Figure 3A. The facility will include three trailers: one office trailer for Severson site management, one break trailer for Severson workers, and a third trailer for Ramboll Environ and USEPA oversight personnel. The office trailer for Ramboll Environ and USEPA personnel will include two individual offices separated by an open conference area. The office trailers will also include heating, air conditioning, bottled water, a small refrigerator, and a regular trash service for noncontaminated waste items. Figure 4 shows the general layout of the office trailers and an employee parking area for personal transportation vehicles and construction equipment that has not, and will not, come into contact with PCB-containing soils or sediments. Two portable toilets and a hand wash

station will be set up in locations accessible to the work areas. Severson will provide electric power for the trailers using a generator. One or more light sets will be used to support night-time operations.

The first step in establishing the site support facility will be to cut the grass at ground's surface (no grubbing) followed by the placement of a nonwoven geotextile as a marker layer. Crushed stone will be placed over the marker layer and the area leveled. The intent is not to grade the area by disturbing in-place soils but rather, use the crushed stone to build up the grade where needed. The area will be surrounded by security fencing that will include a locking gate.

Following removal of the trailers at the conclusion of the construction activities, the crushed stone will be removed and placed on one of the nearby access roads and the support area will be seeded and stabilized. Depending on when the project ends, erosion controls (e.g., silt socks) may be needed around the area and/or a second seeding may be needed in the following spring.

### **3.2.2 Decontamination Areas**

Contamination Reduction Zones (CRZs) will be established at each active work area where PCB-containing materials may be present. These CRZs will prevent contaminated soils and sediment from being tracked outside of the work areas. Three fixed CRZs will be established for the duration of the project. One of the fixed CRZ is shown on the top portion of Figure 5 and will be located at the base of the former landfill where the logging road from the excavation areas meets the haul road that travels up to the site support facility. This CRZ is strategically located at Site boundary at the base of the former landfill. A second fixed CRZ station will be located at the exit of the material staging pad. This second CRZ provides for an additional cleaning step for the Hydrema trucks after the excavated materials are dumped from the truck onto the processing pad. Following placement of the materials on the pad, the Hydrema trucks will go through an initial dry decontamination step while on the pad to remove any accumulated solids. The trucks will then proceed to the decontamination station where any residual materials from the outside of the trucks will be removed and the tires will be washed. This second fixed CRZ will also be used to decontaminate the over-the-road trucks that will be used to transport the excavated materials to the off-site disposal facilities. Both of these decontamination stations will include spray washing equipment and temporary storage drums/tanks. Severson will use a submersible pumps to transfer contaminated wash water to a portable tank or drum from where it will be conveyed to the water treatment system for processing. A third permanent decontamination station will also be located at the materials handling pad and be used to decontaminate personnel working on the materials handling pad (Figure 5). This facility will be equipped with an eye wash station and a separate boot wash station. The current plan is to obtain water for the decontamination stations from a local fire hydrant with trucking to the Site. Use of a local fire hydrant for this purpose will be cleared with the City of Waynesboro during the mobilization period.

Because the excavation and loading of soils/sediment will be completed along the creek as opposed to a single location, the location of a fourth CRZ (for each excavation/loading area), will move with the excavation/loading activities. To prevent soils and sediments, from accumulating on the Hydrema trucks that will be used to convey the excavated materials to handling pad, the

truck bed of the Hydrema will be draped with plastic sheeting to catch any drips as they are loaded with the backhoe. The plastic sheeting will be held in place with sand bags on the ground and clamps to the bed of the Hydrema. Materials generated during the decontamination process including soil/sediment and plastic will be collected at the end of each shift and disposed of with the excavated materials.

### **3.2.3 Exclusion Zones**

Sevenson will demarcate the active work zone with orange safety fencing or similar appropriate method. Signs will be placed at the entrances to all exclusion zones to alert personnel of appropriate levels of PPE and to prevent unauthorized access.

### **3.2.4 Equipment and Backfill Staging Area**

To store backfill materials and equipment, Sevenson will establish a staging area adjacent to the materials handling pad (see Figure 6). Construction of the staging area will include placement of nonwoven geotextile and crushed stone. Similar to the site support facility, the intent is not to grade the area by disturbing in-place soils but rather, use the crushed stone to build up the grade where needed.

## **3.3 Site Security Plan**

Sevenson will hire a local contractor to provide security for the site during times when the Sevenson project staff are not at the Site and when PCB-containing soil and sediment are being temporarily stored on the materials handling pad. The security guard will be stationed inside the office trailers and employee parking area in a personal vehicle or in one of the Sevenson supplied office trailers. (Figure 4). The guard will periodically patrol the access road, office trailer complex, and the materials handling area during these times. Sevenson does not anticipate that the security guard will patrol down the haul or logging roads due to safety concerns. While PCBs are being temporarily stored on the materials handling pad, the anticipated days/times when outside security staff will be present include:

- Monday – 7 pm to 7 am (one shift nights)
- Tuesday – 7 pm to 7 am (one shift nights)
- Wednesday – 7 pm to 7 am (one shift nights)
- Thursday – 7 pm to 7 am (one shift nights)
- Friday – 7 pm to 7 am (one shift nights)
- Saturday – 7 am to 7 pm and 7pm to 7am (two shifts day and nights)
- Sunday – 7 am to 7 pm and 7pm to 7am (two shifts day and nights)

If a local security guard is not available, Sevenson will work with Securitas, a national security staffing firm to fill the position.

## **3.4 Tree Removal**

Trees and brush will be cleared from the work area, including the floodplain excavation areas and the roadways. The trees greater than 6 inches diameter at breast height (DBH) that have

been identified for removal are marked in the field and shown on Figures 7a through 7f. These figures have been revised and updated from the figure that was provided with the EDWP (ENVIRON 2014). The update is based on a recent review of field conditions. In addition, smaller trees (i.e., those less than 6 inches DBH) and a small amount of brush in the excavation areas and the proposed roadway need to be felled and removed. The trees flagged for removal will be downed with support of an excavator to control fall direction and protect laborers. Once the trees are felled, the tree trunks and branches will be cut into 10- to 20-foot lengths and stockpiled into habitat piles. The tree trunks will be cut no higher than 4 inches above the local ground surface and the tree stumps will remain in place unless otherwise directed by Ramboll Environ. The potential for limited tree stump removal will be addressed under the excavation component of the work. Branches less than 3 inches in diameter will be chipped to provide mulch for later use as part of the restoration process. The location, size, and configuration of the habitat piles will be determined in the field in consultation with the USEPA. The objective is to generally locate the habitat piles away from creek.

### **3.5 Access Road Enhancements**

A network of access roads, including creek crossings, will be necessary to support implementation of the TCRA project. Construction roadway upgrades will be consistent with the guidance provided by TDEC (2012). The intent of the access road enhancements is to provide a stable roadway for personnel (pedestrian access) and heavy equipment and to minimize the spread of PCB-containing soil and sediment within the footprint of the Site as the off-road trucks move the materials from the point of excavation to the base of the former landfill where they will be decontaminated on their way to the materials handling pad. The improvements made to this (and other) portions of the access roads will be left in place following construction.

#### **3.5.1 Access Roads**

The access road network is shown on Figure 3A and includes the roadways from the Site support facility and the materials handling pad that lead to the base of the former landfill (the haul road), and the access roads within the Site from the base of the former landfill to the locations where soil and sediment will be excavated (the logging road). Additional details for the logging road to access the excavation areas are shown on Figures 3B1, 3B2 and 3B3. These figures show the logging road relative to the creek and floodplain excavation locations. The three figures also show the locations where small step-out portions of the logging road will be built to facilitate loading of the Hydema trucks. These step-out areas are needed in several locations so the trucks can be loaded directly by the excavator. This is being done to maximize the amount of direct loading of the Hydema trucks and minimize the rehandling of excavated materials. The logging road shown on Figures 3B1, 3B2 and 3B1 follows the general path established by the current logging road. This roadway road will be upgraded by placing a geotextile fabric and a layer of crushed stone.

The haul road that leads to the Site (from behind the church) will be upgraded to make it safe and to prevent the roadway from washing out as a result of heavy precipitation. Significant improvements at the base of the former landfill to control surface water erosion will be used to bridge the existing gap between the two access roads (the haul road and the logging road). Typical access road enhancements are shown on Figure 8. Excavation is not the preferred approach for work on any of the roadway improvements. The overall approach is to use clean fill

materials rather than reworking and relocating PCB-containing materials. The imported fill materials for the roadway upgrades will be left in place following project implementation as the materials are consistent with the character and use of the existing logging and haul roads. Severson will also use additional equipment (e.g., roadside cables) and procedures (e.g., personnel equipped with two-way radios at the top and bottom of the road) to ensure safety for equipment and personnel using the steep-sloped portion of the roadway network to access work areas.

### **3.5.2 Flow Transition and Creek Crossing at the Base of the Former Landfill**

Flow transition structures (riprap) will be added to the most upstream (southern) reach of the Site. This includes the area located immediately north of the former landfill. This layer of riprap will be used to convey surface water runoff from the former landfill to the creek. Construction of the flow transition structures will include grading the slope and placing riprap to serve at the long-term mechanism to convey flow that runs off the landfill to the creek. The area is currently eroded and the riprap is being placed to minimize further erosion of the steep-sloped area. A temporary creek crossing will also be placed by the western sluiceway that conveys surface water runoff from the surface of the former landfill to its base (Figure 9). This temporary creek crossing will facilitate access for equipment and personnel to the logging road that begins at the base of the former landfill. The temporary creek crossing includes several pipes to convey surface water flow that will be removed following implementation of the TCRA project.

### **3.5.3 Temporary Creek Crossings**

It is anticipated that two temporary creek crossings will be needed to implement the TCRA project. The locations of the two temporary creek crossings are shown on Figures 3B2 and 3B3 and will be removed following completion of the work. Both of the creek crossings will allow creek flow to occur during and following precipitation events. A typical section is provided in Figure 8.

### **3.6 Materials Handling Pad**

The temporary materials handling pad will be used for dewatering, staging, and loading PCB-containing soil and sediment into over-the-road trucks for transport to an off-site disposal facility. The pad will be constructed over a layer of crushed stone. The intent is not to grade the area by disturbing in-place soils but rather to use the crushed stone to build up the grade, where needed.

The first step during construction will be to mow the grass to the ground surface (no grubbing will be allowed) followed by the placing a nonwoven geotextile as a marker layer. At least 3 inches of crushed stone will be placed over the marker layer and then a 3-inch-thick asphalt layer will be placed over the stone. The asphalt layer will include 6-inch curbing around the outside of the materials handling pad and will be sloped to a sump in order to collect water from the dewatering of the soil and sediment, as well as precipitation that drains from the pad. Eight separate areas will be built on the pad (e.g., bins) with an approximate capacity of 150 cy per bin to manage the dewatering and staging of soil and sediment. Severson will use precast concrete bin blocks (2 feet by 2 feet by 6 feet) to construct the storage bins for the excavated soil/sediment. An isolated portion of the materials handling pad will be used for the temporary

water treatment equipment, which is discussed in greater detail below. A third portion of the materials handling pad will be used for loading the dewatered soil and sediment into the over-the-road trucks for transportation to the off-site disposal facility. The truck loading area will be equipped to decontaminate the trucks prior to leaving the materials handling pad in the event that PCB-containing soil and sediment need to be removed from the exterior of the truck. The materials handling pad will be equipped with lights to facilitate nighttime operations. The light plants will be located outside of the pad area but inside of the fence. The pad will be surrounded by a 6-foot security fence that has 2 locking vehicle gates.

Upon project completion, the asphalt used to construct the pad will be decontaminated and sent to an asphalt recycling plant and the crushed stone will be placed on nearby access roads. Ramboll Environ will be responsible for any testing of the pad following decontamination activities. The marker layer will be sent to an off-site disposal facility and the area will be seeded and stabilized. Depending on the project completion date, restoration of the area may include the installation and removal of erosion controls (silt socks), a second seeding in the following spring, and/or seeding placed in the area during late 2015 prior to the onset of winter. A plan view figure showing the general layout of the materials handling pad is provided as Figure 6. Construction related details for the materials handling pad are provided on Figure 8.

The materials handling pad will be operated and maintained on a daily basis, as needed, during the project. Hydrema trucks will transport excavated material from the excavation areas to the materials handling pad. Trucks will enter the material handling pad and end-dump materials into a designated bin. Bins will be designated for either TSCA (i.e., soil or sediment with PCB concentrations greater than 50 mg/kg) or non-TSCA (i.e., soil or sediment with PCB concentrations less than or equal to 50 mg/kg) material and will remain segregated. The initial designation in terms of the materials being above or below 50 mg/kg will be made by Ramboll Environ based on PCB data presented in the EDWP. An eight-point composite sample will be collected from each bin and analyzed for PCBs by a laboratory under contract to Ramboll Environ. The PCB results from these samples relative to a concentration benchmark of 50 mg/kg will be used to determine the off-site facility that the excavated materials will be transported to for disposal.

The general plan is not to store soil and sediment on the materials handling pad for periods of time longer than 60 days. Unless otherwise approved by the USEPA, the excavated soils/sediment will not be stored on the materials pad for a period of time longer than 90 days. Soil and sediment will be dewatered such that they will pass the paint filter test and other relevant criteria that the off-site disposal facility deems necessary. Based on the available data for the soil and sediment, admixtures will not be necessary to pass the paint filter test. However, placing tarps over the soil piles may be necessary to prevent water infiltration from rain as well as to reduce fugitive dust emissions. An operator will utilize a loader to manage materials in the material handling pad and load trucks for off-site disposal. Decontamination of the bucket will be performed with a power washer whenever the loader is required to work separate material types during the operation. A laborer will oversee all decontamination tasks including: the loader working the handling pad, trucks loaded for offsite disposal, and trucks delivering excavated soil/sediment to the pad.

### 3.7 Water Treatment Plant

A temporary water treatment system will be used to treat water generated during the dewatering of soil and sediment; and water from precipitation that collects on the materials handling pad. The treatment plant is designed to treat 200 gallons per minute. The treatment plant includes the necessary components and is sized in a manner to achieve the project’s effluent criteria, which are summarized on the below table.

#### Effluent Criteria

Parameter	Effluent Criterion
Total Suspended Solids	Less than 10 milligrams per liter (mg/L)
Whole-Water PCB Concentration	Less than 0.5 micrograms per liter (µg/L)
pH	Between 6 and 9

A process flow diagram summarizing the treatment process is included on Figure 10. The general layout of the equipment is shown on Figure 6. The following equipment will be included in the water treatment process:

- **Influent Equalization** – Water accumulated on the materials handling pad will be pumped into the two influent tanks. These tanks are piped together in a parallel configuration and will be used for flow equalization. The tanks will also be used to separate heavier materials such as sediment prior the filtration phase of the treatment process. If necessary, accumulated solids will be removed from the tanks during operations. The tanks will also be decontaminated before leaving the Site at the end of the TCRA project.
- **Filter Feed Pump** – Following the influent tanks will be a 200 -gpm electric, centrifugal pump. This pump will be operated in manual mode. The flow rate will be adjusted with the use of a variable frequency drive (VFD) mounted on the pump skid. One duty pump and one standby pump will be provided. The duty pump will normally be manually operated and the flow rate adjusted as required to suit the operations of the downstream units. The filter feed pump will pump through the bag filters and the GAC vessels to the effluent storage tank.
- **Primary Bag Filters** – Particulate filtration will be accomplished using two skid-mounted bag filters, arranged in parallel. Each bag filter is six-element bag filter. Initially the bag filters will be fitted with 5-micron bags, though these may be modified depending upon site conditions. The vessels have been fitted with inlet and outlet pressure gauges. Bag filters will be changed at an appropriate pressure differential.
- **Granular Activated Carbon (GAC) Reactors** – Two 8-foot diameter GAC units will be operated in series. The GAC units remove soluble and insoluble organics, and suspended solids. Each of the GAC columns holds approximately 10,000 pounds of carbon, for a total of approximately 20,000 pounds of carbon. The amount of carbon in each vessel has been calculated to give the process water the correct amount of contact time at a maximum flow rate of 200 gallons per minute. The GAC vessels have been provided with a backwash capability. It is estimated that the GAC units will be backwashed weekly to “fluff” the media and to remove any accumulated solids to the Influent Equalization Tanks. It is not

anticipated that a change of carbon media will be required during the course of construction. However, if a media change becomes necessary, Severson will remove the spent media by using a vacuum truck, and replace the media in kind.

- Effluent/Backwash Storage Tank – Following the GAC vessels, the flow will continue under pressure, to be discharged into an effluent/backwash storage tank. The purpose of this tank is to receive and store treated wastewater to be used for backwashing the GAC vessels. Sampling of final effluent is envisaged from this tank.
- Flow Meter Rate/Totalizer – All treated wastewater will pass through a flow meter and totalizer. This will provide an estimate of the amount of water that is treated and discharged.
- Hoses – Hoses will be used for the conveyance of the process waters. Hoses are used instead of piping because they provide a degree of flexibility and shock absorption that is critical in the field. The hoses will be constructed of a hard rubber and include spiral wound steel reinforcement.

Severson will commence start-up activities by first filling the process tankage with water. Pumps will be “bumped” to verify correct rotation. Instrumentation will be checked to establish that instruments and systems are fully functional. The plant will be started on 10,000 to 20,000 gallons of accumulated waters from materials handling pad and will operate at the design flow rate of 200 gpm until the initial batch is treated. Severson will monitor all gauges and instruments during the start-up and make any necessary process changes to ensure proper operation and treatment. After processing the initial batch, the treated water will be retained in the effluent storage tank while samples are collected and analyzed. Grab samples will be utilized to sample influent and effluent flows. All samples will be collected by Severson and provided to Ramboll Environ for analysis. The influent samples will be taken at the entrance to the flow equalization tanks. Effluent samples will be taken at the effluent storage tank. The operational testing to verify initial performance will be conducted in accordance with the effluent criteria and the testing protocol provided in the EDWP.

All residuals from the treatment plant (e.g., settled solids and used filter bags) will be disposed of with the excavated material. GAC media may be either disposed with the excavated materials or sent back to the manufacturer for regeneration.

Treated water will be discharged via a gravity flow pipeline from the effluent/backwash storage tank to a riprap pile constructed above ground and located approximately 350 feet from the water treatment system. The discharge configuration is shown on Figure 11.

### **3.8 Excavation and Backfilling of PCB-Containing Soil and Sediment**

The primary objective of this TCRA is to remove floodplain soils, creek sediments, and bank soils in the designated areas to achieve a post-removal PCB concentration of 10 mg/kg or less. The excavation areas are shown on Figures 12a through 12f, and cross sections for selected portions of the excavation are shown on Figures 13a through 13g.

#### **3.8.1 Erosion Control**

Prior to performing any intrusive work at the site, Severson will install temporary erosion control measures around the work areas. These include silt fencing in areas where PCBs are not

present and engineered straw logs (waddles) in areas where PCBs may be present. When silt fence is installed, Severson will place the bottom 6 inches of the silt fence fabric in a shallow trench, when it is feasible, and cover the fabric with soil to prevent migration. Siltation and erosion control practices will be consistent with currently BMPs discussed in this PEP and the EDWP.

### **3.8.2 Excavation**

Severson anticipates being able to remove approximately 100 to 200 cy of soil/sediment per day (average of 150 cy per day). The efforts to remove soil and sediment will generally proceed from upstream (south) to downstream (north). Excavation activities for a given reach of the Site will begin in the creek and will proceed outward to the applicable area (e.g., creek bank or the exposure unit [EU] [inclusive of the creek bank]). This will facilitate equipment access to the creek in those situations where creek bank soil or floodplain soil removal is also required. The sequence of work (upstream to downstream) is one of several BMPs that will be used to minimize the potential for materials to migrate downstream should there be precipitation during project implementation. Excavation may occur on a parallel basis with excavation occurring at both an upstream and a downstream location at the same time. The downstream excavation would only be conducted for bulk removal purposes, and would not include final clean-up passes and post-excavation sampling until the upstream excavations are completed (including sampling confirming that the 10 mg/kg post-removal criteria have been met).

In developing BMPs for the project, the August 2012 version of the Tennessee Erosion & Sediment Control Handbook (TDEC 2012) was used as a guide. Other BMPs for the project include working quickly to close out and stabilize excavated portions of the floodplain EUs and creek banks and placing a silt fence or silt sock adjacent to the creek for bank areas (including EUs) where the excavation was conducted. Orange construction fencing will be used to delineate the general work areas of the Site.

Following excavation, Ramboll Environ will collect post-removal samples, manage the analytical laboratory, and request a three-business-day turnaround for samples. Once sample results document that excavation areas meet closure requirements (i.e., a PCB concentration less than 10 mg/kg), the area will be stabilized. If the results of post-removal samples indicate that additional removal of soils or sediments is needed, Ramboll Environ will provide the Severson with the necessary direction.

The excavated soils areas near the creek will be stabilized using a combination of techniques to facilitate vegetative regrowth. An additional BMP includes visual inspection of the Site following precipitation events that result in over 0.5 inches of rain within a 24-hour period, or as requested by USEPA. This inspection will be conducted to identify if soil materials from the creek bank or floodplain excavation areas have washed into the creek. If loose soils from the excavation areas have been washed into the creek (within or immediately downstream of the Site), these materials will be removed and taken off-site for disposal along with other excavated soil and sediment. Depending on the specific circumstances of material washing into the creek (e.g., amount of material, approximate PCB concentration [based on characterization sampling], creek substrate), removal of the material that was washed into the creek and/or post-removal sampling may be appropriate to confirm that PCB concentrations in creek sediments following the removal are below 10 mg/kg.

The excavated materials will be loaded into off-road dump trucks and transported to the materials handling pad. Aprons and covers will be used to prevent PCB-containing sediment and soil from falling on the outside of these off-road dump trucks during loading. A primary objective during the transport of the excavated soil and sediment to the materials handling pad is to avoid the spread of PCBs within and outside of the Site's footprint as excavated materials will be transported over the temporary access road network. The trucks will be inspected and decontaminated, as necessary, before they leave the point of loading and again prior to exiting the logging road and traveling on the haul road beginning at the base of the former landfill to the materials handling pad.

### **3.8.3 Backfill**

Floodplain areas and the creek bed will be returned to the approximate pre-excavation elevation with backfill materials. The floodplain will be backfilled with granular fill and topsoil and then seeded. Prior to the acceptance of any cover or fill materials to be used in the restoration efforts, the originator of the materials may be required to produce analytical reports to assure that the material does not contain unacceptable concentrations of PCBs. Reinforced turf mats will be used along the creek bank areas, as shown in the EDWP. The backfill materials in the creek bed will be commonly available 2- to 3-inch processed stone, or equivalent. Figure 14 illustrates the range of potential restoration alternatives. Direction to Severson will be provided in the field by Ramboll Environ regarding the location-specific approach to be used in restoring the creek bank areas. This direction may be based on consultation with the USEPA field representative.

### **3.8.4 Decontamination Procedures**

This decontamination procedure applies to equipment and personnel working on the Site. Personnel utilizing additional personnel protective equipment (PPE), such as gloves and Tyvek coveralls, will be required to doff at the decontamination zone. A designated storage drum will be provided for the disposal of used PPE. Additional details of the decontamination procedures may be found in the site specific Site Health and Safety Plan.

#### **3.8.4.1 Procedures to Prevent Contamination of Clean Areas**

In order to prevent cross-contamination from occurring, Severson will employ a series of procedures, such as, proper delineation of work zones, use of plastic to protect the truck during loading operations, and instructing operators to exercise care during loading operations.

Once at the decontamination pad (at the base of the former landfill), Severson will initiate the decontamination process using power washers. Decontamination activities during the excavation and loading of the off road Hydrema trucks will be performed as a dry decontamination. Once the truck has been decontaminated, the risk of spreading contamination from loaded trucks has been mitigated and the truck will follow the haul road from the base of the former landfill to the materials handling pad.

In order to prevent the migration of contamination onto clean areas from site personnel, all personnel that are performing work within the work area (i.e. in the Creek) will be required to exit the exclusion zone through the personnel decontamination pad within the CRZ. The location will move as the work moves down the Creek. At this area, all personnel will remove

and dispose their used PPE into drums. After the soiled PPE has been discarded, the employee will self-perform a wet decontamination process by scrubbing their boots in a boot wash station. This will prevent the migration of impacted materials from the exclusion zones into the support zones or clean areas.

If, for any reason, any residual impacted soil is accidentally tracked onto a clean area, Severson will immediately isolate and collect the soil using shovels and brooms. This material will be taken back into the active portion of the exclusion zone and disposed in the future.

#### **3.8.4.2 Vehicle Decontamination and Inspection Procedures**

The decontamination and inspection process will occur after a truck has been loaded inside the active portion of the exclusion zone. This will include the removal of residual soil/sediment from the side rails of the truck bed and the truck. The truck will be directed to follow the delineated access roadway (the improved logging road) where it will enter the decontamination pad at the base of the former landfill (the transition point to the haul road leading to the materials handling pad). Once at the decontamination pad, Severson will power wash any residual soil from the truck and tires.

The over-the-road vehicles that are transporting the excavated soils/sediment to the off-site disposal facilities will also be decontaminated after loading. Following decontamination, tarps will be placed over the truck bed and secured. A pre-final inspection will be conducted and any additional decontamination activities will be conducted. The driver will then be directed to pull off the decontamination pad, where it will be stopped for one final inspection and issued a manifest. In addition to the trucks hauling the excavated materials to off-site disposal facilities, all equipment and materials will be decontaminated using a high-pressure water wash at the materials handling pad prior to leaving the Site. The decontamination water will be collected and pumped to either localized holding tanks or the on-site plant for treatment and discharge.

#### **3.8.4.3 Procedures for Collection, Treatment and Disposal of Decontamination Residuals and Used PPE**

The decontamination procedures that Severson will utilize for this project and the use of certain PPE will create residual wastes during remediation efforts. The high-pressure power washing method of decontamination will create residual contact water at the decontamination pad. Severson decontamination pads are specifically designed to capture the decontamination / contact water in water tight pads that has been constructed beneath the top of the decontamination trays. This allows for the truck or equipment to park on the decontamination pads and, as the truck is washed, the residual water will run into a sump location. Once the pan is nearly full of decontamination / contact water, Severson will pump this water to a temporary holding tank or directly to the onsite waste water treatment plant where it will be treated and discharged.

### **3.9 Dust Control**

Severson has identified the following project work areas/tasks as potential sources of fugitive dust emissions. They are as follows:

- Mobilization

- Grading and placing stone to prepare the parking and processing pad area
- Delivery of equipment and materials
- Site Preparation
  - Tree removal and stump grubbing
  - Installation of erosion and sediment controls
- Contaminated Soil Excavation, Soil Processing, and Load-Out
  - Soil excavation and loading to hydrema trucks
  - Staging soils in containment bins while waiting for analytical results
  - Loading soil to dump trucks for disposal
  - Soil transportation
- Work Area Restoration and Demobilization
  - Backfill to existing lines and grades,
  - Topsoil/repairing disturbed areas, and
  - Removal of equipment and temporary facilities.

The following methods, which focus on worker training and practices, will be used to prevent conditions conducive to dust generation and suppress dust should it occur.

- Educate, train, and reinforce with workers at daily safety meetings the necessity to perform their tasks in a manner that does not generate dust.
- Stress the importance and reinforce the need to keep assigned work areas clean, neat, and dust-source free as a standard operational procedure during all work activities on an ongoing basis.
- Maintain dust suppression in assigned work areas.
- Ensure that workers notify supervisors of dusty conditions whenever they are visually observed and request dust suppression support, if needed.

### **3.10 Off-Site Transportation and Disposal**

Sediment and soil excavated from the Site and other generated materials (e.g., filter bags, collected solids, PPE, and possibly activated carbon) will be transported to an approved off-site disposal facility using a licensed waste hauler (Page ETC). Contact information for Page ETC and their USEPA identification number (ID) are provided below. Copies of their transport licenses for Tennessee and Alabama are provided in Appendix B.

Page ETC  
2758 Trombley Rd  
Weedsport, NY 13166  
EPA ID# NYD986969947

Three off-site disposal facilities are proposed for use during the TCRA project. These include two off-site facilities for materials with PCB concentration less than 50 mg/kg (Environmental Waste Solutions, LLC and Waste Management/Cedar Ridge Landfill) and one off-site facility for the disposal of materials with PCB concentrations equal to or greater than 50 mg/kg (Waste Management/Emelle). The facility names, addresses and state/federal permit ID numbers for these three off-site disposal facilities are listed below.

Environmental Waste Solutions, LLC  
200 Omar Circle  
Camden, TN 38320  
Solid Waste Disposal ID: IDL 03-0212

Waste Management/Cedar Ridge Landfill  
2340 Mooresville Highway  
Lewisburg, TN 37091  
Solid Waste Disposal ID: SNL 591020238

Waste Management/Emelle  
36964 Alabama Highway 17  
Emelle, AL 35459  
Hazardous Waste Disposal ID: ALD000622464

All materials generated during Site activities will be handled and managed as PCB-containing materials until they are characterized. Materials will be sampled by Ramboll Environ and analyzed by an analytical chemistry laboratory that is under contract to Ramboll Environ. The materials will be analyzed for PCBs prior to disposal. After the excavated materials have been dewatered and characterized for disposal, they will be transported by ETC Page to one of the licensed off-site disposal facilities identified above (based on PCB concentration). The expected average amount of waste to be transported off-site weekly is approximately 500 tons with off-site transportation typically occurring 3 to 5 days per week. The anticipated truck traffic volume is 5 to 20 trucks per transport day.

Loading for off-site disposal will occur from the materials loading station portion of the materials handling pad (Figure 6). All trucks with materials that have been classified as having PCB concentrations greater than or equal to 50 mg/kg will utilize a liner. All trucks exiting the sediment loading area will pass through a decontamination station that includes removal of any large soil/sediment, power washing (if necessary) to remove the remaining materials, and passage over a wheel wash. Once loaded and decontaminated, each truck and/or trailer will be covered and dispatched to an off-site facility for disposal. The waste manifests will include the Generator ID Number provided by the USEPA (TNN000410901) and the manifests will be signed by Ramboll Environ on behalf of the generator.

### **3.11 Demobilization**

All equipment and personnel that have been mobilized to the site will be removed. All equipment and facilities (e.g., portions of the materials handling pad) that may have contacted soils/sediments PCB-containing materials will be decontaminated prior to leaving the site. The

buckets, tracks and bodies of equipment that may have come in contact with potentially contaminated soils will be cleaned of accumulated materials (dry decontamination) on site. All equipment that has will be decontaminated before handling non-TSCA materials, before handling clean backfill materials, and prior to leaving the site. Upon completion of work and before leaving the site, cleaned equipment will be wipe sampled by Ramboll Environ.

Transport vehicles that may have been in contact with contaminated materials will be washed with high pressure, low volume water spray prior to hauling clean backfill materials and prior to leaving the site. Wash water will be collected and transported (if decontamination activities also take place on the temporary pad between haul and access road) to the onsite wastewater treatment plant.

Following restoration and decontamination operations, Severson will remove all equipment and job-associated rubbish and materials from the site and clean the site to appropriate standards.

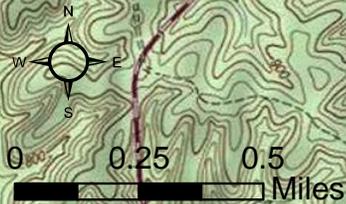
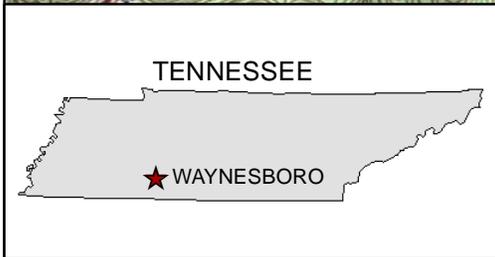
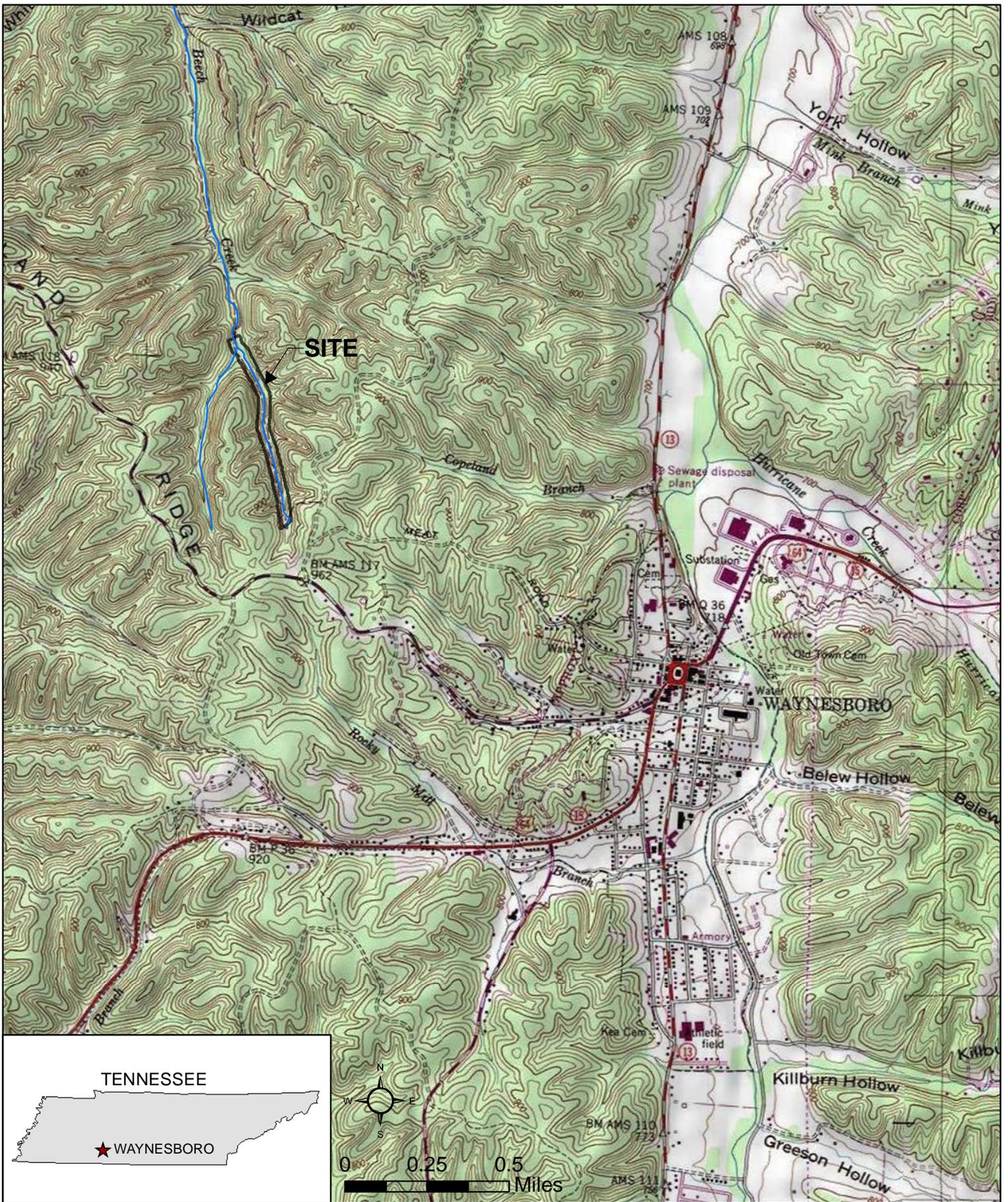
## 4 References

ENVIRON. 2014. Excavation and Disposal Work Plan. ENVIRON International Corporation. October.

USEPA 2014. Administrative Settlement Agreement and Order on Consent for Removal Action. Beech Creek Superfund Site Wayne County, Tennessee. United States Environmental Protection Agency Region 4 Docket Number CERCLA-04-2014-3751. Effective Date: February 20, 2014.

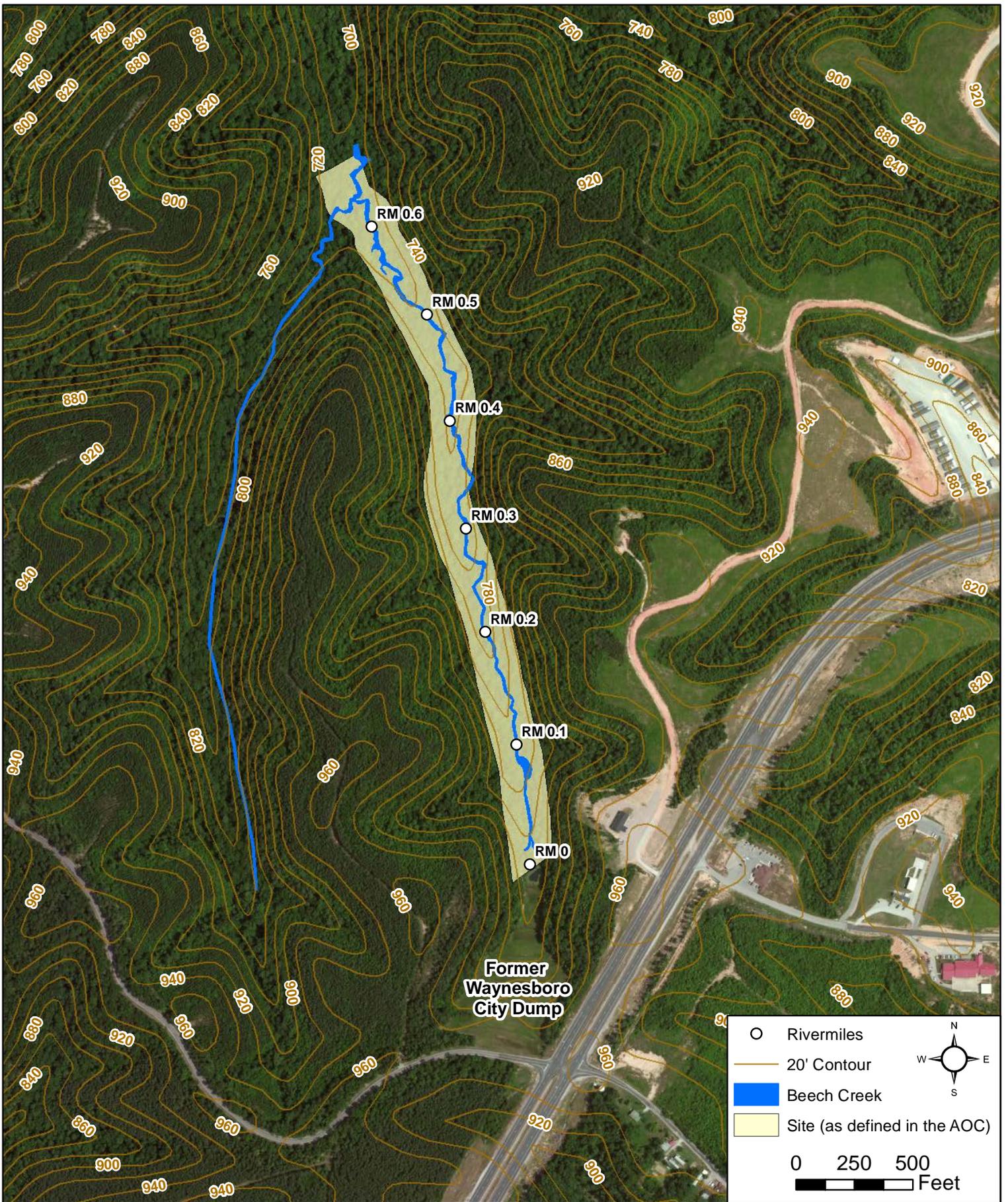
Tennessee Department of Environment and Conservation (TDEC). 2012. Erosion and Sediment Control Handbook: A stormwater planning and design manual for construction activities. Fourth Edition. August.

## Figures



Site and Vicinity  
 Beech Creek Superfund Site  
 Wayne County, TN

Figure  
 1

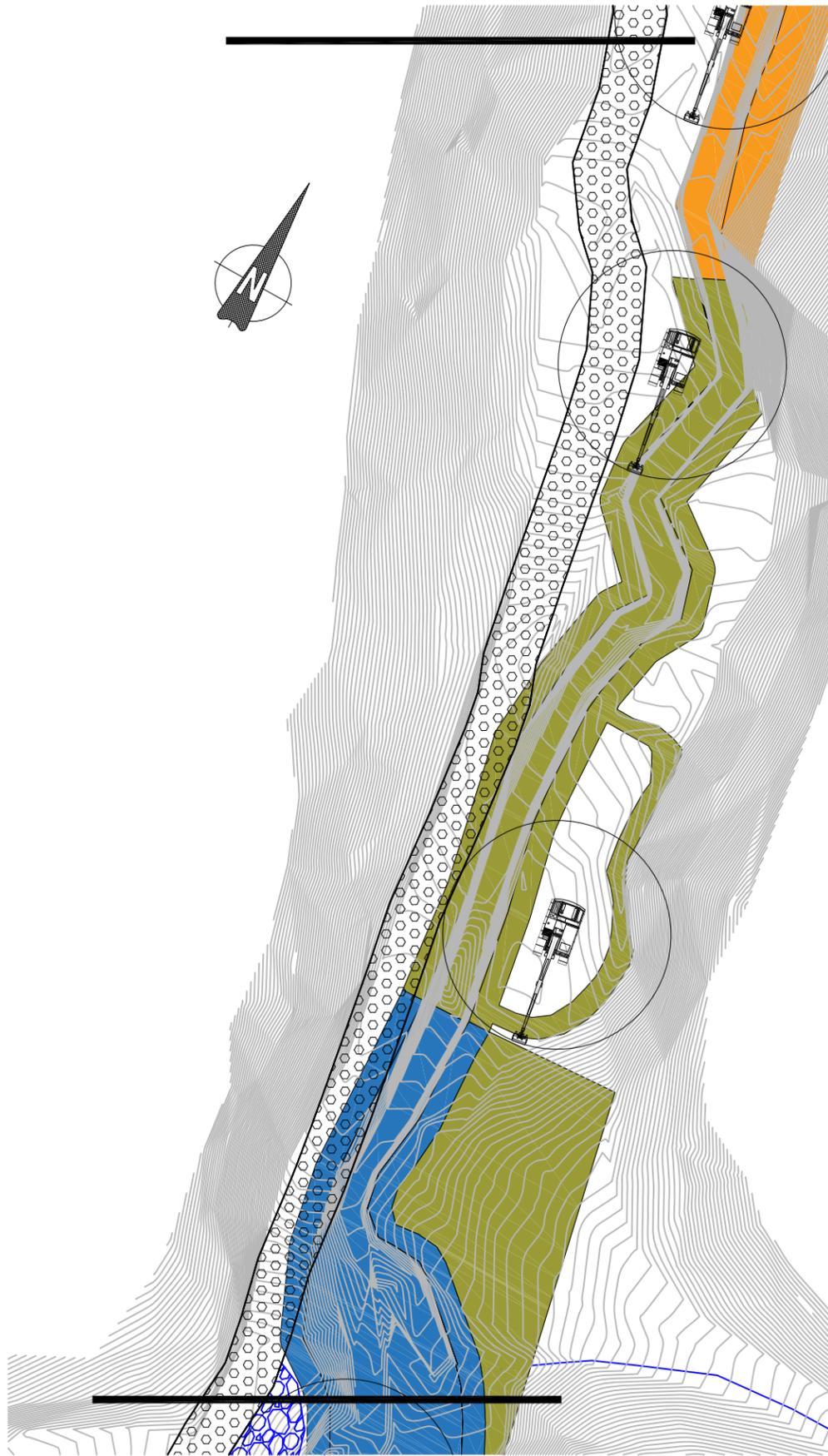
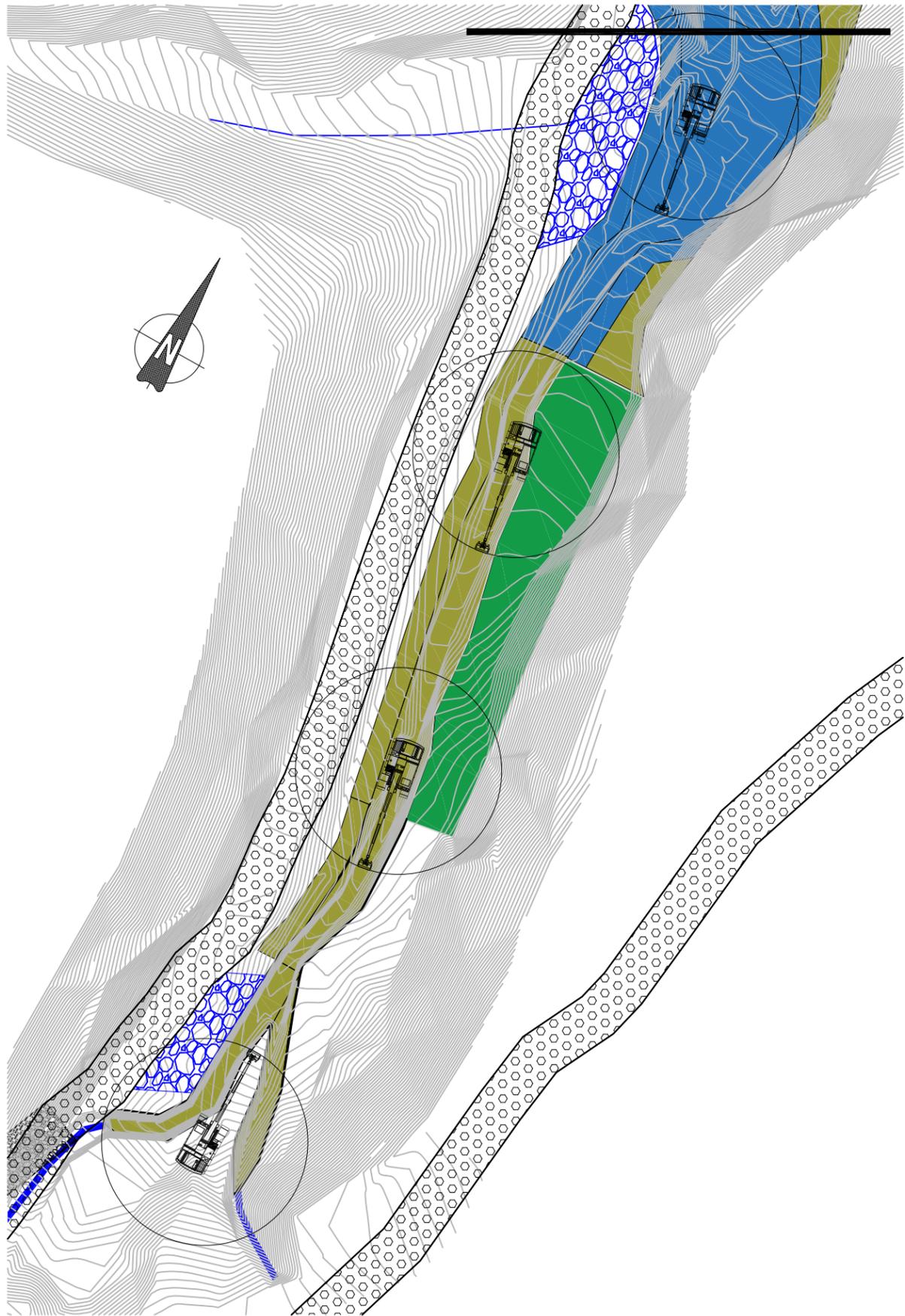


Site Location  
 Beech Creek Superfund Site  
 Wayne County, TN

Figure  
 2



<b>SITE LAYOUT ACCESS ROAD</b>	
ENVIRON BEECH CREEK SUPERFUND SITE	
WAYNE COUNTY, TENNESSEE	
<b>SEVENSON ENVIRONMENTAL SERVICES, INC.</b>	
<b>FIGURE 3A</b>	DATE: 04/28/15
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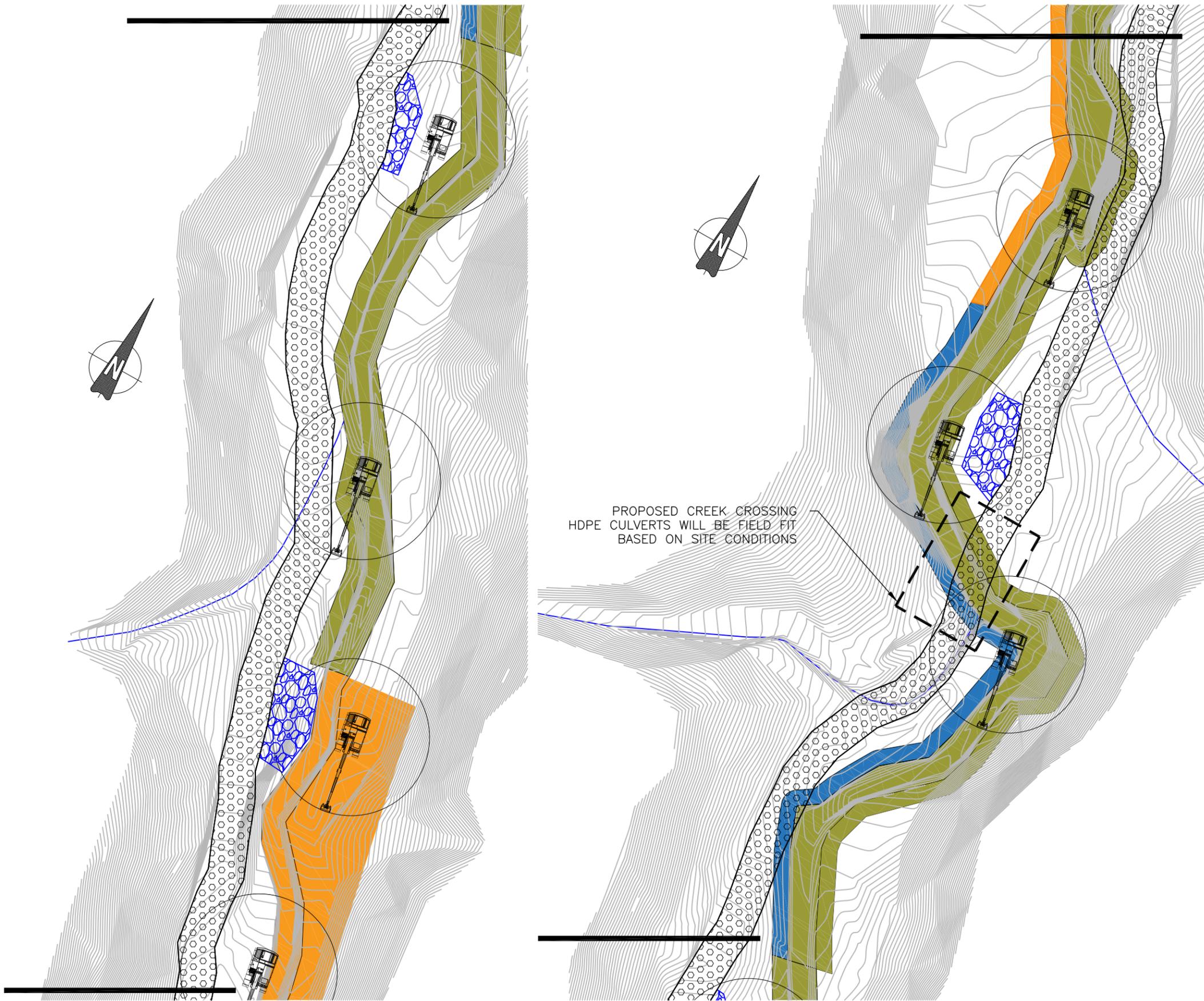


LEGEND

-  EXCAVATOR REACH
-  IMPROVED LOGGING ROAD
-  CREEK ACCESS ROAD
-  6" REMOVAL
-  12" REMOVAL
-  18" REMOVAL
-  24" REMOVAL



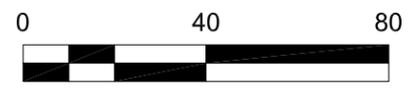
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WAYNE COUNTY, TENNESSEE	
 <b>SEVENSON ENVIRONMENTAL SERVICES, INC.</b>	
<b>FIGURE</b>	DATE: 05/04/2015
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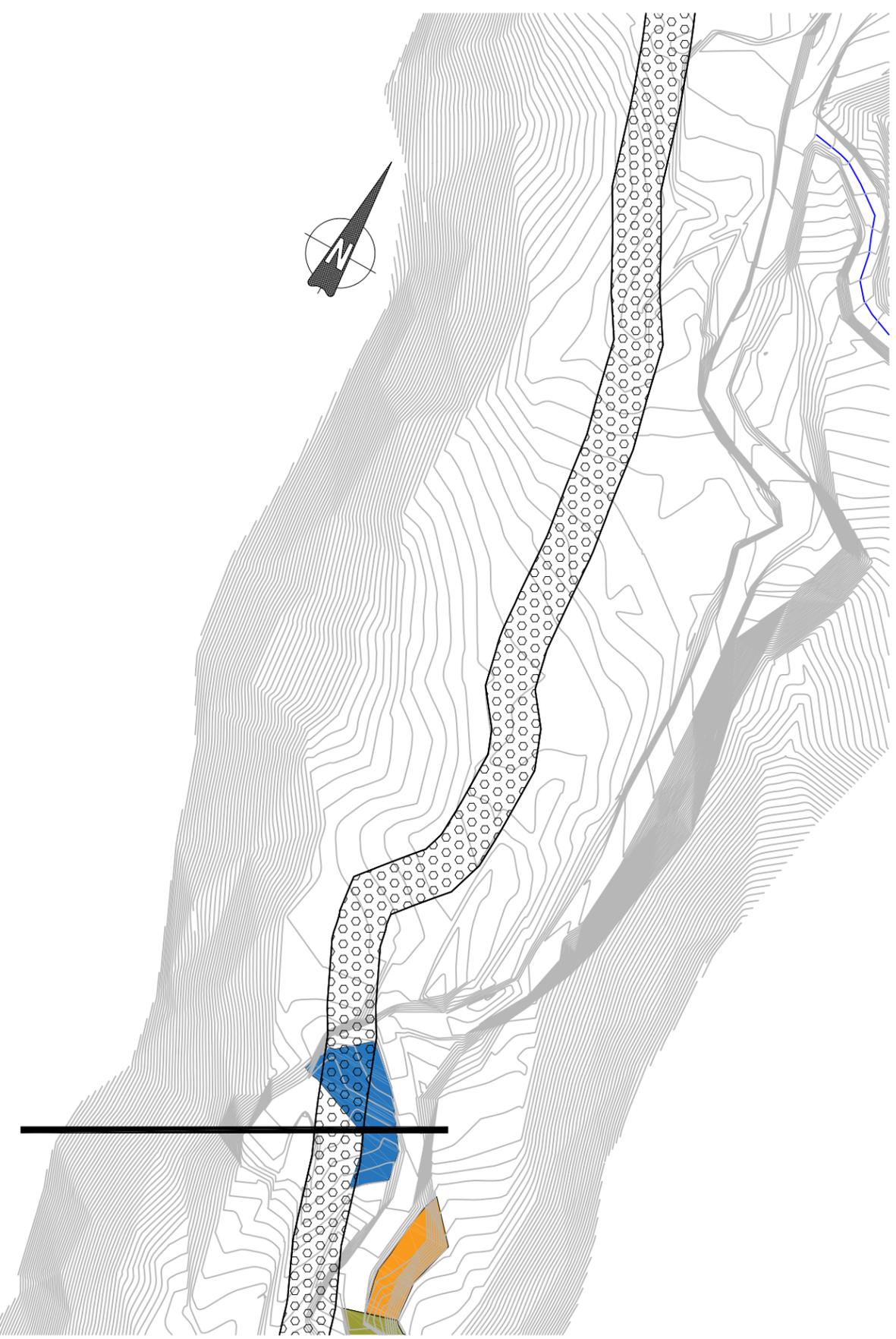
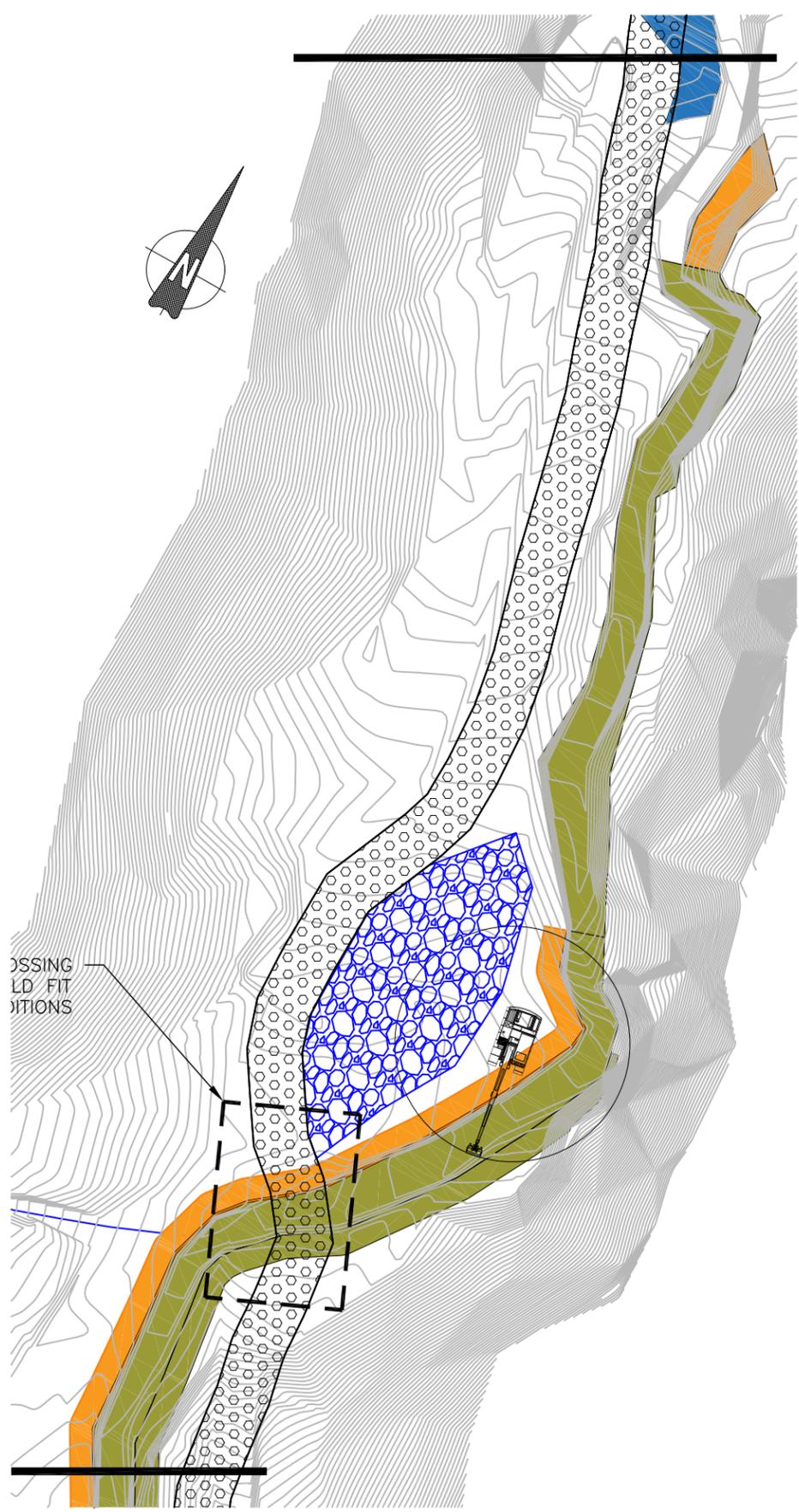
PROPOSED CREEK CROSSING  
 HDPE CULVERTS WILL BE FIELD FIT  
 BASED ON SITE CONDITIONS

LEGEND

-  EXCAVATOR REACH
-  IMPROVED LOGGING ROAD
-  CREEK ACCESS ROAD
-  6" REMOVAL
-  12" REMOVAL
-  18" REMOVAL
-  24" REMOVAL



<b>SITE LAYOUT ACCESS ROAD</b>	
ENVIRON BEECH CREEK SUPERFUND SITE	
WAYNE COUNTY, TENNESSEE	
 <b>SEVENSON ENVIRONMENTAL SERVICES, INC.</b>	
<b>FIGURE</b>	DATE: 05/04/2015
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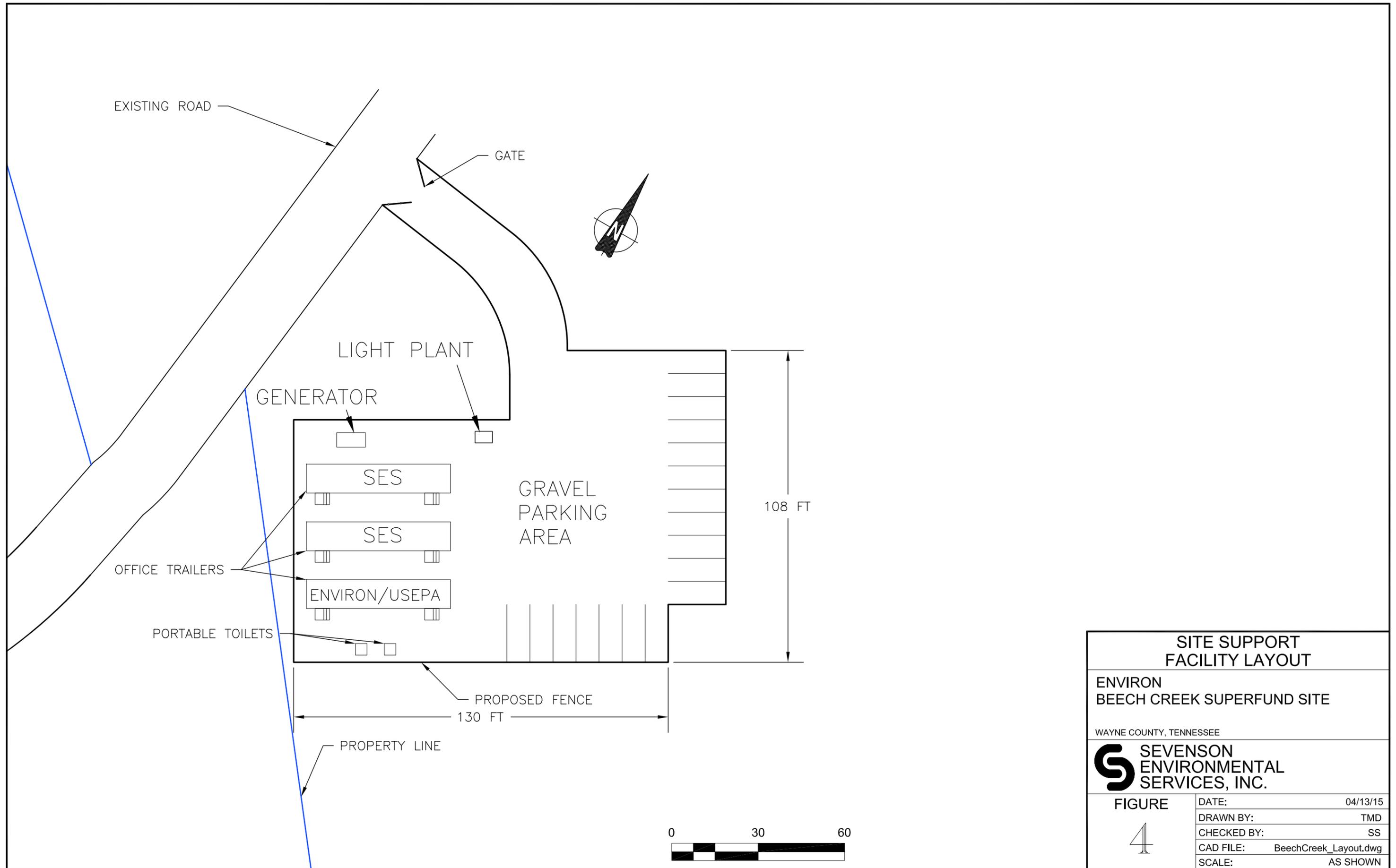


LEGEND

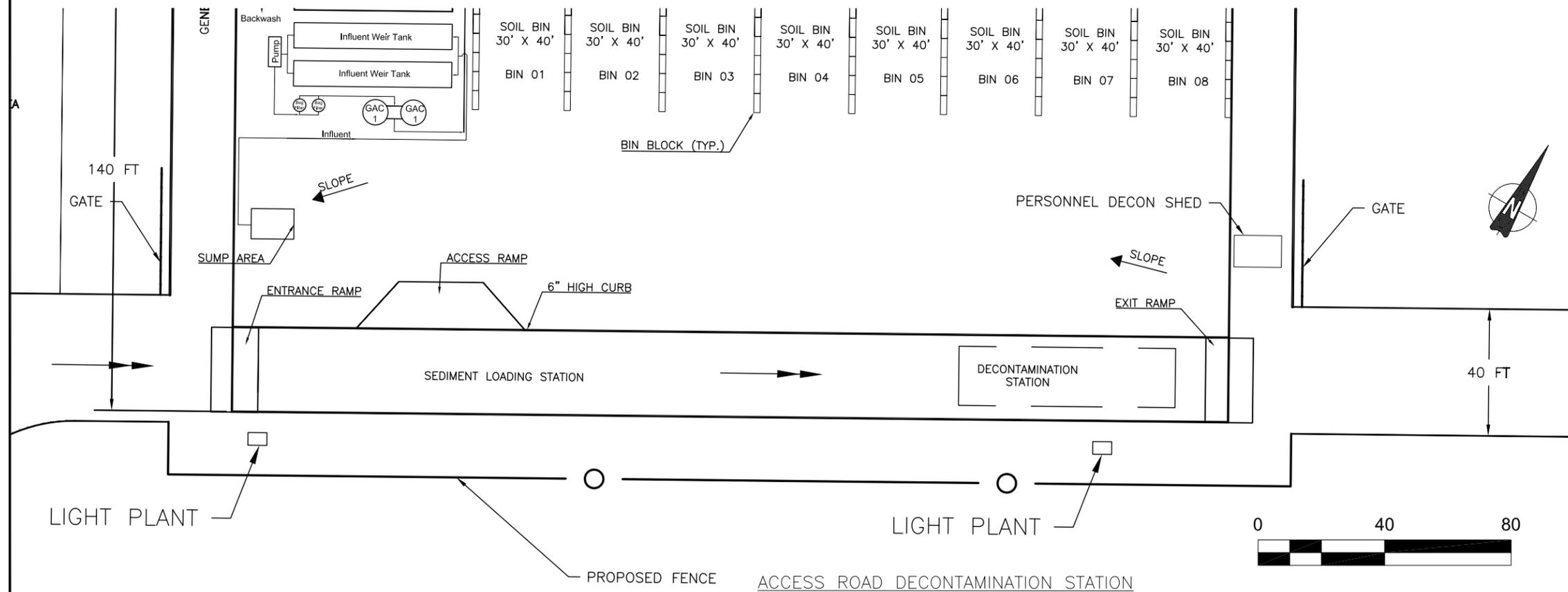
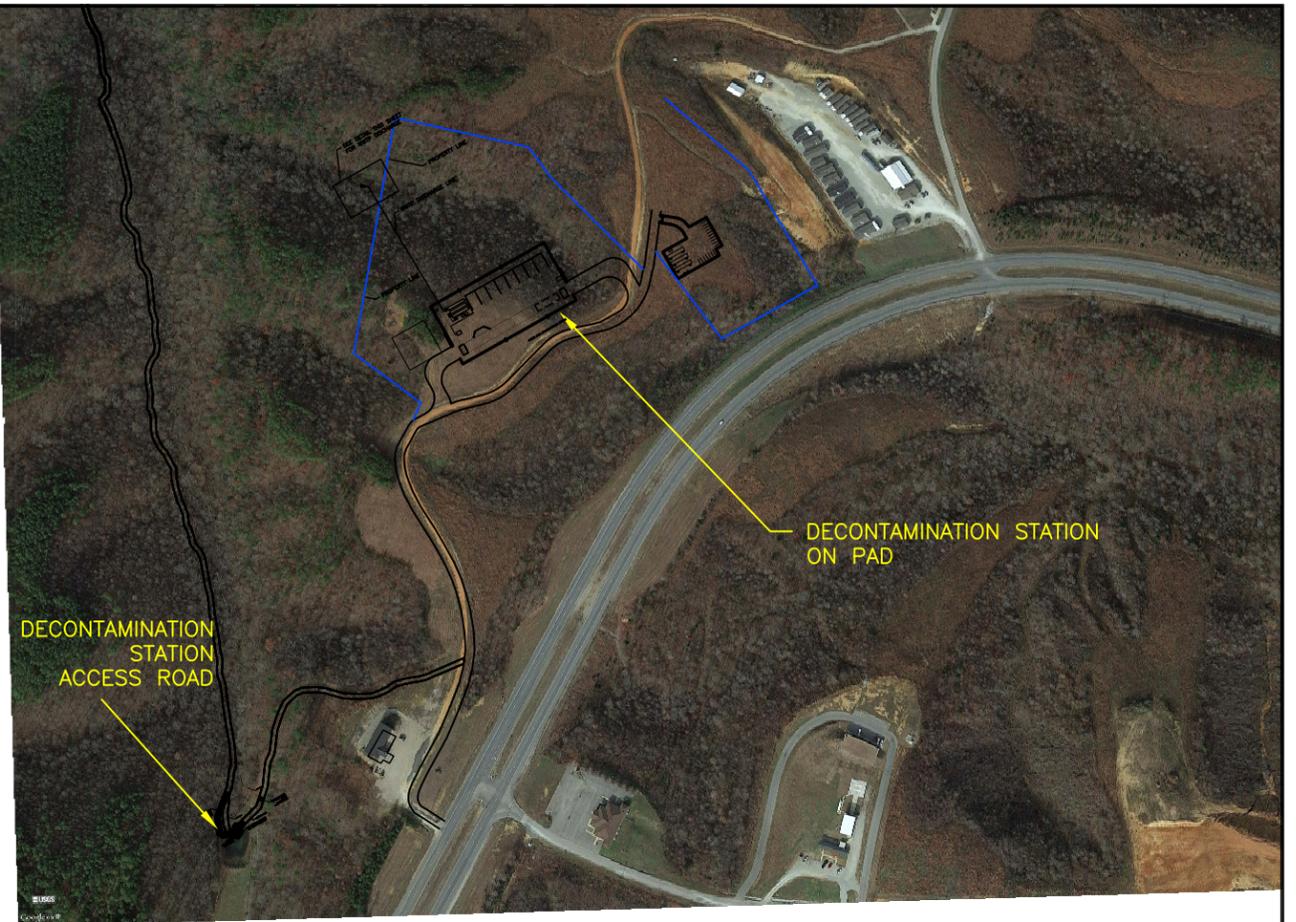
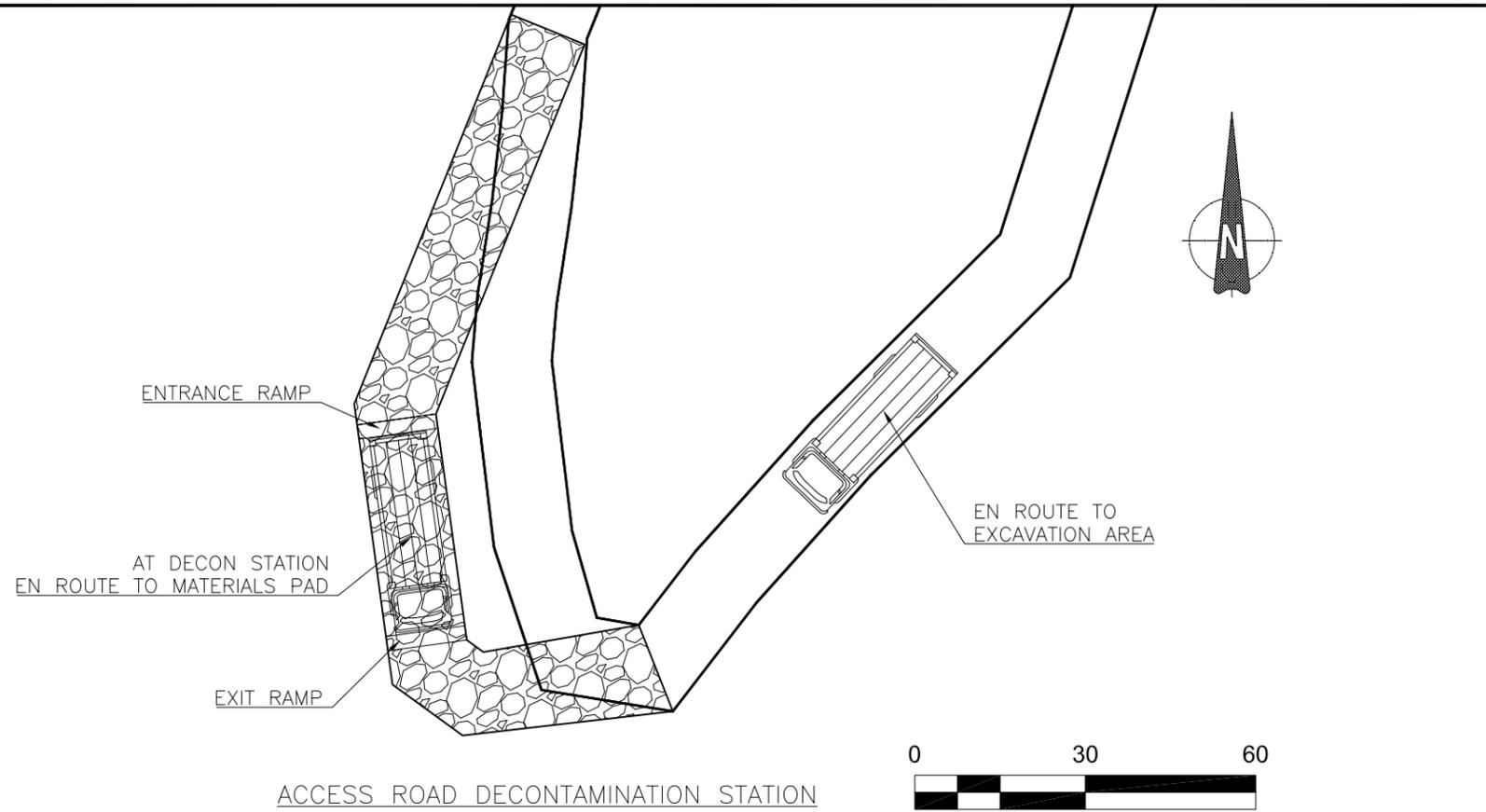
-  EXCAVATOR REACH
-  IMPROVED LOGGING ROAD
-  CREEK ACCESS ROAD
-  6" REMOVAL
-  12" REMOVAL
-  18" REMOVAL
-  24" REMOVAL



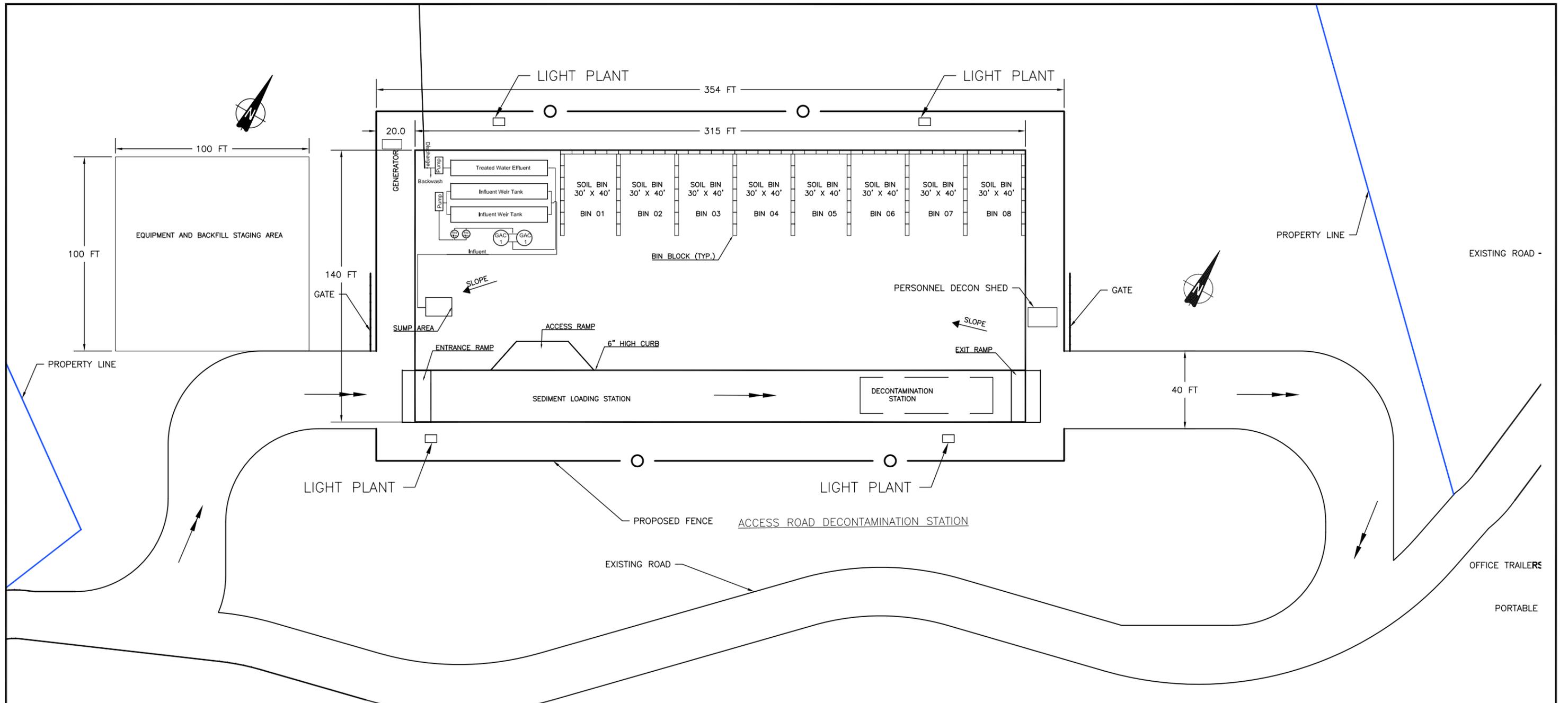
<b>SITE LAYOUT ACCESS ROAD</b>	
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WAYNE COUNTY, TENNESSEE	
 <b>SEVENSON ENVIRONMENTAL SERVICES, INC.</b>	
<b>FIGURE</b>	DATE: 05/04/2015
<b>3B3</b>	DRAWN BY: TMD
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<b>SITE SUPPORT FACILITY LAYOUT</b>	
ENVIRON BEECH CREEK SUPERFUND SITE	
WAYNE COUNTY, TENNESSEE	
 <b>SEVENSON ENVIRONMENTAL SERVICES, INC.</b>	
<b>FIGURE</b>  4	DATE: 04/13/15
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<b>DECONTAMINATION STATION LAYOUT</b>	
ENVIRON BEECH CREEK SUPERFUND SITE	
WAYNE COUNTY, TENNESSEE	
<b>SEVENSON ENVIRONMENTAL SERVICES, INC.</b>	
FIGURE <b>5</b>	DATE: 04/28/15
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**STAGING AREA AND MATERIALS HANDLING PAD LAYOUT**

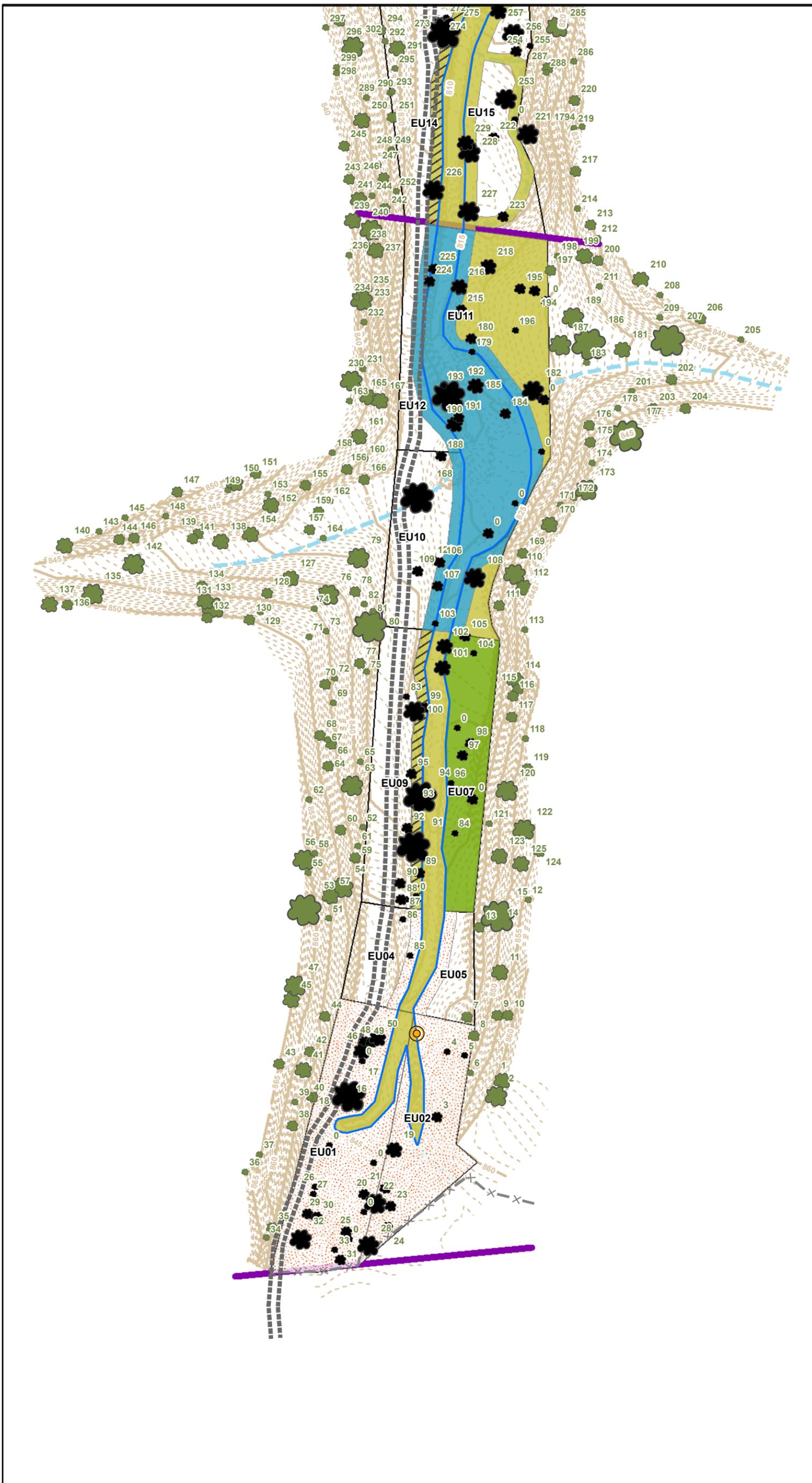
ENVIRON  
BEECH CREEK SUPERFUND SITE

WAYNE COUNTY, TENNESSEE

**SEVENSON ENVIRONMENTAL SERVICES, INC.**

<b>FIGURE</b>	DATE:	04/13/15
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	CAD FILE:	BeechCreek_Layout.dwg
	SCALE:	AS SHOWN





**Legend**

- Outfall (Approximate Location)
- Tree Targeted for Removal

**Tree Locations**

**DBH (in)**

- 6 - 9
- 10 - 12
- 13 - 16
- 17 - 20
- 21 - 32

- Logging Road (Approximate)
- Access Roads
- Fence Line
- Creek Boundary
- Expanded Remediation Scenario

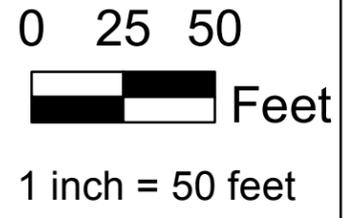
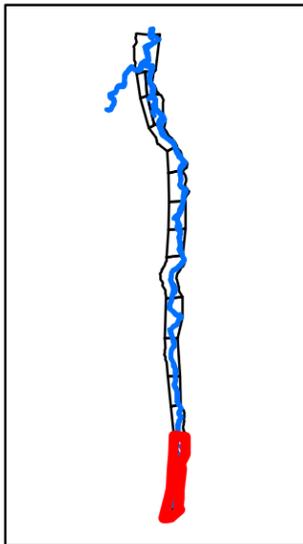
**Removal Thickness (in)**

- 6
- 12
- 18
- 24

- Riprap Erosion Control
- Reach Boundaries
- EU Boundary
- Intermittent Drainage

**Topography**

- 5-ft Contour
- 6-in Contour



Tree Survey and Trees Targeted for Removal  
 Beech Creek Superfund Site  
 Wayne County, Tennessee

Figure 7a



**Legend**

- Outfall (Approximate Location)
- Tree Targeted for Removal

**Tree Locations**

**DBH (in)**

- 6 - 9
- 10 - 12
- 13 - 16
- 17 - 20
- 21 - 32

- ▬ Logging Road (Approximate)
- ▬ Access Roads
- × × Fence Line
- ▭ Creek Boundary
- ▨ Expanded Remediation Scenario

**Removal Thickness (in)**

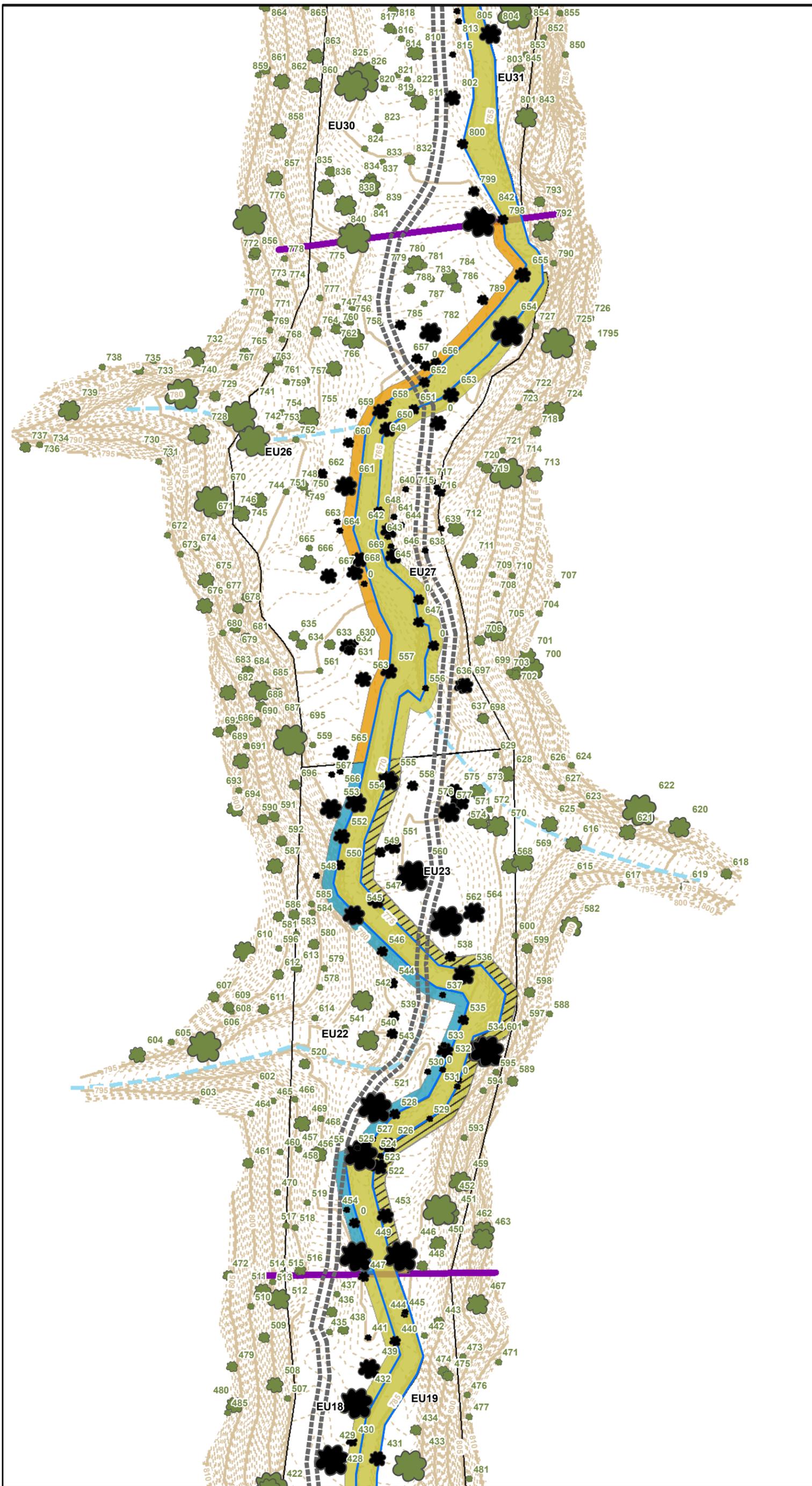
- 6
- 12
- 18
- 24

- ▨ Riprap Erosion Control
- ▬ Reach Boundaries
- ▭ EU Boundary
- ▬ Intermittent Drainage

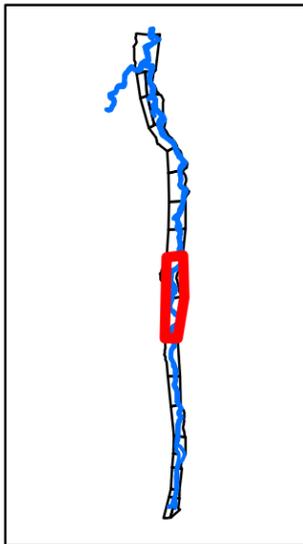
**Topography**

- ▬ 5-ft Contour
- ▬ 6-in Contour

0 25 50  
 Feet  
 1 inch = 50 feet



- Legend**
- Outfall (Approximate Location)
  - Tree Targeted for Removal
- Tree Locations**
- DBH (in)**
- 6 - 9
  - 10 - 12
  - 13 - 16
  - 17 - 20
  - 21 - 32
- Logging Road (Approximate)
  - Access Roads
  - Fence Line
  - Creek Boundary
  - Expanded Remediation Scenario
- Removal Thickness (in)**
- 6
  - 12
  - 18
  - 24
- Riprap Erosion Control
  - Reach Boundaries
  - EU Boundary
  - Intermittent Drainage
- Topography**
- 5-ft Contour
  - 6-in Contour

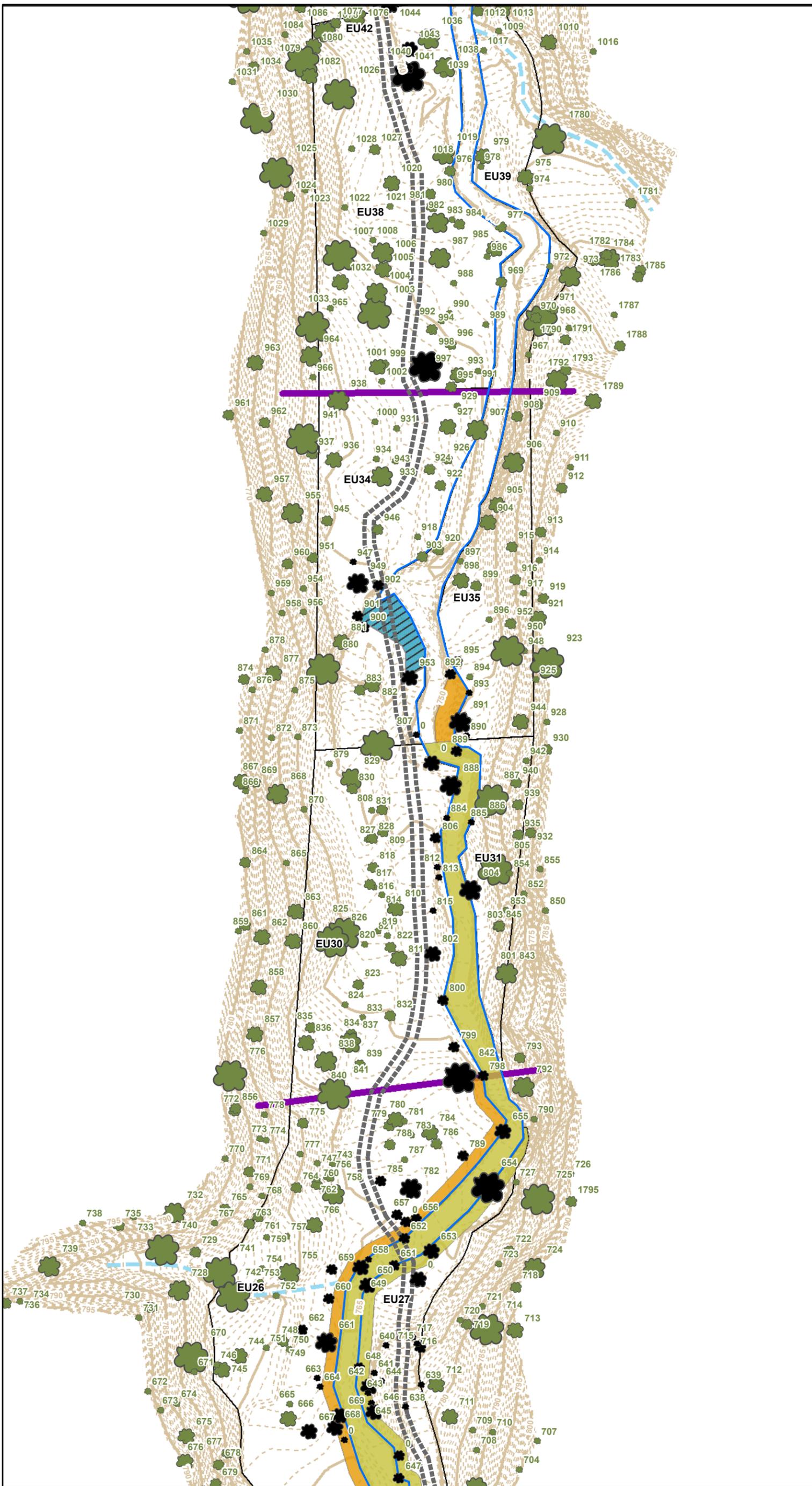


0 25 50  
  
 Feet  
 1 inch = 50 feet



**Tree Survey and Trees Targeted for Removal**  
 Beech Creek Superfund Site  
 Wayne County, Tennessee

Figure 7c



**Legend**

- Outfall (Approximate Location)
- Tree Targeted for Removal

**Tree Locations**

**DBH (in)**

- 6 - 9
- 10 - 12
- 13 - 16
- 17 - 20
- 21 - 32

- Logging Road (Approximate)
- Access Roads
- × × Fence Line
- Creek Boundary
- ▨ Expanded Remediation Scenario

**Removal Thickness (in)**

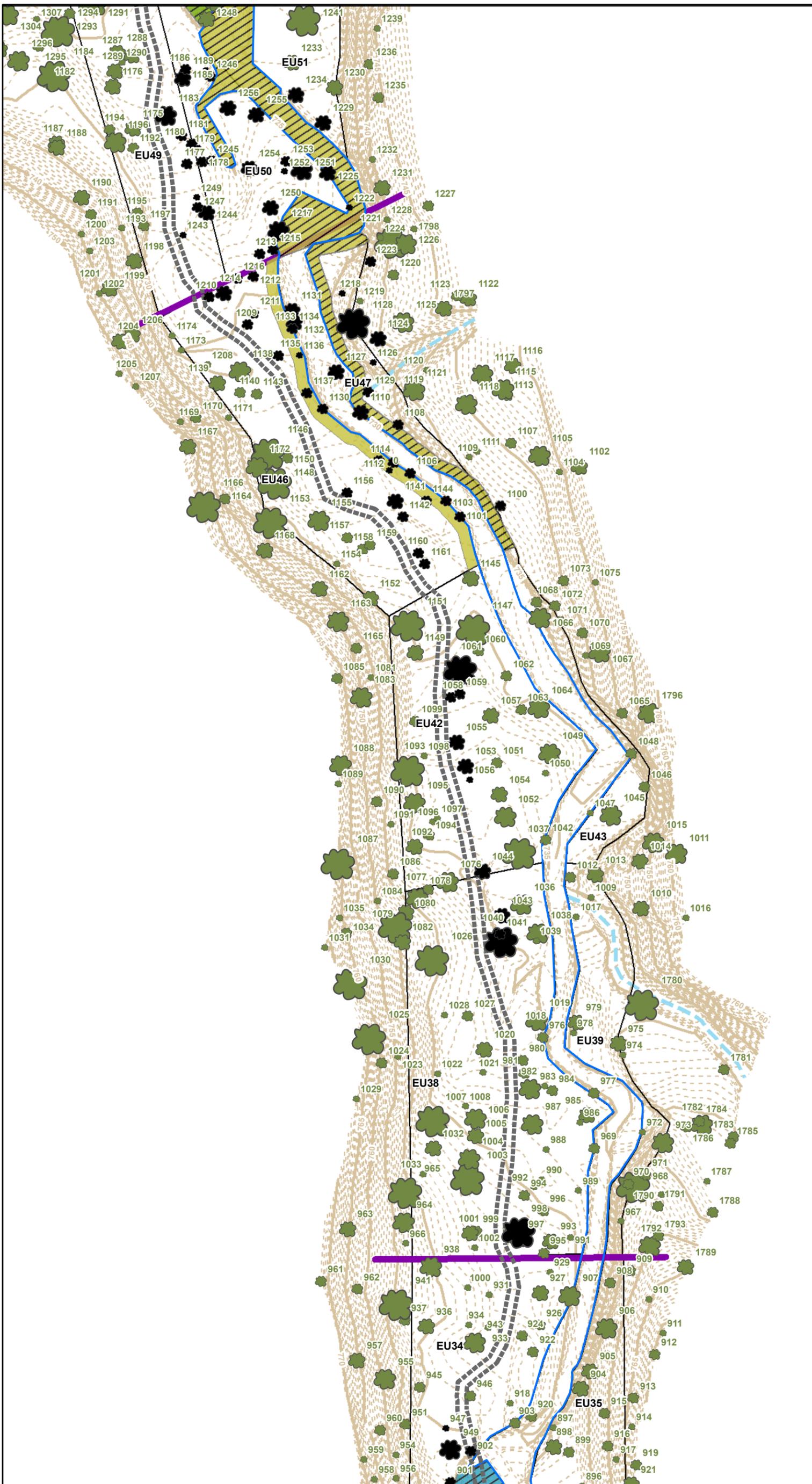
- 6
- 12
- 18
- 24

- ▨ Riprap Erosion Control
- Reach Boundaries
- EU Boundary
- Intermittent Drainage

**Topography**

- 5-ft Contour
- 6-in Contour

0 25 50  
 Feet  
 1 inch = 50 feet



**Legend**

- Outfall (Approximate Location)
- Tree Targeted for Removal

**Tree Locations**

**DBH (in)**

- 6 - 9
- 10 - 12
- 13 - 16
- 17 - 20
- 21 - 32

- Logging Road (Approximate)
- Access Roads
- Fence Line
- Creek Boundary
- Expanded Remediation Scenario

**Removal Thickness (in)**

- 6
- 12
- 18
- 24

- Riprap Erosion Control
- Reach Boundaries
- EU Boundary
- Intermittent Drainage

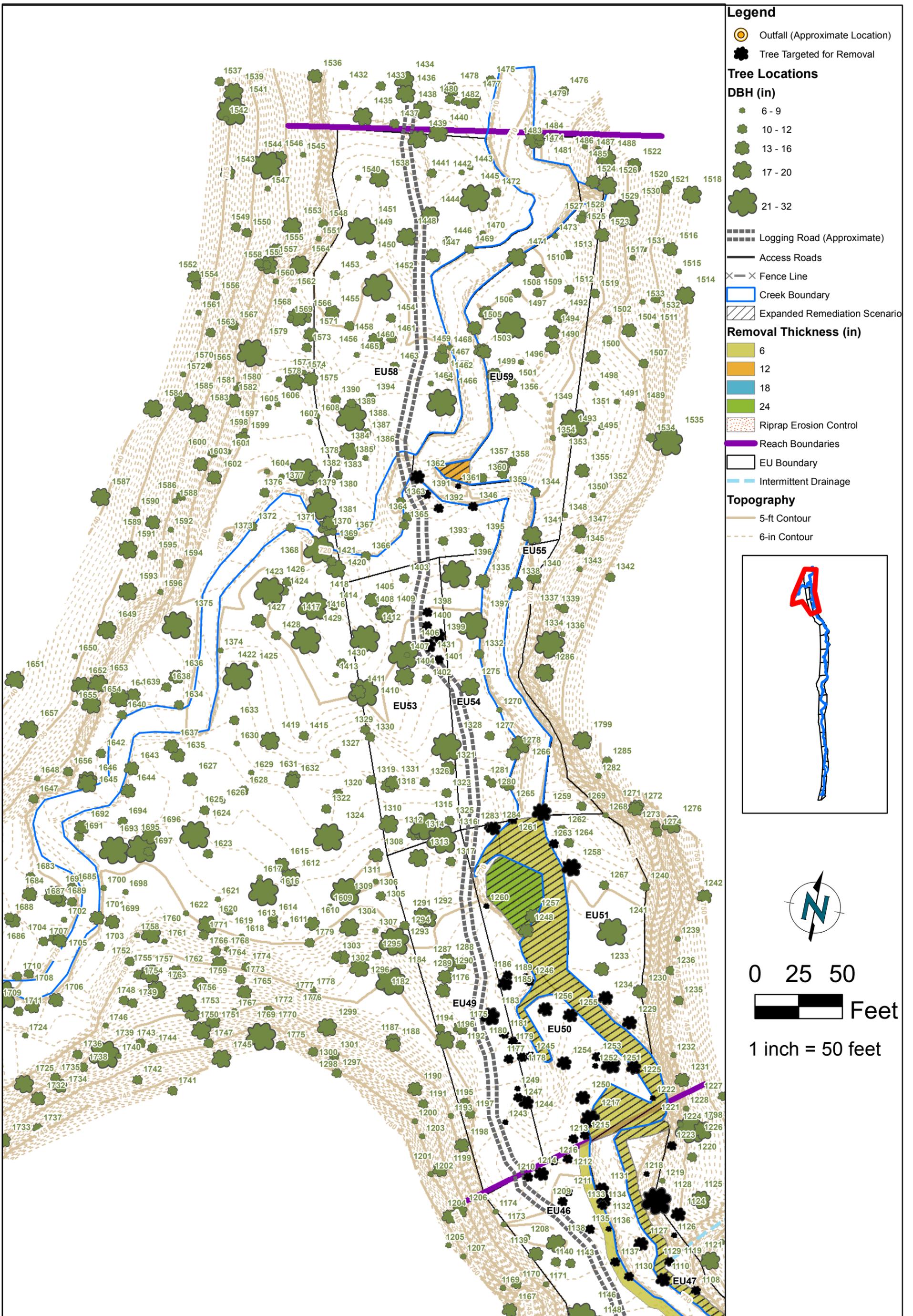
**Topography**

- 5-ft Contour
- 6-in Contour

0 25 50

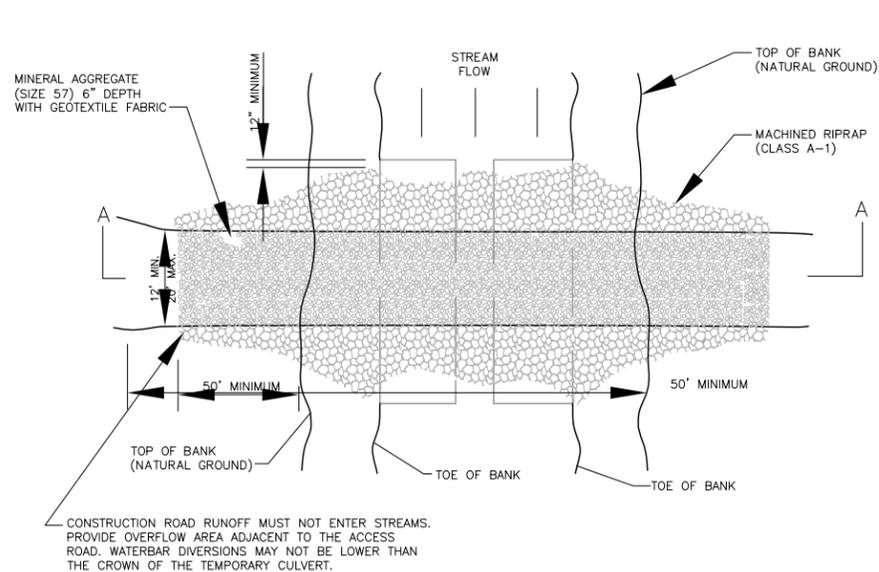
Feet

1 inch = 50 feet

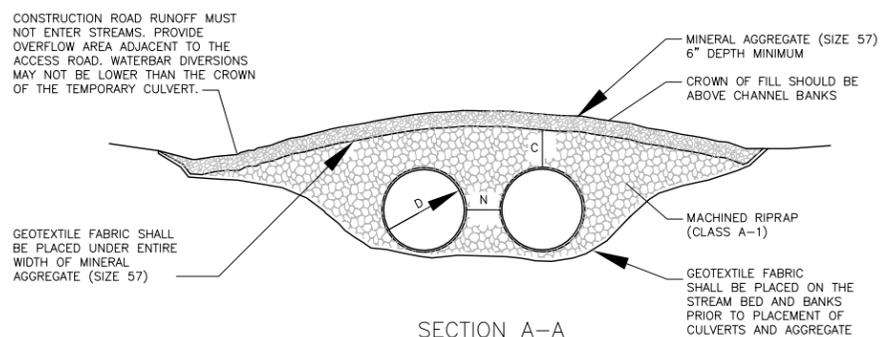


Tree Survey and Trees Targeted for Removal  
 Beech Creek Superfund Site  
 Wayne County, Tennessee

Figure 7f



PLAN VIEW OF TEMPORARY CULVERT CROSSING

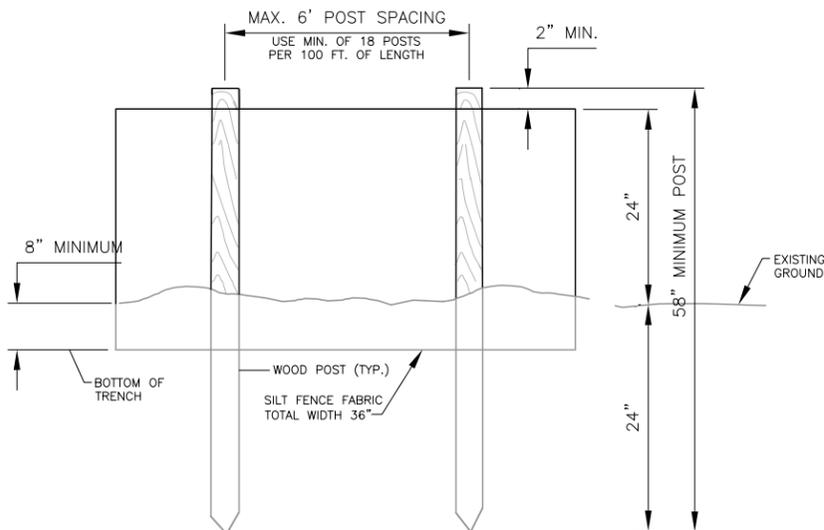


TEMPORARY STREAM CROSSING

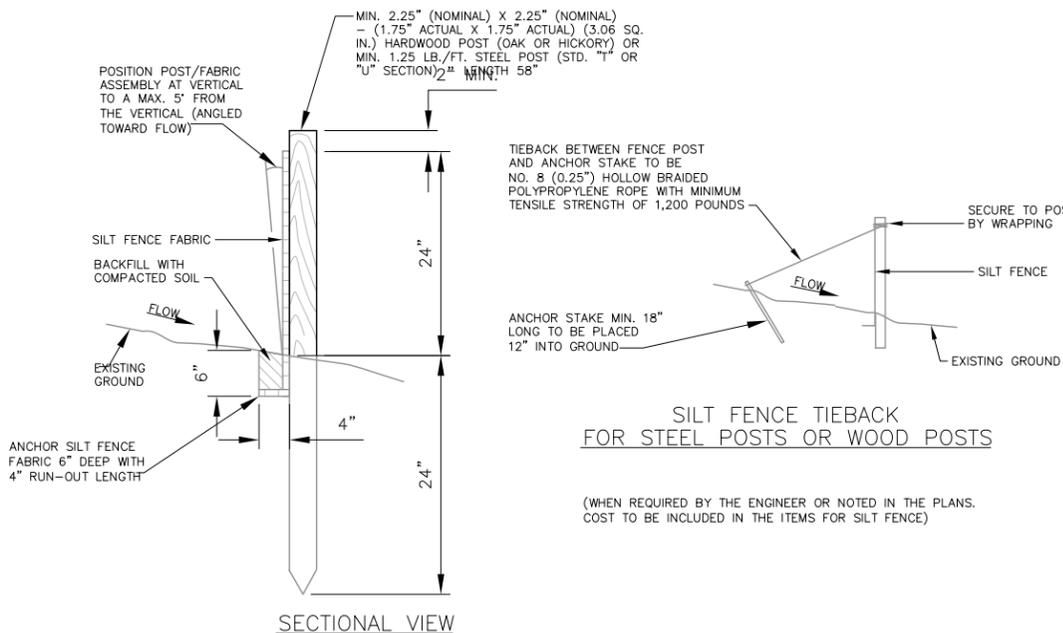
DETAIL A  
NTS DWG 2

NOTES:

- ALL CULVERTS MUST BE STRONG ENOUGH TO SUPPORT THEIR CROSS-SECTIONED AREA UNDER MAXIMUM EXPECTED LOADS.
- GEOTEXTILE MUST EXTEND A MINIMUM OF 6" AND MAXIMUM OF 12" BEYOND THE END OF CULVERT AND AGGREGATE FILL MATERIAL
- CAPACITY OF MULTIPLE CULVERTS COMBINED MUST BE GREATER THAN BANKFULL FLOW OF THE STREAM PRODUCED BY A 2-YEAR, 24-HOUR FREQUENCY STORM. SIZING AND NUMBER OF CULVERTS WILL BE COORDINATED WITH ENVIRON FOR CREEK CROSSINGS.
- STREAM CROSSING ALIGNMENT SHALL BE AT RIGHT ANGLES TO THE STREAM. MAXIMUM DEVIATION = 15°.
- CENTERLINE OF BOTH ROADWAY APPROACHES SHOULD COINCIDE WITH CROSSING CENTERLINE FOR MINIMUM OF 50 FEET (IF CONDITIONS ALLOW).



ELEVATION VIEW

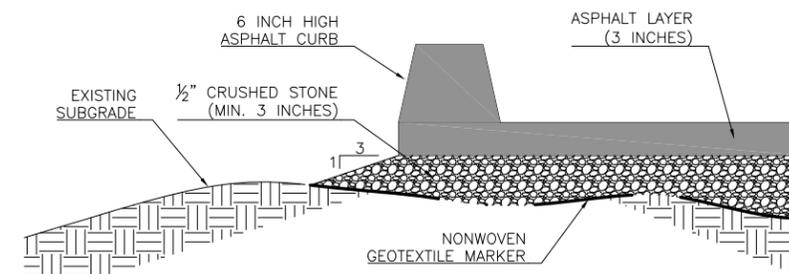


SECTIONAL VIEW

ASDF

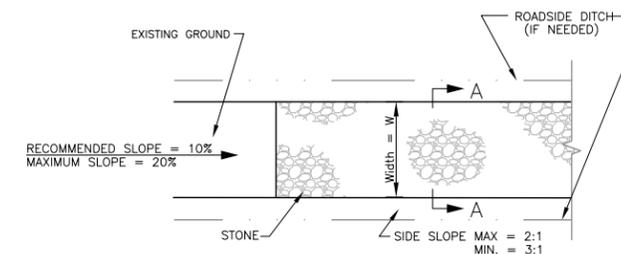
SILT FENCE

DETAIL B  
NTS DWG 2

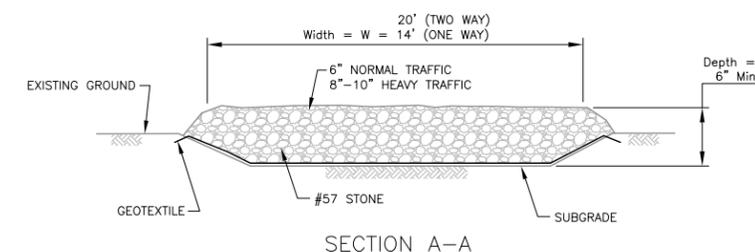


MATERIALS HANDLING PAD

DETAIL D  
NTS DWG 3



PLAN VIEW



SECTION A-A

ACCESS ROAD ENHANCEMENTS

DETAIL C  
NTS DWG 2

TYPICAL SECTIONS - 1

ENVIRON  
BEECH CREEK SUPERFUND SITE

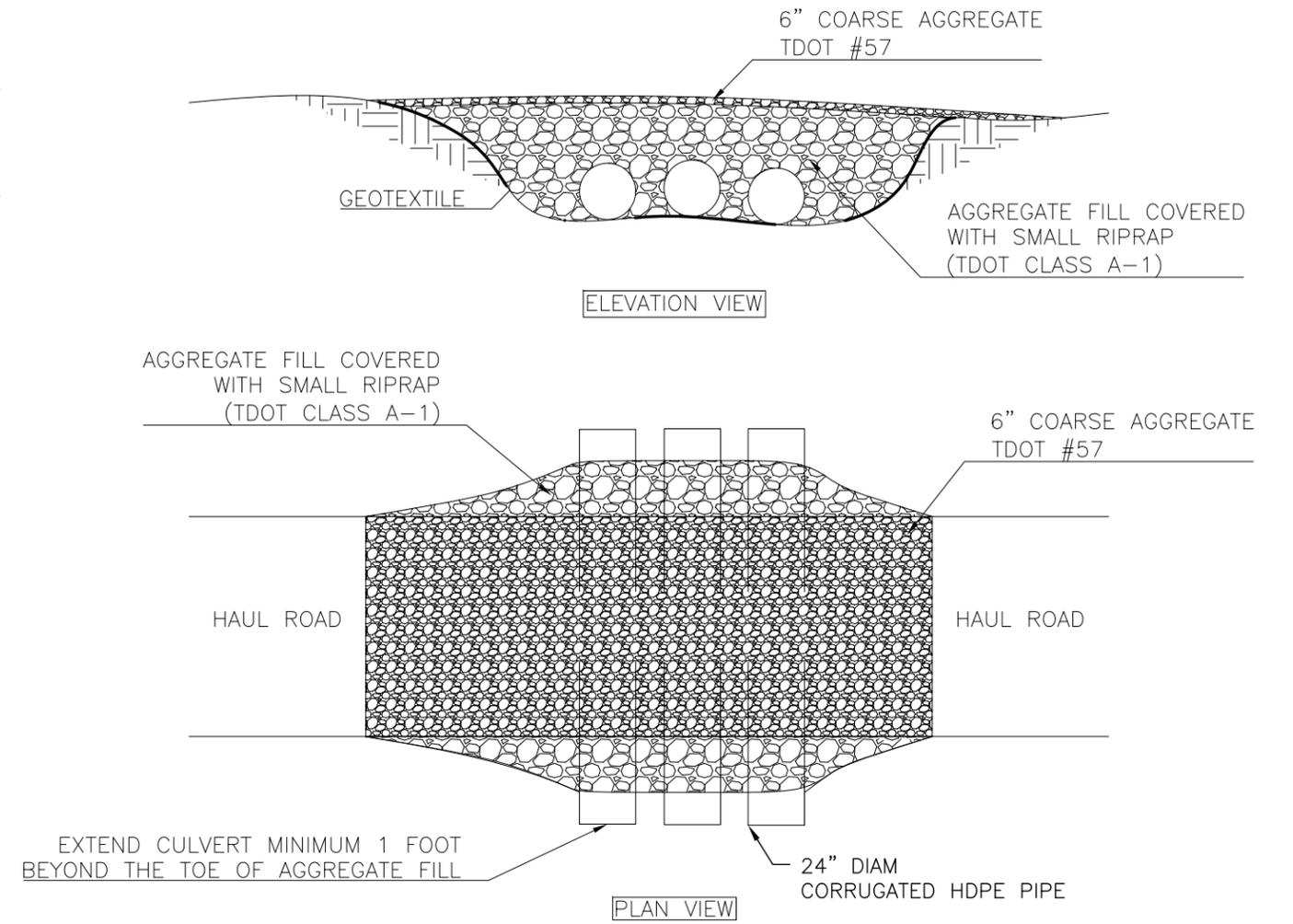
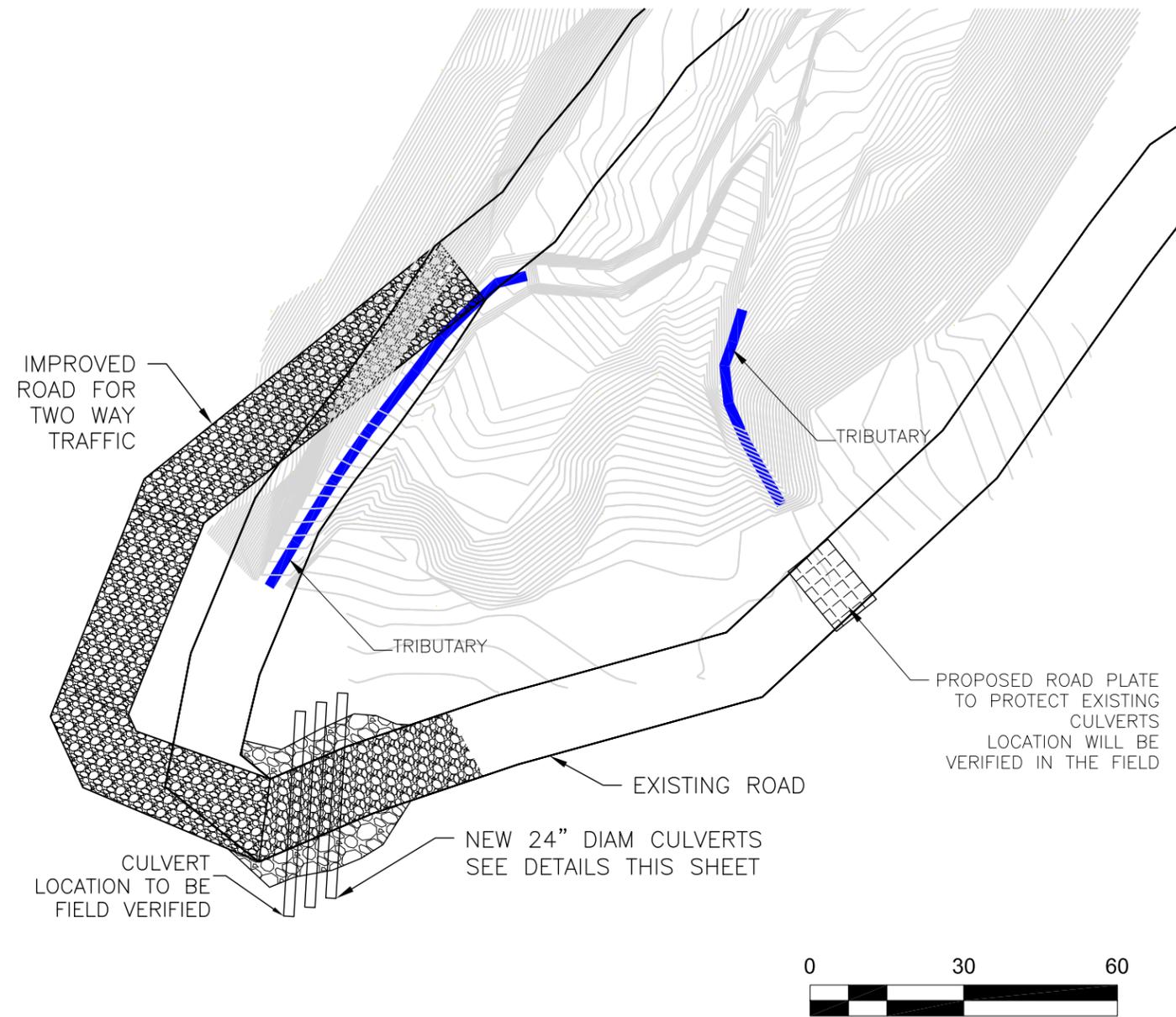
WAYNE COUNTY, TENNESSEE

SEVENSON  
ENVIRONMENTAL  
SERVICES, INC.

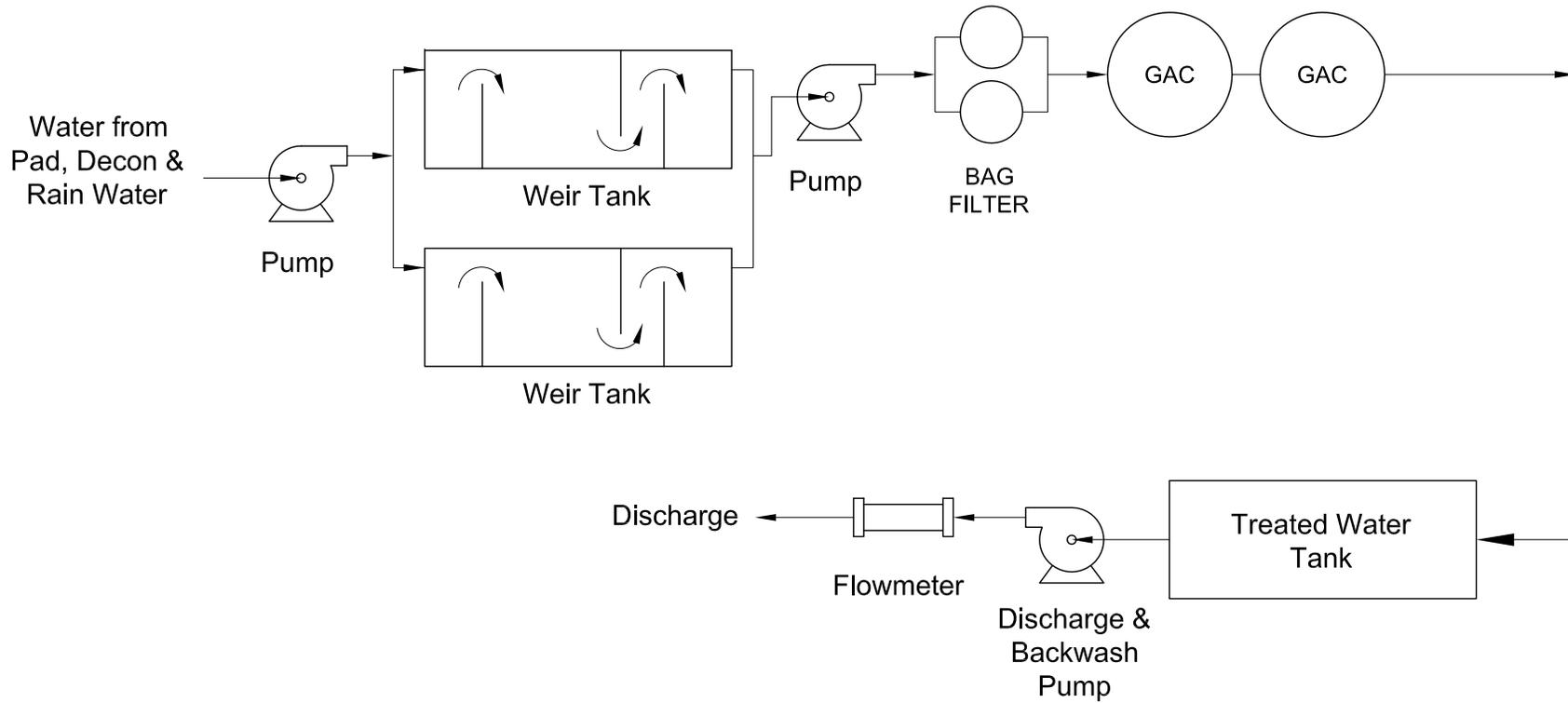
FIGURE



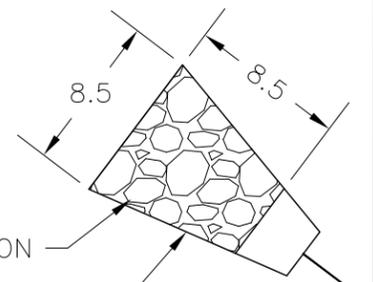
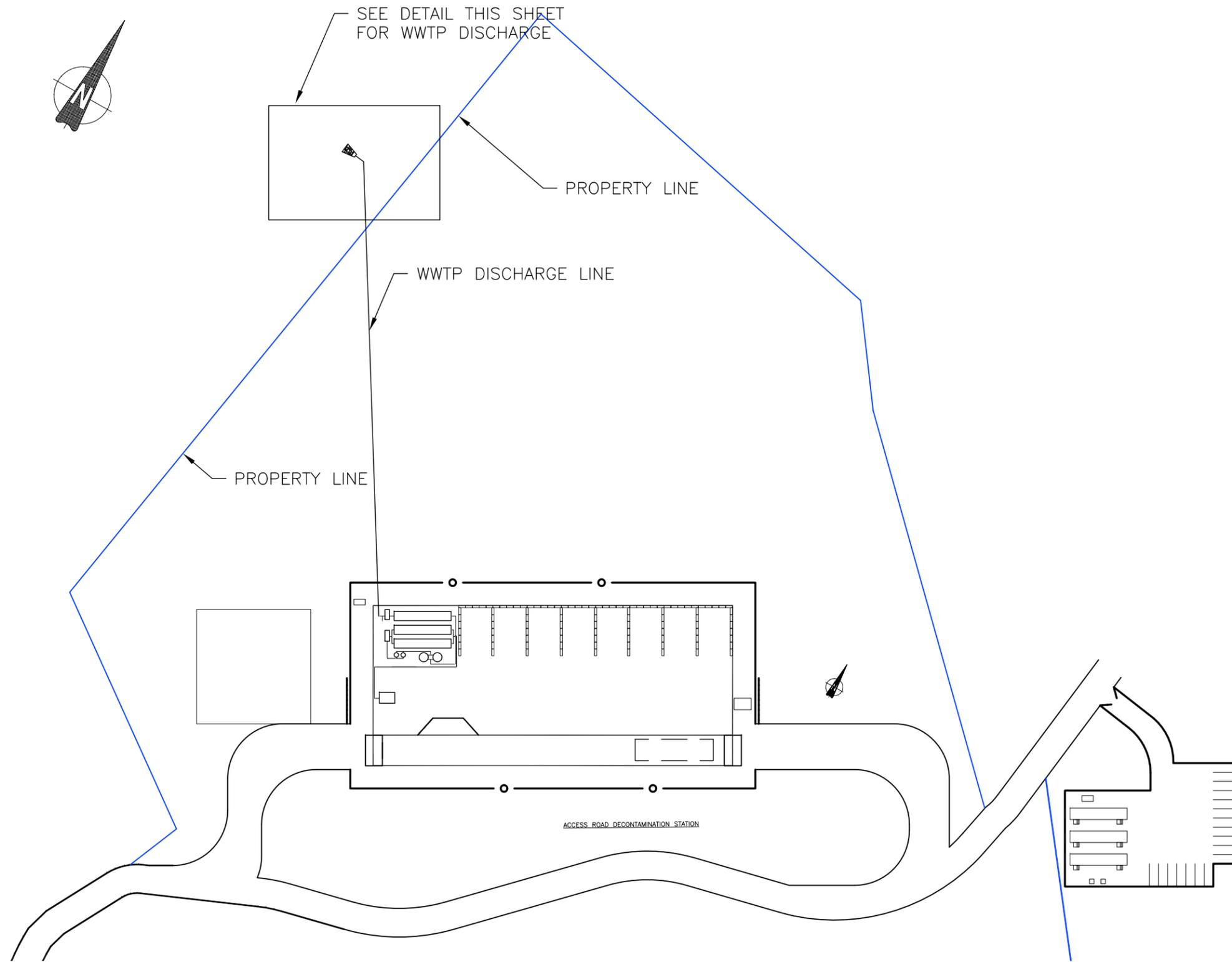
DATE:	12/18/14
DRAWN BY:	KH
CHECKED BY:	SS
CAD FILE:	BeechCreek_Layout.dwg
SCALE:	NTS



<b>LANDFILL CREEK CROSSING</b>	
ENVIRON BEECH CREEK SUPERFUND SITE	
WAYNE COUNTY, TENNESSEE	
 <b>SEVENSON ENVIRONMENTAL SERVICES, INC.</b>	
<b>FIGURE</b>  9	DATE: 04/28/15
	DRAWN BY: TMD
	CHECKED BY: SS
	CAD FILE: BeechCreek_Layout.dwg
	SCALE: AS SHOWN

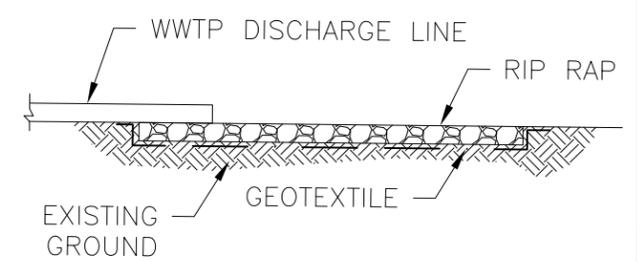


<b>Wastewater Treatment Process Flow Diagram</b>	
Beech Creek Superfund Site Creek Excavation & Restoration Waynesboro, Tennessee	
 <b>SEVENSON ENVIRONMENTAL SERVICES, INC.</b>	
Figure	DATE: 4.24.15
10	DRAWN BY: C. Bigelow
	CHECKED BY: M. Walker
	CAD FILE: wwtp
	SCALE: None



RIP RAP APRON  
 STONE MIN D50 = 2.5"  
 MIN THICKNESS 6"

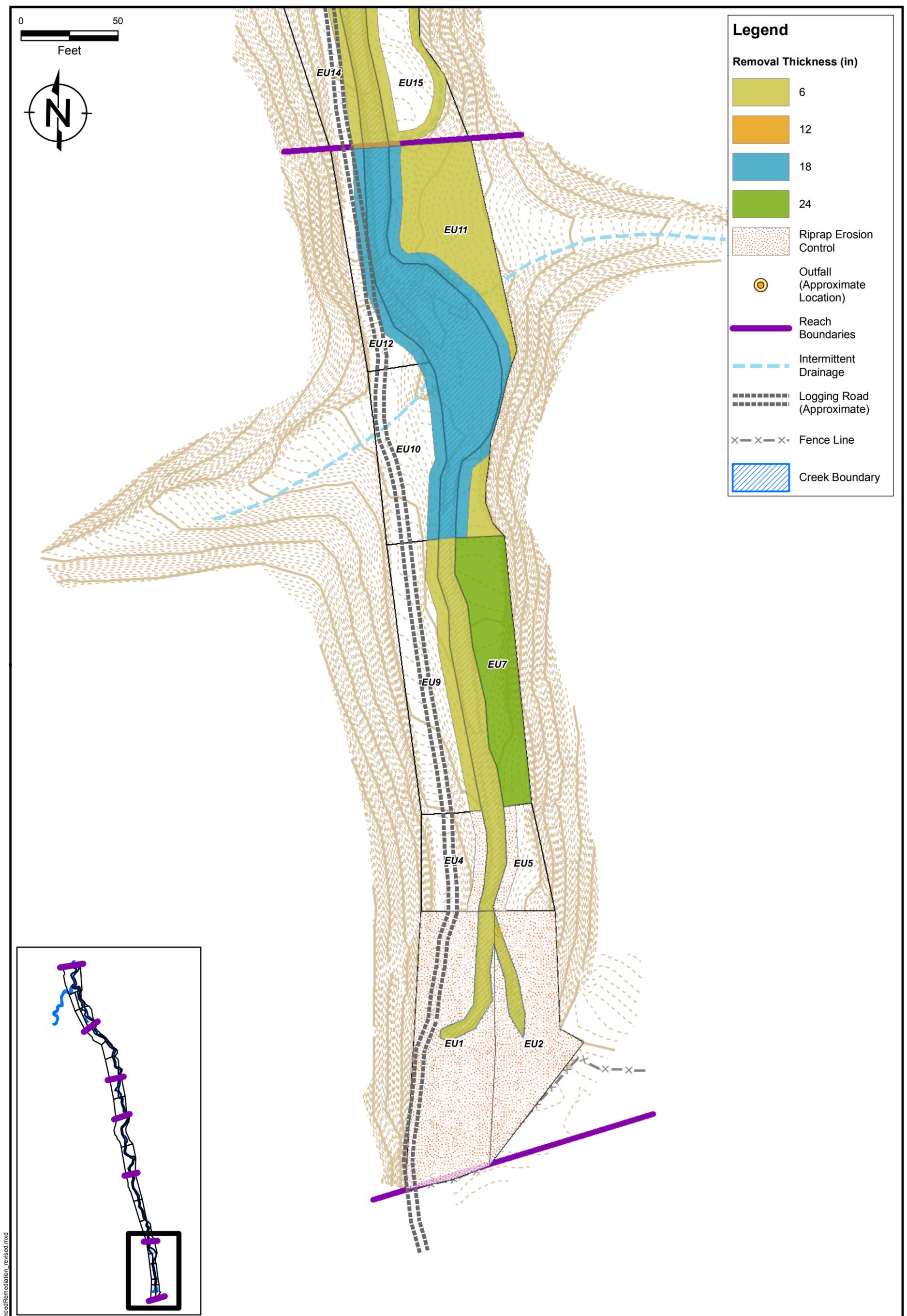
RIP-RAP APRON NOT TO SCALE



APRON PROFILE NOT TO SCALE



<b>WWTP DISCHARGE CONFIGURATION</b>	
ENVIRON BEECH CREEK SUPERFUND SITE	
WAYNE COUNTY, TENNESSEE	
<b>SEVENSON ENVIRONMENTAL SERVICES, INC.</b>	
<b>FIGURE</b>	DATE: 04/14/15
<b>11</b>	DRAWN BY: TMD
	CHECKED BY: SS
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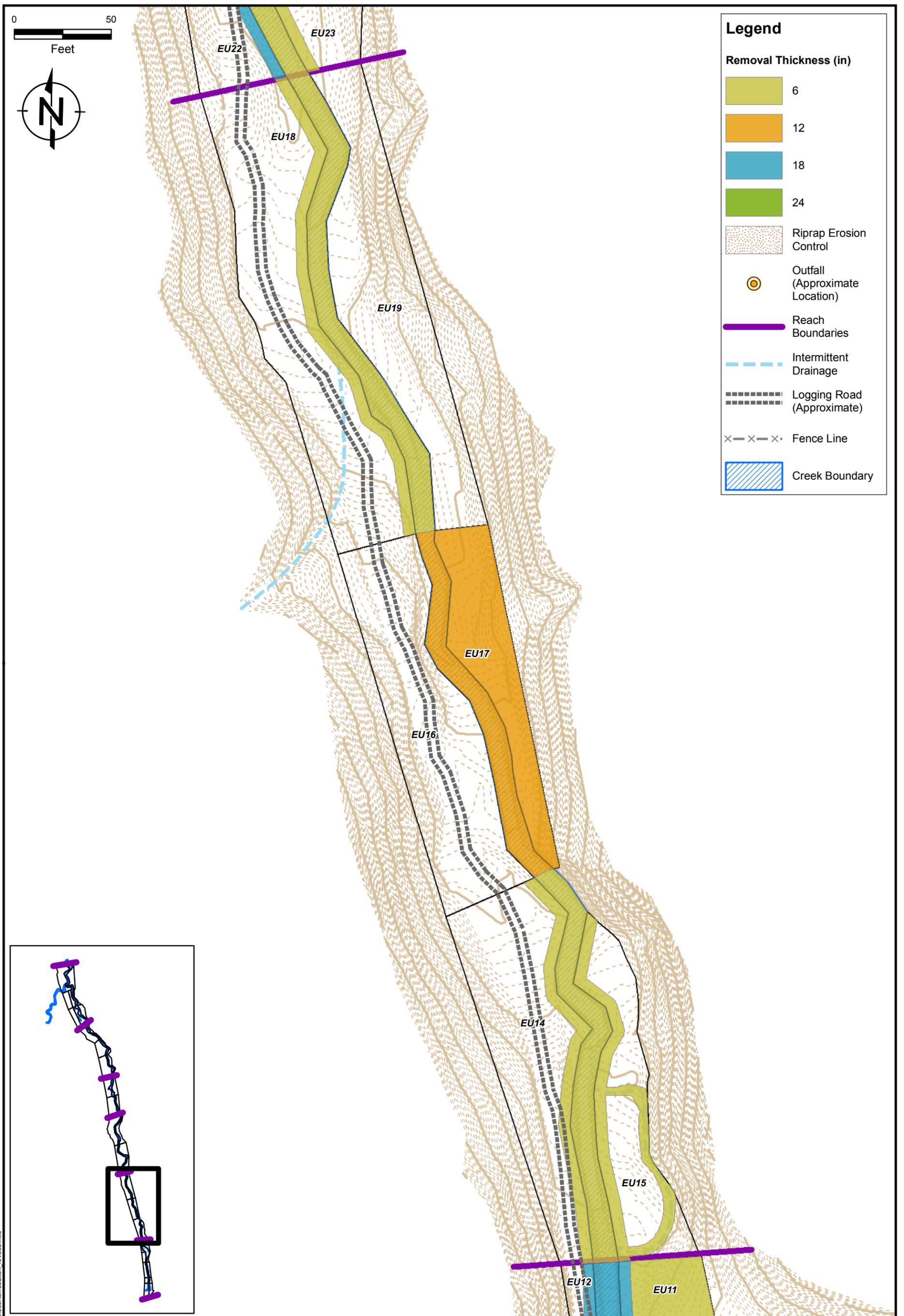


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Areas Targeted for Remediation  
 Beech Creek Superfund Site  
 Wayne County, Tennessee

Figure 12a

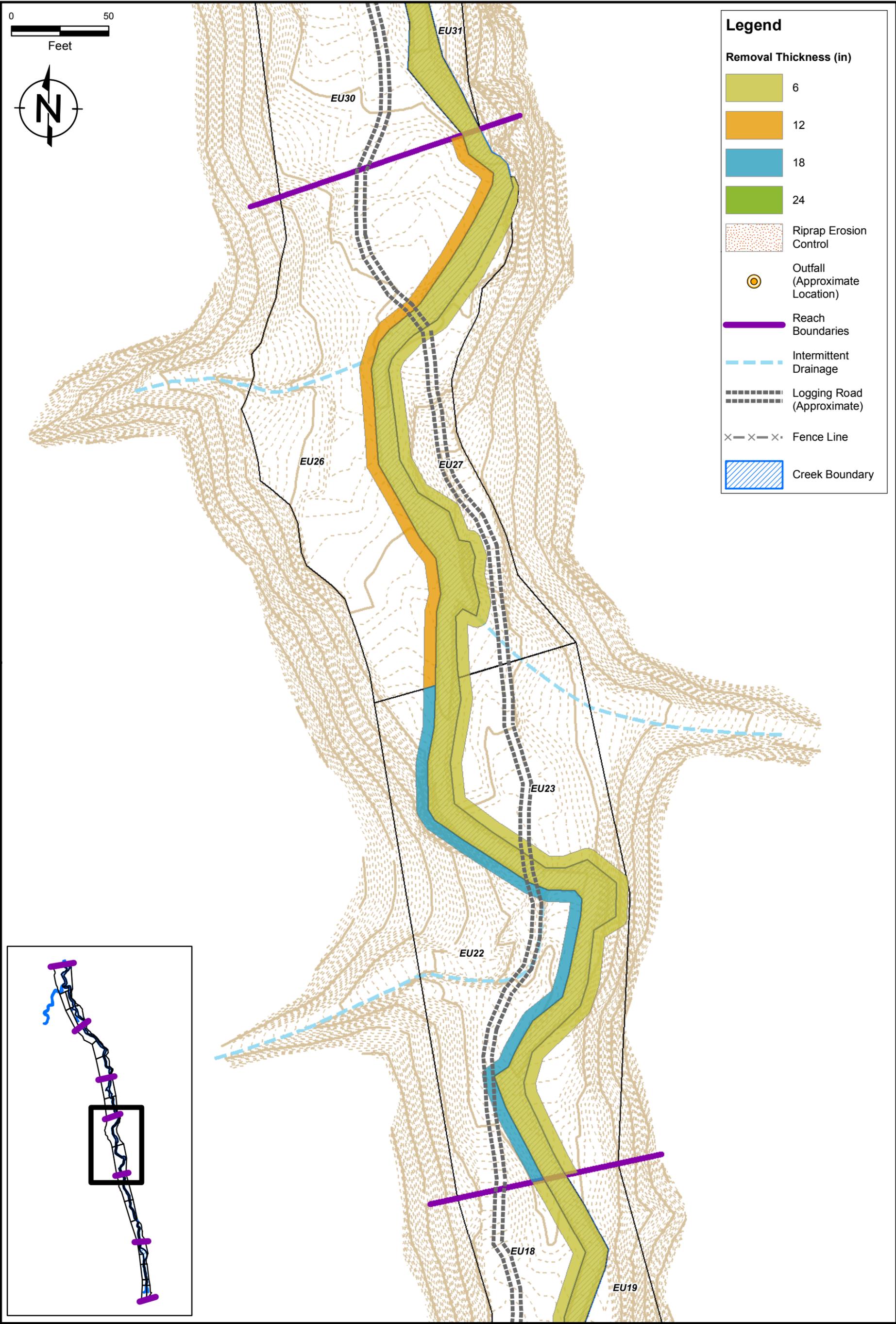


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Areas Targeted for Remediation  
 Beech Creek Superfund Site  
 Wayne County, Tennessee

Figure 12b



**Legend**

**Removal Thickness (in)**

- 6
- 12
- 18
- 24

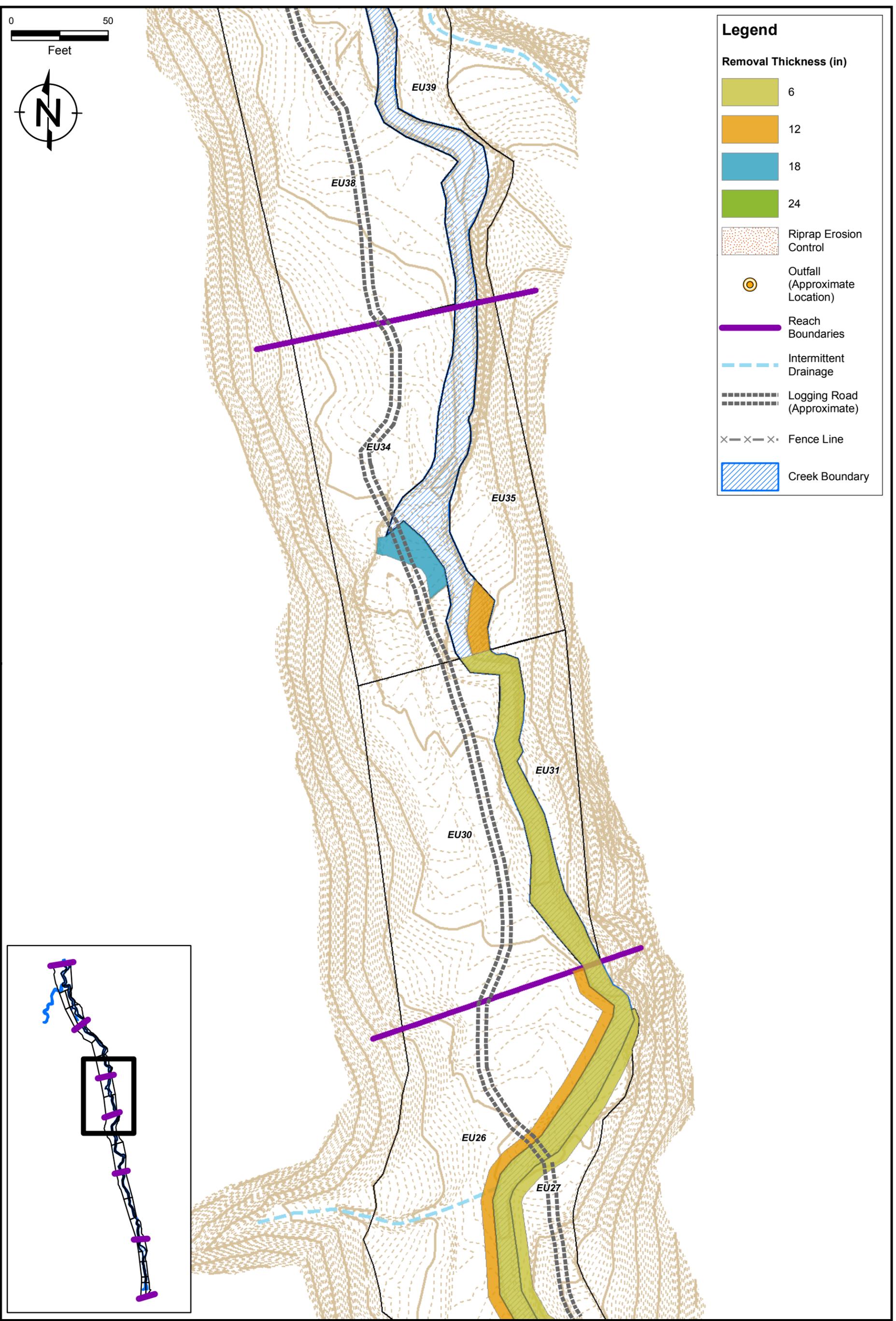
- Riprap Erosion Control
- Outfall (Approximate Location)
- Reach Boundaries
- Intermittent Drainage
- Logging Road (Approximate)
- Fence Line
- Creek Boundary

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Areas Targeted for Remediation  
 Beech Creek Superfund Site  
 Wayne County, Tennessee

Figure 12c



**Legend**

**Removal Thickness (in)**

- 6
- 12
- 18
- 24

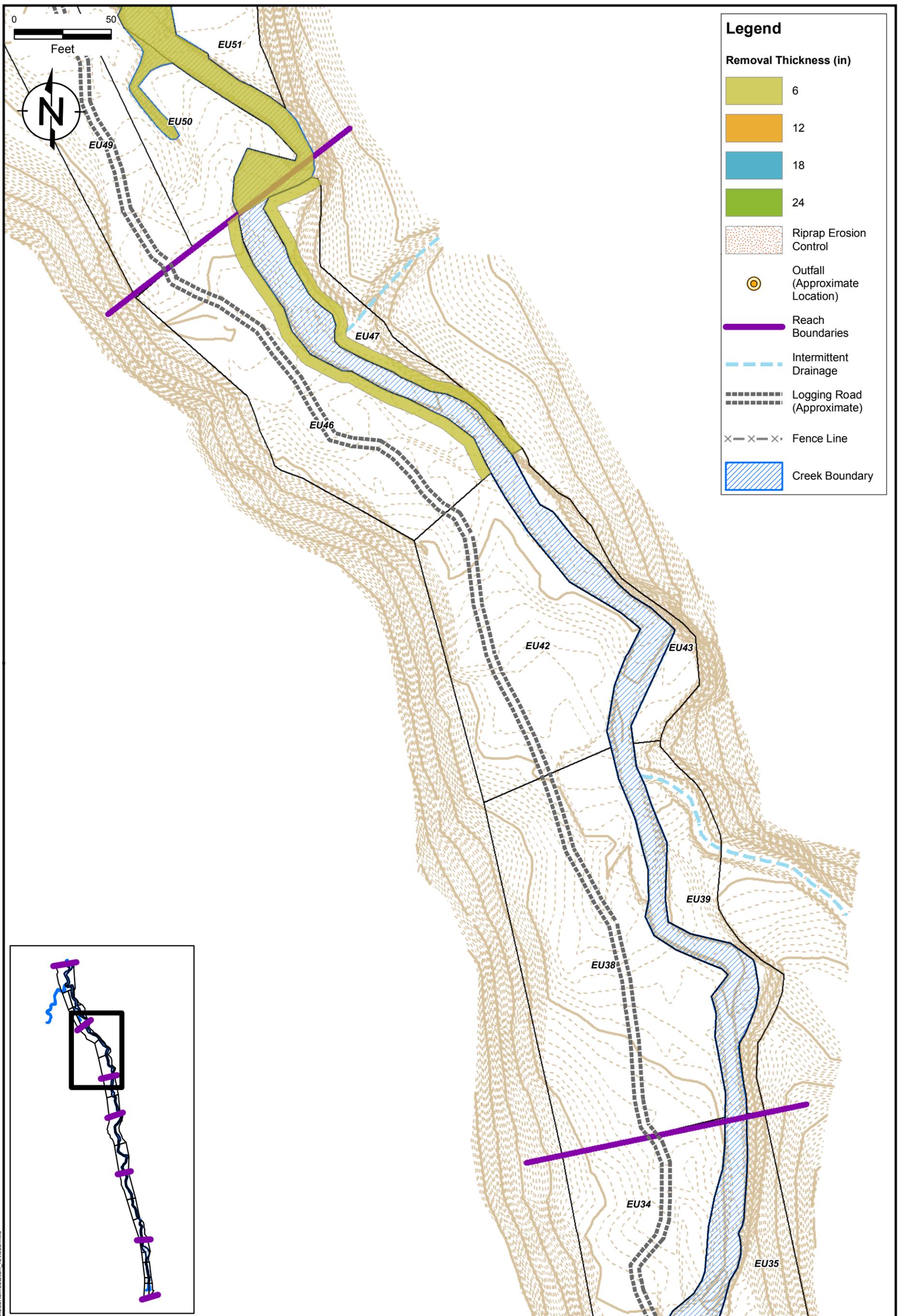
- Riprap Erosion Control
- Outfall (Approximate Location)
- Reach Boundaries
- Intermittent Drainage
- Logging Road (Approximate)
- Fence Line
- Creek Boundary

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Areas Targeted for Remediation  
 Beech Creek Superfund Site  
 Wayne County, Tennessee

Figure  
 12d

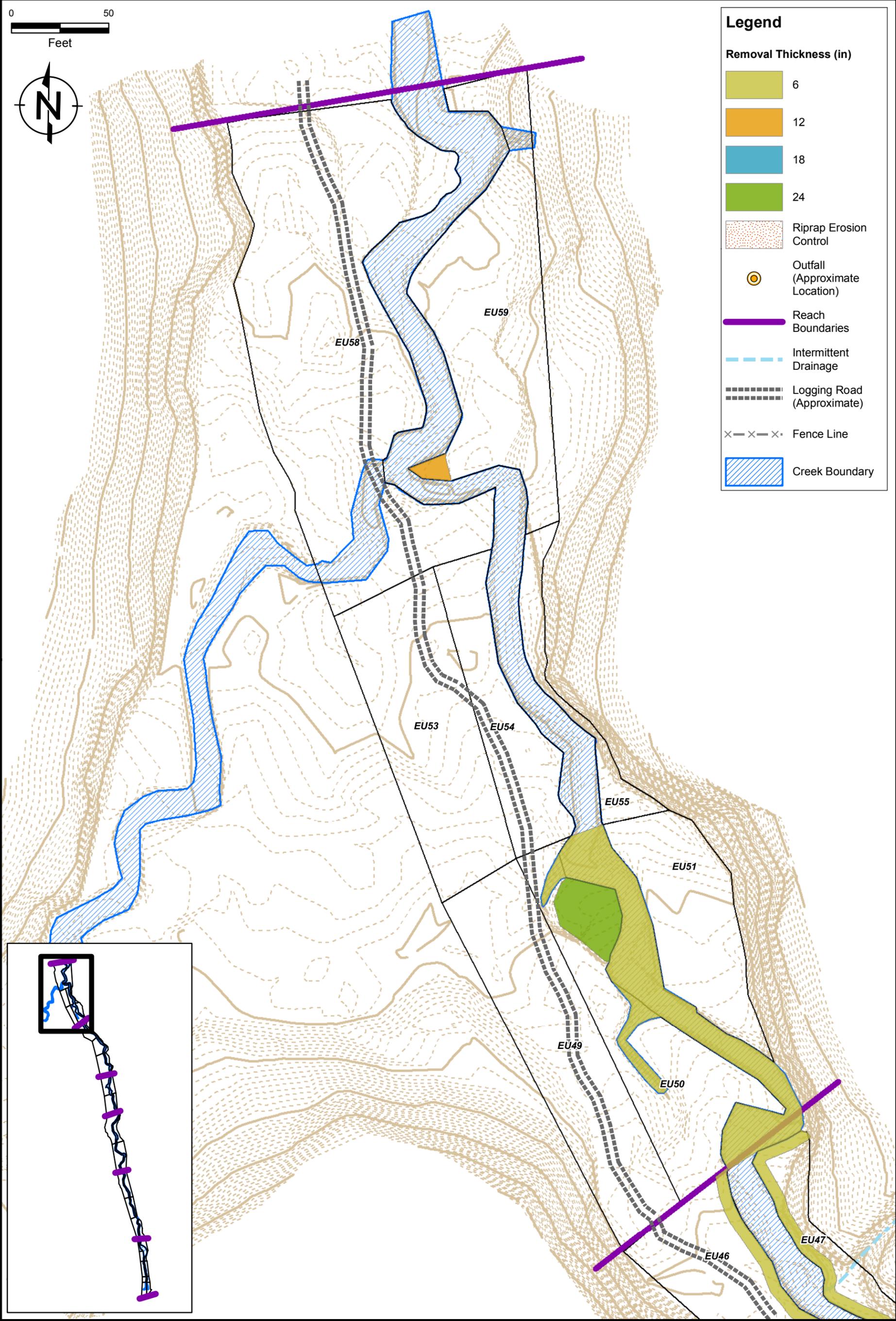


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Areas Targeted for Remediation  
 Beech Creek Superfund Site  
 Wayne County, Tennessee

Figure  
 12e



**Legend**

**Removal Thickness (in)**

- 6
- 12
- 18
- 24

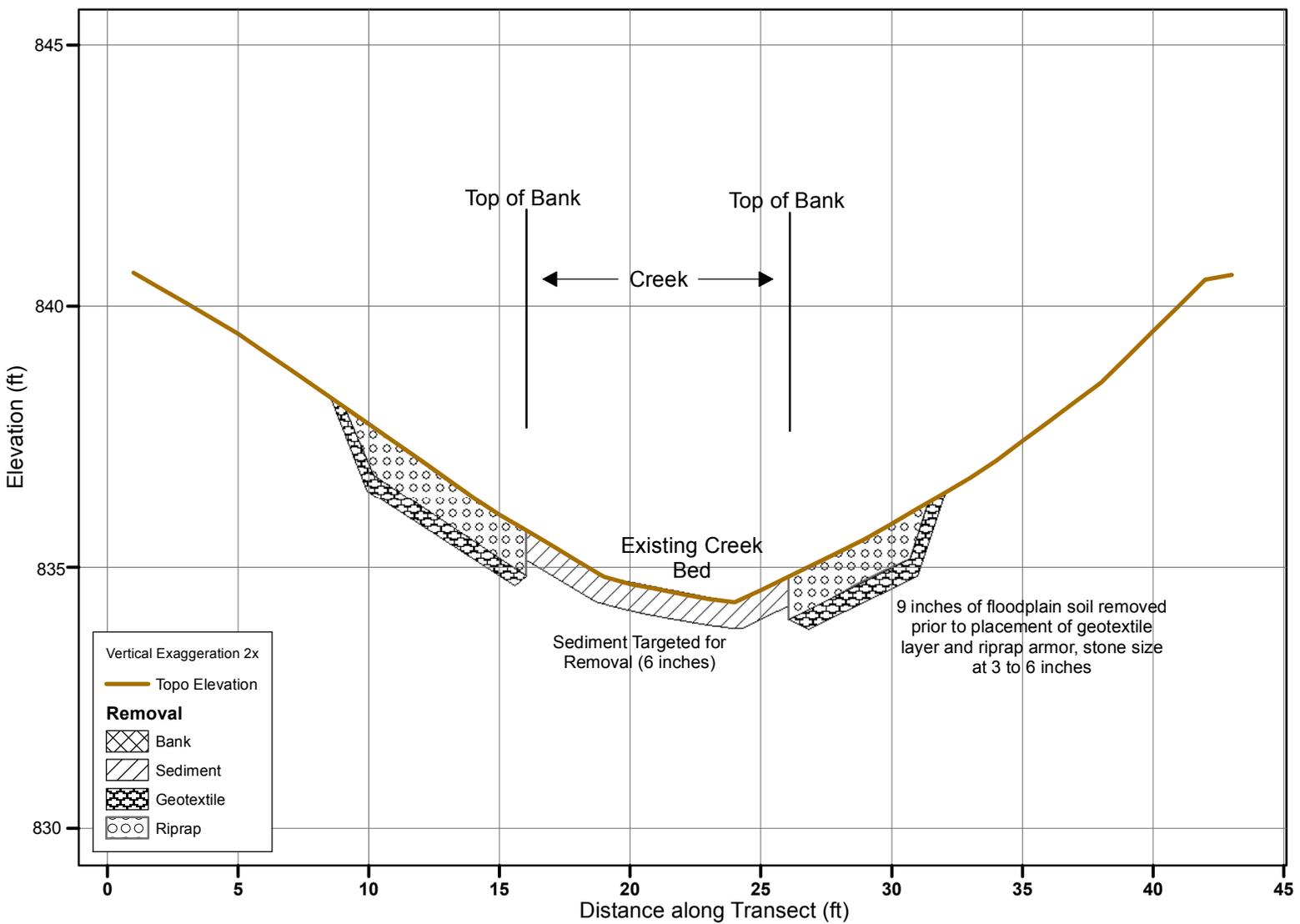
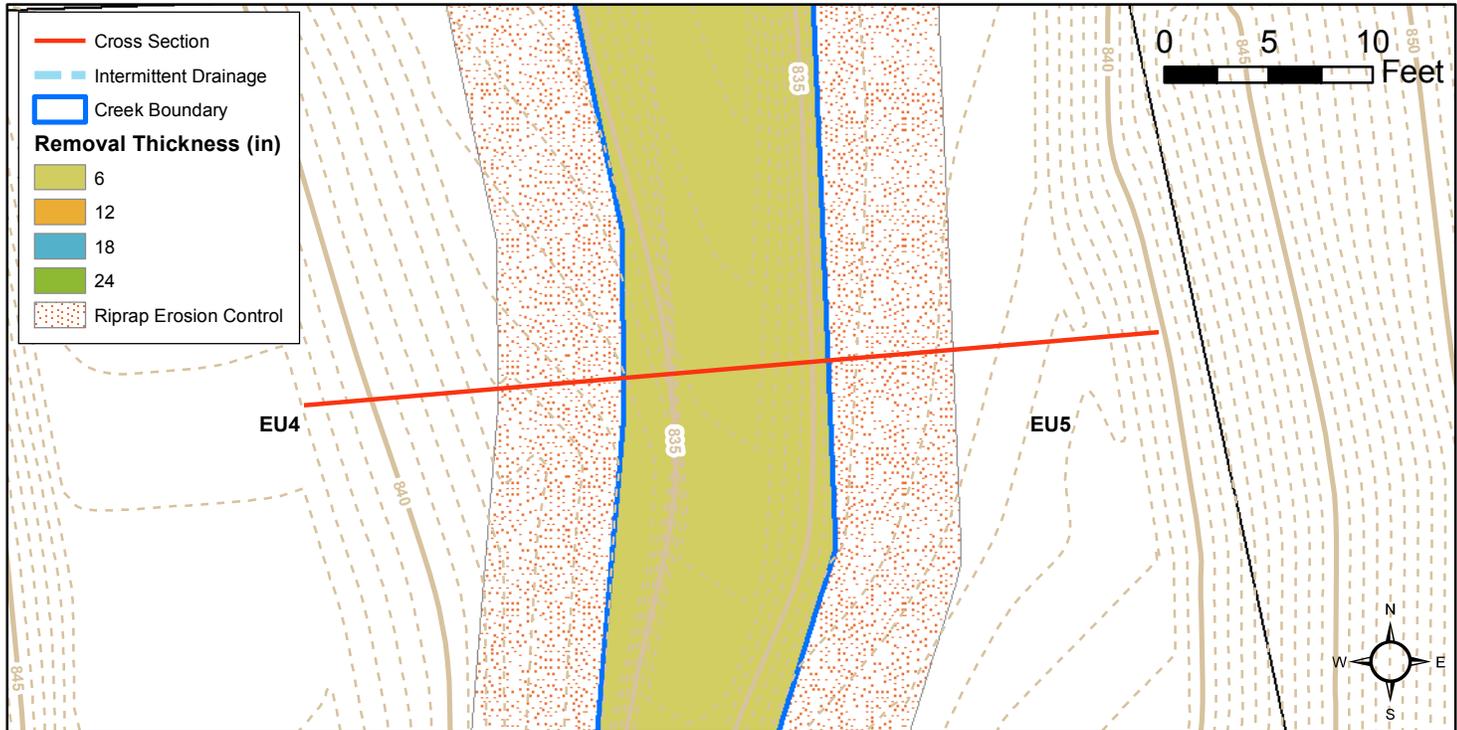
- Riprap Erosion Control
- Outfall (Approximate Location)
- Reach Boundaries
- Intermittent Drainage
- Logging Road (Approximate)
- Fence Line
- Creek Boundary

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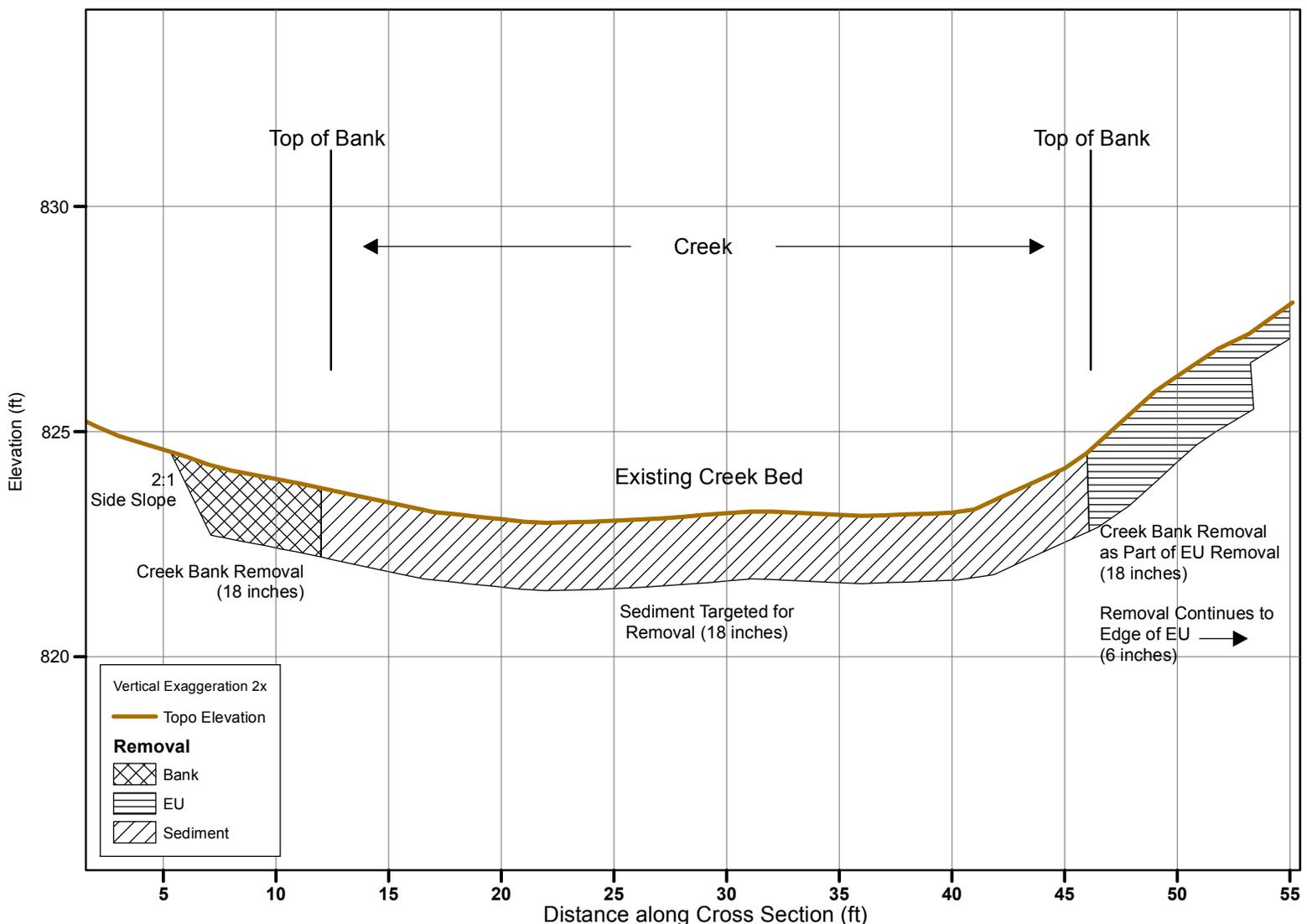
Areas Targeted for Remediation  
 Beech Creek Superfund Site  
 Wayne County, Tennessee

Figure  
 12f



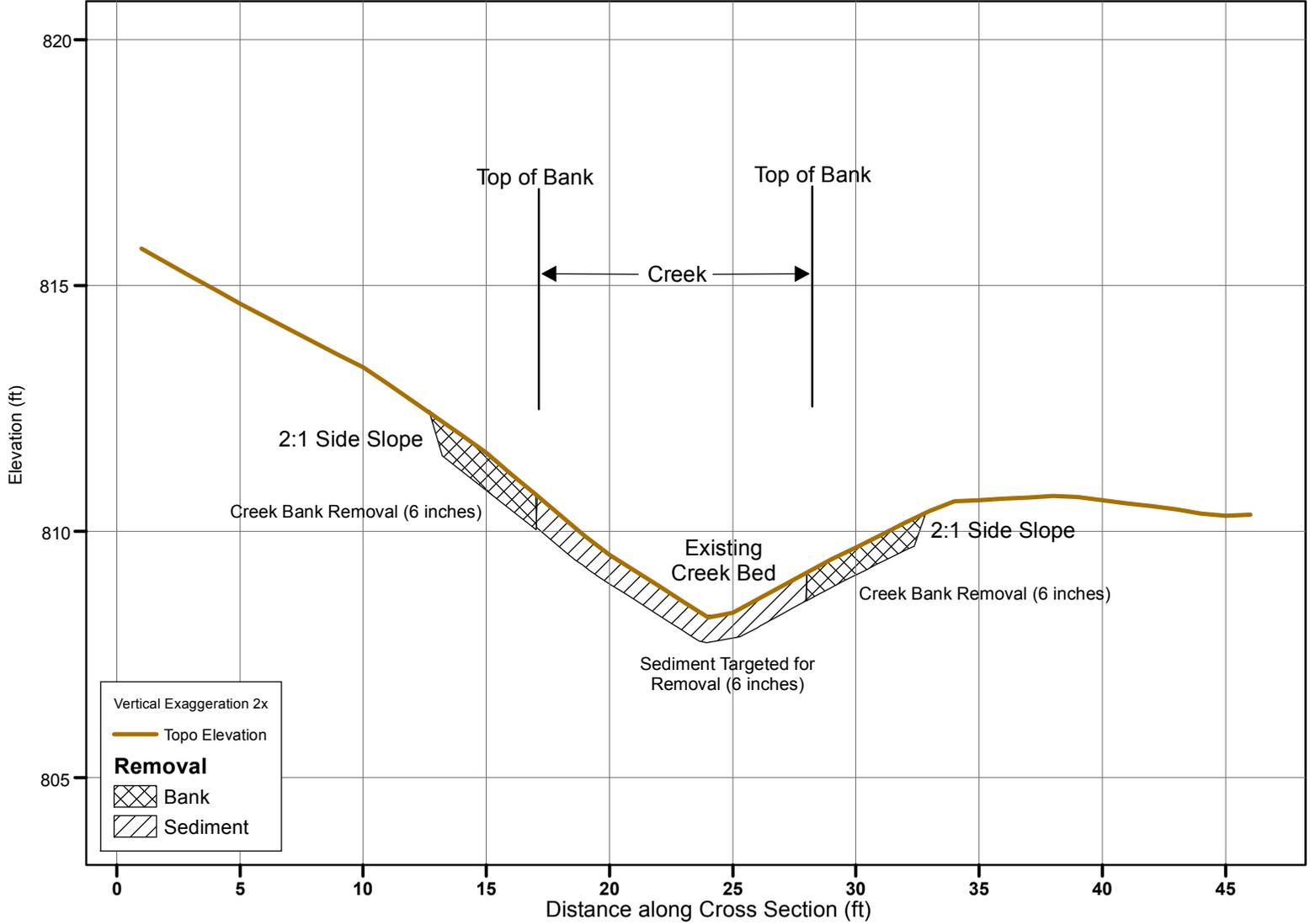
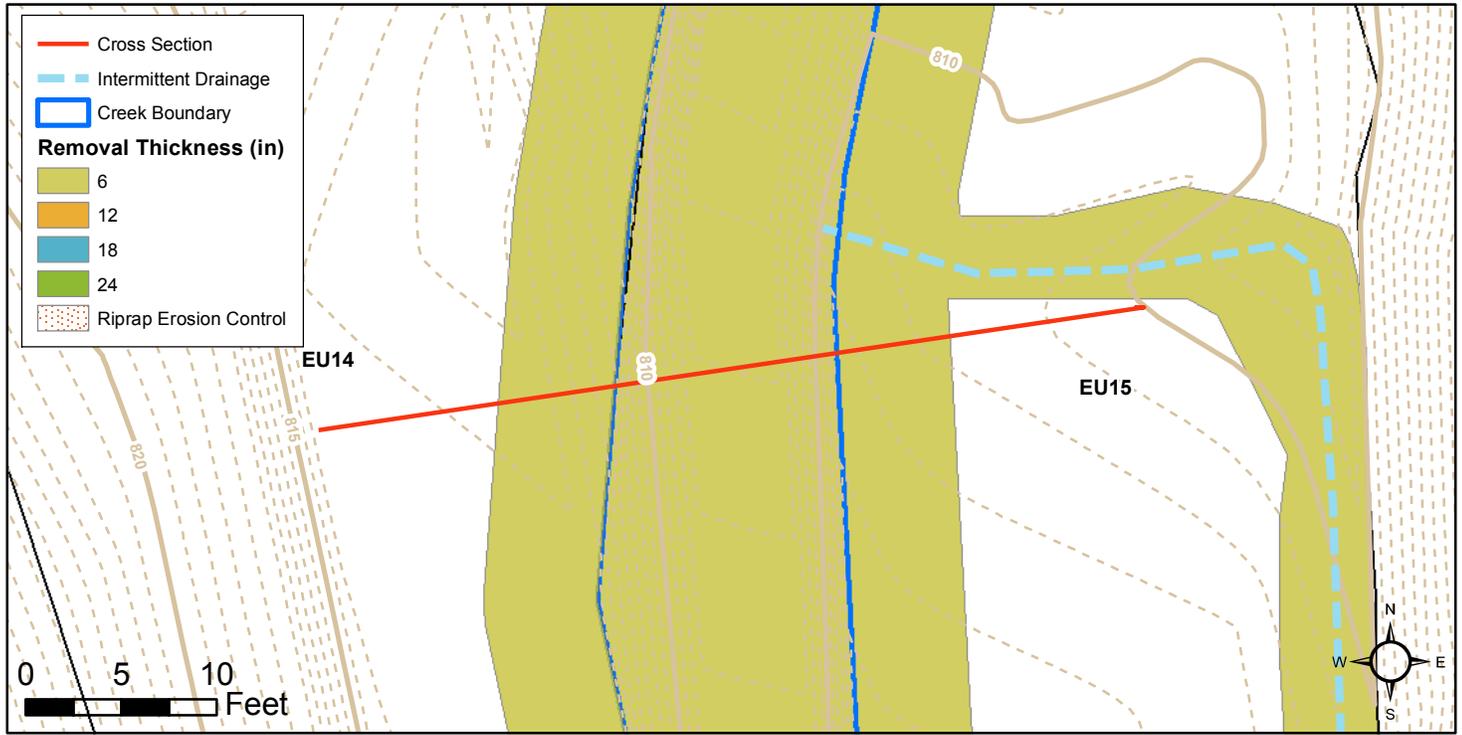
**Cross Section in EU 4/5**  
 Beech Creek Superfund Site  
 Wayne County, Tennessee

Figure 13a



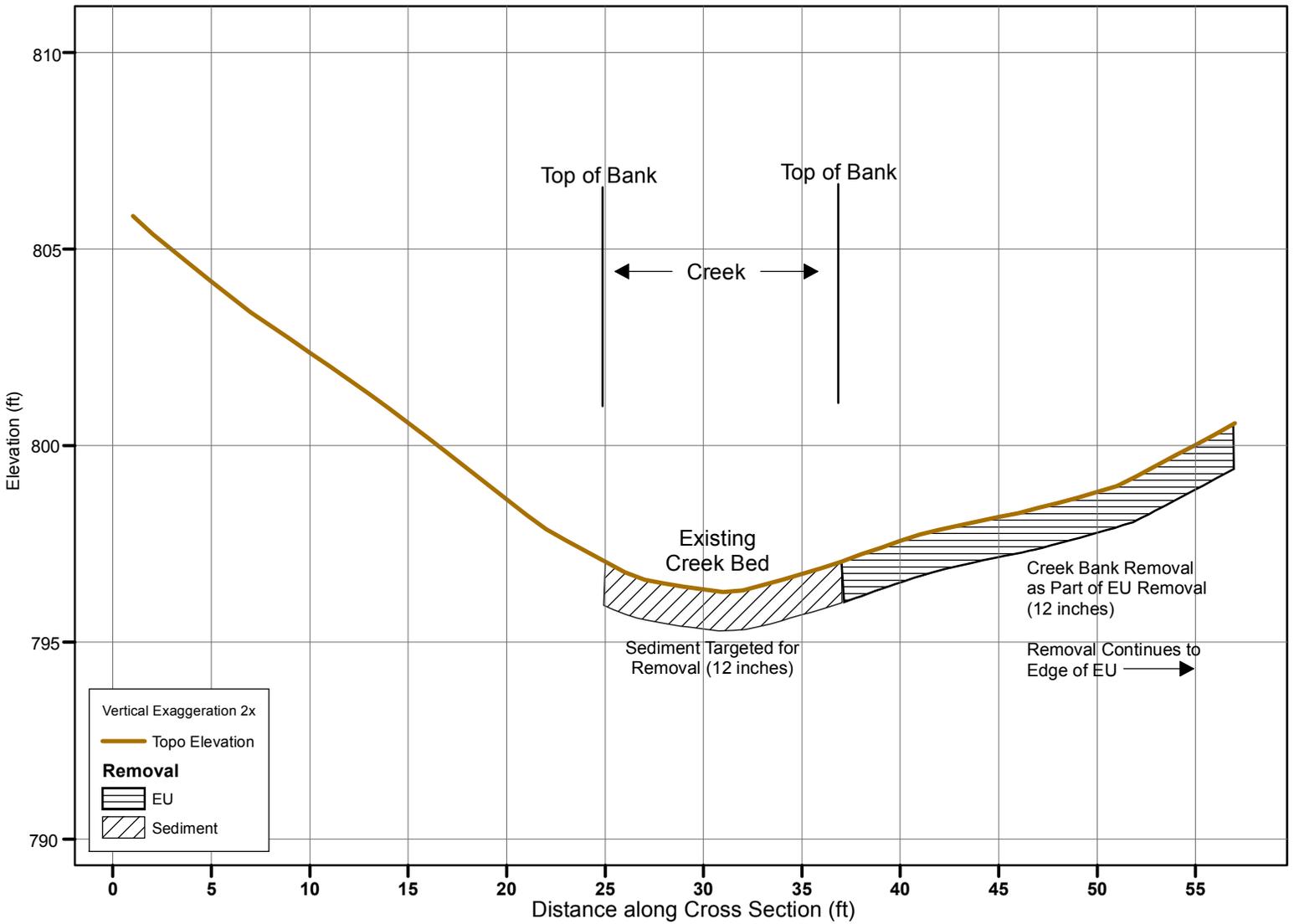
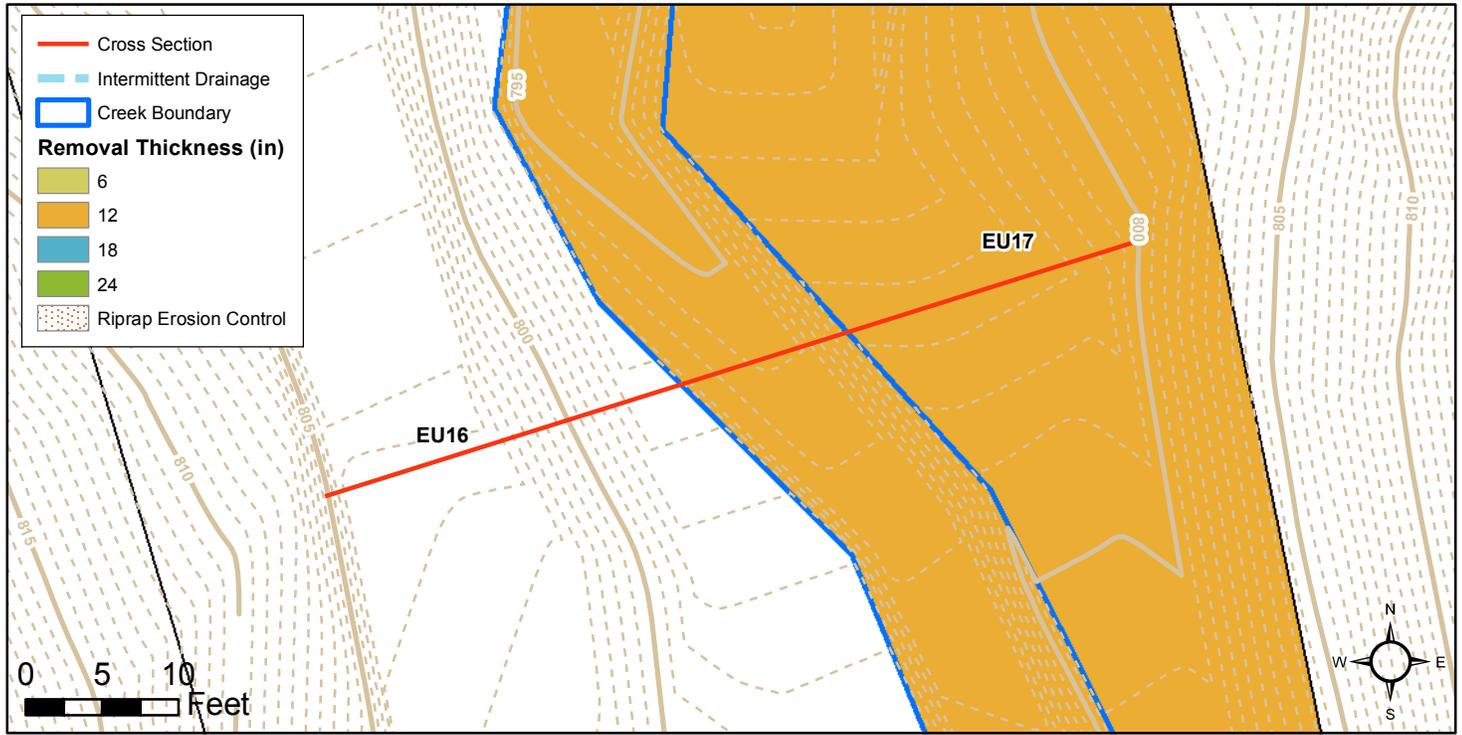
**Cross Section in EU 10/11**  
 Beech Creek Superfund Site  
 Wayne County, Tennessee

**Figure 13b**



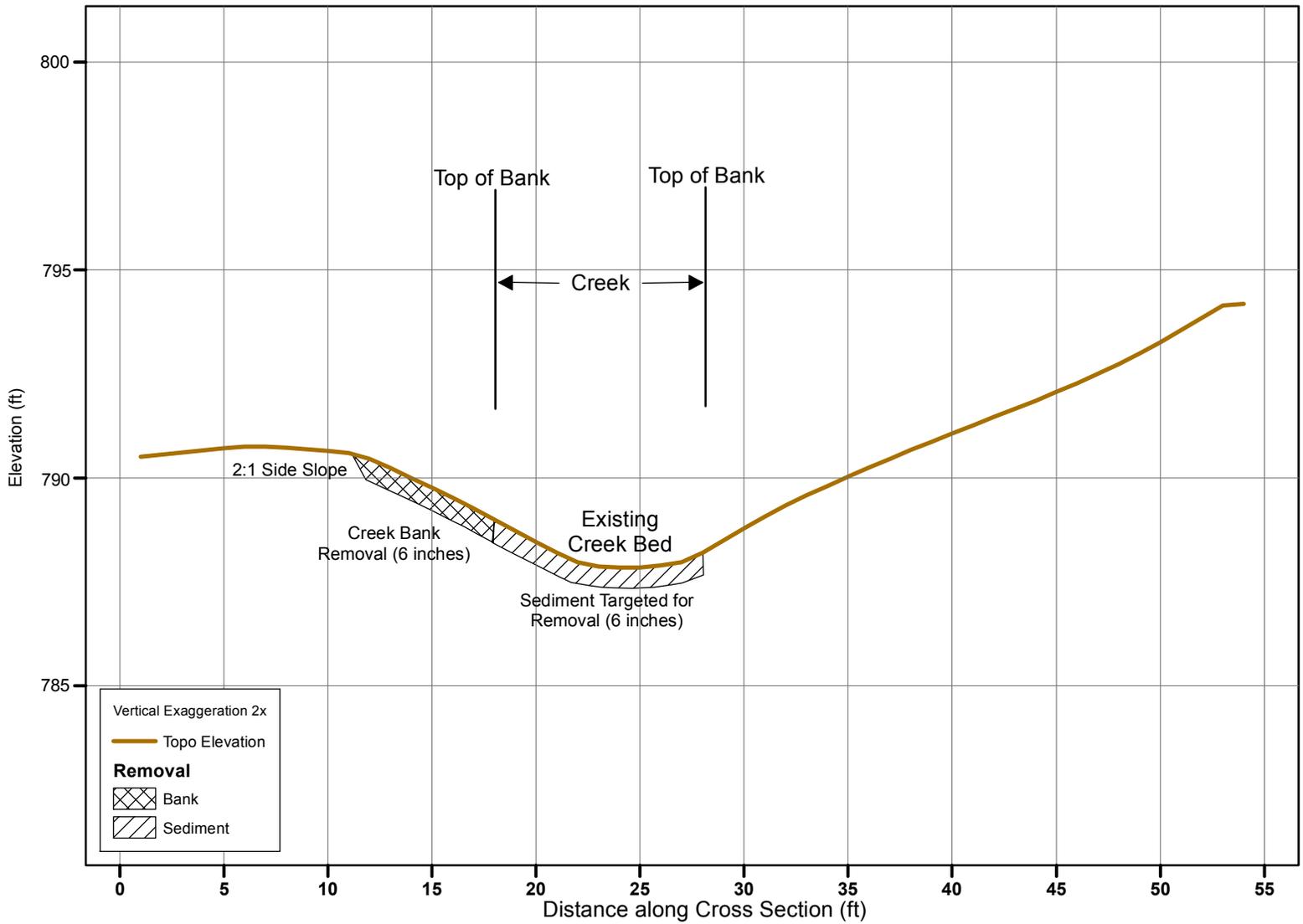
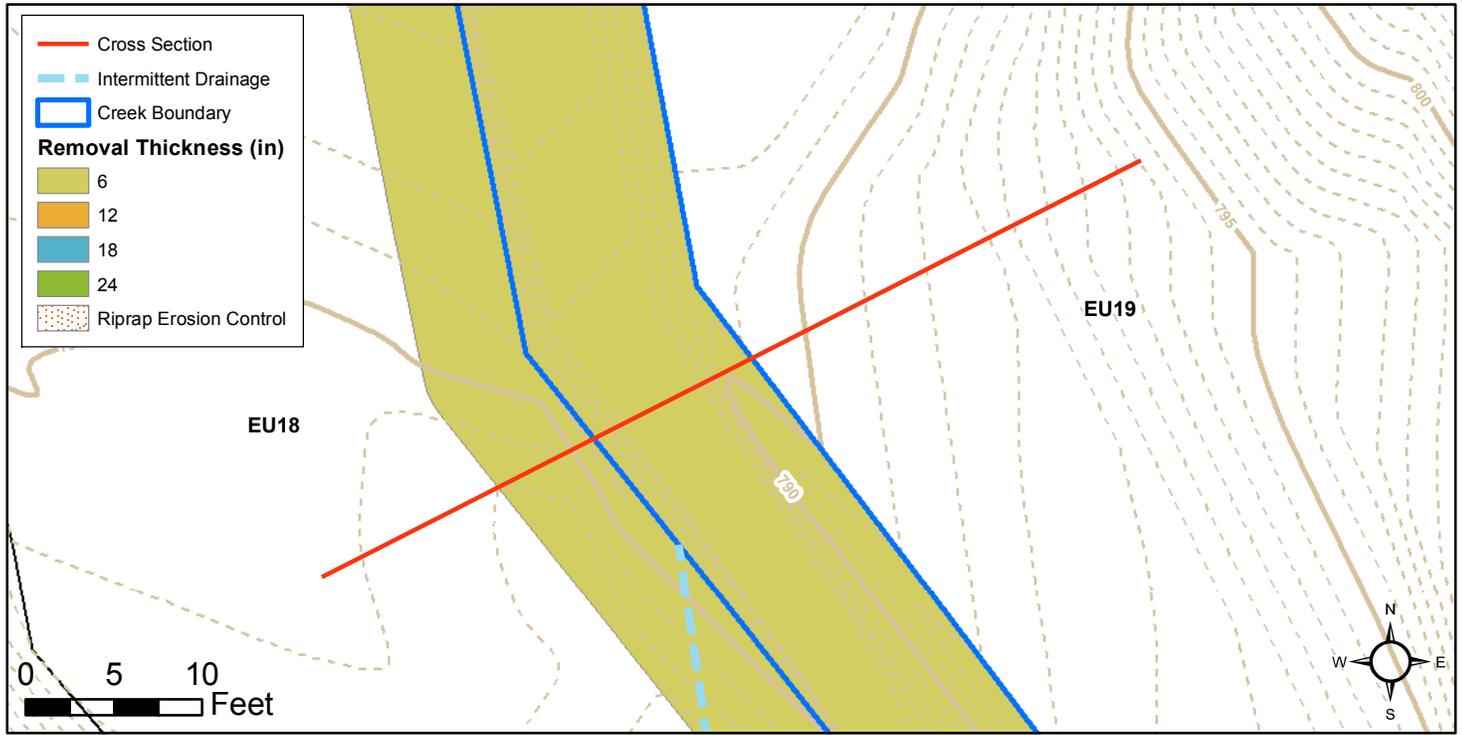
Cross Section in EU 14/15  
 Beech Creek Superfund Site  
 Wayne County, Tennessee

Figure 13c



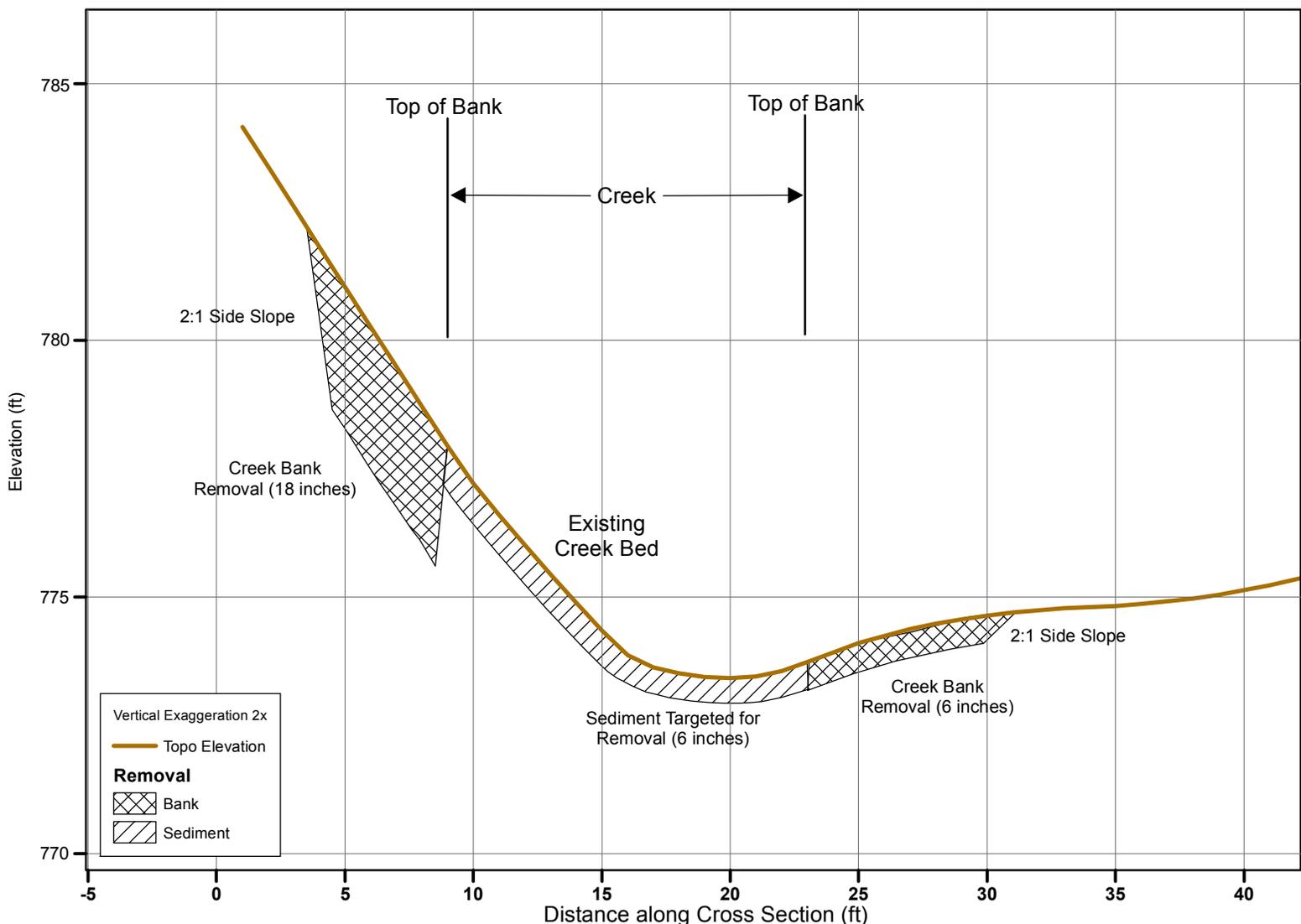
**Cross Section in EU 16/17**  
 Beech Creek Superfund Site  
 Wayne County, Tennessee

Figure  
 13d



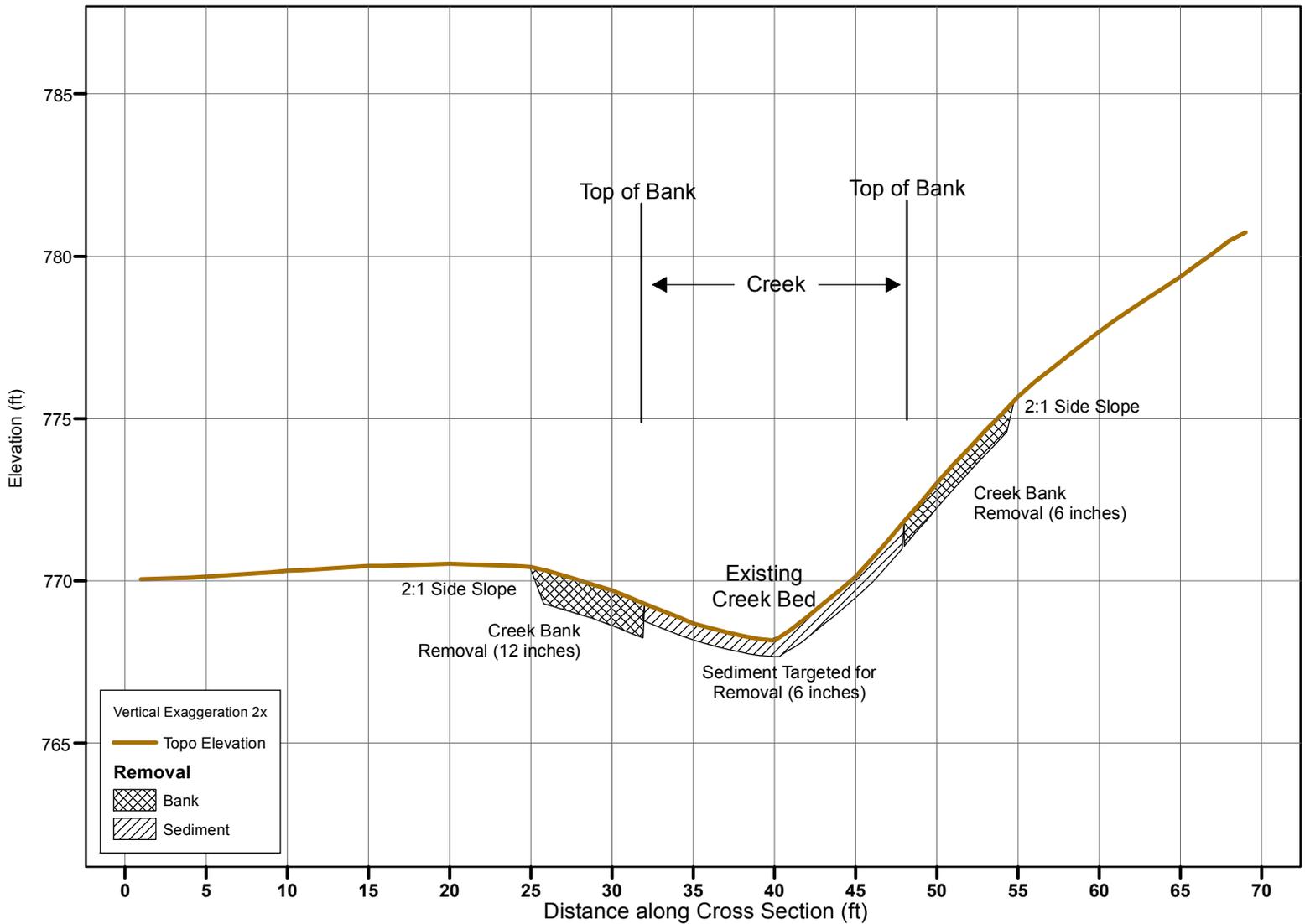
**Cross Section in EU 18/19**  
 Beech Creek Superfund Site  
 Wayne County, Tennessee

Figure 13e



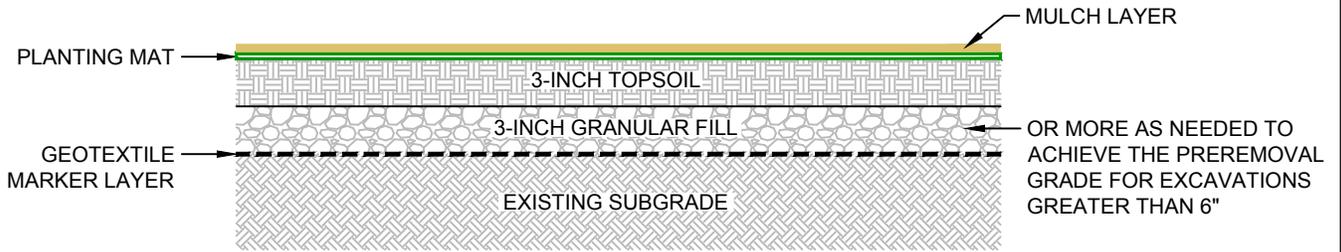
Cross Section in EU 22/23  
 Beech Creek Superfund Site  
 Wayne County, Tennessee

Figure 13f

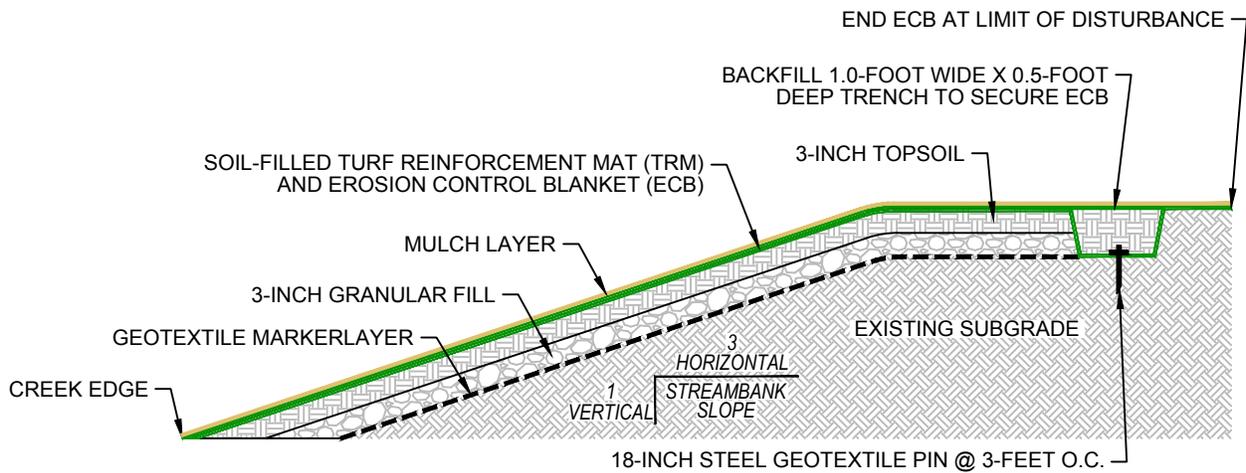


**Cross Section in EU 26/27**  
 Beech Creek Superfund Site  
 Wayne County, Tennessee

Figure  
 13g



**DETAIL A**  
**TYPICAL FLOODPLAIN AREA RESTORATION**



**DETAIL B**  
**TYPICAL CREEK BANK RESTORATION**

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Restoration Examples  
Beech Creek Superfund Site  
Wayne County, Tennessee

Figure  
14

DRAFTED BY: APR/CKL

DATE: 5/7/15

08-33897A US02

## **Appendix A**

### **Sevenson Health and Safety Plan**

**Site Safety and Health Plan  
Beech Creek Superfund Site  
Wayne County, Tennessee**

*Prepared For:*



**ENVIRON International Corporation**

333 West Wacker Drive  
Suite 2700  
Chicago, Illinois

*Prepared By*



**2749 Lockport Road  
Niagara Falls, NY 14305**

**Revision 0  
April 20, 2015**

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## Acronyms

ACGIH	American Conference of Governmental Industrial Hygienists'
AHA	Activity Hazard Analysis
CFR	Code of Federal Regulation
CIH	Certified Industrial Hygienist
CO	Carbon Monoxide
CPR	Cardiopulmonary resuscitation
dB(A)	Decibels A level
DEET	N-Diethyl-m-toluamide
EMS	Emergency Medical Service
GFCI	Ground Fault Circuit Interrupter
HEPA	High Efficiency Particulate Air
HIV	Human Immunodeficiency Virus
HPS	Hanta Virus Pulmonary Syndrome
IDLH	Immediately Dangerous to Life and Health
JSEP	Job Safety Enhancement Program
lb	Pound
LEL	Lower Explosive Limit
m	Meter
MSDS	Material Safety Data Sheets
ml	Milliliter
mph	Miles per hour
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
O <sub>2</sub>	Oxygen gas
PCBs	Polychlorinated Biphenyl
PEL	Permissible Exposure Limit
PID	Photo Ionization Detector
PPE	Personal Protective Equipment
ROPS	Roll Over Protective Structure
SHM	Safety and Health Manager
SOPs	Standard Operating Procedures
SPA	Safe Plan of Action
SSHO	Site Safety and Health Officer
TBD	To Be Determined
TLV	Threshold Limit Value
USEPA or EPA	United States Environmental Protection Agency
WTP	Water Treatment Plant

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## **1.0 Introduction**

Sevenson Environmental Services, Inc. is under contract to perform the remedial activities at the Beech Creek Superfund Site (Site) located in Wayne County Tennessee. The work consists of mobilization/demobilization, support facilities, tree removal, access road enhancement, materials handling pad construction/decommissioning, water treatment plant construction/decommissioning, excavation and backfilling of PCB contaminated material, and offsite transportation of excavated materials.

### **1.1 Plan Objective**

The objective of this Site Safety and Health Plan (SSHP) is to define the requirements and designate protocols to be followed during work at the Site. Applicability extends to Sevenson personnel, Sevenson's subcontractors, and visitors inclusive of engineers and subcontractors. Work performed under this contract will comply with applicable Federal, State, and Local Safety and Occupational Health laws and regulations. Through careful planning and implementation of corporate and site-specific safety protocols, Sevenson will strive for project free of accidents and incidents by promoting zero at risk behavior approach.

### **1.2 Safety and Health Policy Statement**

Sevenson's management is committed to the safety of each and every employee. It should not be assumed just because no injury, accident, or illness occurred during a task that at risk behaviors will be acceptable. There is no place at Sevenson for an employee who will not work safely or who will endanger the safety of his fellow workers. It is essential that all Managers and Supervisors insist on the maximum safety performance and awareness of all employees under their direction by enthusiastically and consistently administering all safety rules and regulations as well as at risk behaviors. It is Sevenson's policy to take the necessary actions in engineering, planning, designing, assigning and supervising work operations, to create a safe work-site. Sevenson will:

- Maintain safe and healthful working conditions.
- Provide and assure the use of all necessary personnel protection equipment to ensure the safety and health of site employees and the public at large.
- Require that site work be planned to provide a range of protection based on the degree of hazards encountered under actual working conditions.
- Provide site workers with the information and training required to make them fully aware of known and suspected hazards that may be encountered, and of the appropriate methods for protecting themselves, their co-workers, and the public at large.

### **1.3 Drug and Alcohol Policy**

Sevenson is committed to providing a safe, efficient, and productive work environment for all employees. Using or being under the influence of drugs or alcohol on the job may pose serious safety and health risks. To help ensure a safe and healthful working environment, employees may be asked to provide body substance samples (such as urine and/or blood) to determine the illicit or illegal use of drugs and alcohol. Refusal to submit to drug testing may result in disciplinary action, up to and including termination of employment.

Subcontractors shall be made aware of the Substance Abuse Program requirements when working at the Site. Subcontractor personnel believed to be under the influence of a control substance or alcohol will be subjected to For Cause and Reasonable Suspicion testing. If a subcontractor refuses to submit to For Cause or Reasonable Suspicion testing, they will be denied access to the project.

#### **1.4 Project Safety and Health Expectations**

The safety and health of workers, clients, the public, and the protection of the environment are fundamental responsibility assumed by Severson under this contract. Severson will:

- Promote project safety with an objective no accidents, illnesses, or injuries by promoting and enforcing the zero at risk behavior policy.
- Manage activities in a proactive way that effectively increases the protection of site workers, the public, and the environment.
- Reduce safety and health risk by identifying and eliminating hazards from site activities.
- Carry out site activities in a manner that complies with all applicable safety, health, and environmental laws and regulations.

#### **1.5 Project Safety and Health Compliance Program**

Compliance with the requirements of applicable Federal, State, and local laws will be accomplished through a combination of written programs, employee training, workplace monitoring, and system enforcement. Continued and regular inspections by supervisors and safety personnel, as well as upper management with total involvement in the safety program will produce an atmosphere of voluntary compliance. However, disciplinary action for violations of project requirements will be taken, when necessary.

All site personnel and visitors entering a Contamination-Reduction Zone or Exclusion Zone at the site will be required to read and verify compliance with the provisions of this SSHP and specific appendices. In addition, visitors will be expected to comply with relevant Tennessee Occupational Safety and Health Administration (TOSHA) requirements such as medical surveillance, training, and personal protective equipment. In the event that a person does not adhere to the provisions of the SSHP, he/she will be requested to leave the work area. All nonconformance incidents will be recorded in the Daily Safety and Inspection Log.

The Site Safety and Health Officer (SSHO) will conduct impromptu surveillance on a daily basis of all work areas and subcontractor's activities to ensure that safety and health is properly implemented. In addition, any reports from employees concerning unsafe work practices, acts, or conditions will be investigated promptly. Unsafe acts, practices, or conditions will be reported to the responsible supervisor at the time of inspection.

The safe and efficient work practices of this company require a spirit of teamwork and cooperation from all employees. Also required are uniform standards of expected behavior. Employees who refuse or fail to follow the standard set forth by this plan, the Severson Corporate Health and Safety Plan and/or regulatory standards, will subject themselves to disciplinary action up to, and including discharge. In cases not specifically mentioned, employees are expected to use good judgment and refer any questions to their supervisors.

## **1.6 Site Safety and Health Plan Revisions**

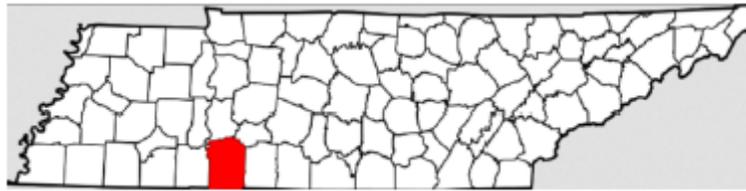
The development and preparation of this SSHP has been based on site-specific information provided to Severson. Should any unforeseen hazard become evident during the performance of the work, the SSHO will bring such hazard to the attention of the Client's Representative both verbally and in writing for resolution as soon as possible. In the interim, Severson will take necessary actions to maintain safe working conditions in order to safeguard on-site personnel, visitors, the public, and the environment. Modifications of any portion or provision of the SSHP will be requested in writing from the Client's by the SSHO, and authorized in writing. No changes to the SSHP will be allowed until the item has been reviewed and an addendum prepared and approved by Safety and Health Manager.

## **1.7 Site Information**

The Site is located near and to the north of the intersection of Clifton Turnpike and U.S. Highway 64 west of the City of Waynesboro, in unincorporated Wayne County Tennessee. The Site is shown on Figures 1 and 2 in Appendix E. The Site is defined in the AOC as beginning at the fence near the north end of the former Old Waynesboro City Dump and including the creek bed, banks, and floodplain of Beech Creek following Beech Creek 0.6 miles to the. Downstream of the Site, Beech Creek continues approximately 17 miles to the Tennessee River.

Constituents in Beech Creek are attributed to the alleged disposal of waste liquid PCBs, spent and broken electrical capacitors containing PCBs, and other PCB-contaminated wastes in the Old Waynesboro City Dump between approximately 1969 and 1972. The Old Waynesboro City Dump was closed in 1982. As part of closure activities, the former landfill was covered with a 2-foot clay cap and topsoil and the former landfill and settling pond were fenced.

**Figure 1  
Site Overview Map**



## **2.0 Organization and Responsibilities**

While the Severson Safety and Health Department directs and supervises the overall Safety, Health and Environmental Program, the responsibility for Safety and Health extends throughout our organization from top management to every employee. For this reason, it is each person's duty to notify the management personnel if a hazardous condition is identified and to make a "stop work" call if the condition represents an immediate danger to life or health, until the SSHO can make a further determination. The following are the Severson project personnel positions and responsibilities for this project.

- Program Manager: Tim Donagen
- Project Manager: Tim White
- Project Superintendent: Randy Campbell
- Safety and Health Manager: Paul Jung, CIH, CSP
- Site Safety and Health Officer: Mike Weidner

- Subcontractors: TBD

## **2.1 Program Manager**

The Program Manager directs and manages all aspects of the project in compliance with all contract and technical requirements. The Program Manager will monitor and control all subcontractors to achieve optimal performance and ensure safe, high quality performance that complies with all contract requirements.

## **2.2 Project Manager**

The Project Manager reports to the Program Manager. His responsibilities include coordinating project activities with the Project Superintendent and serving as the primary liaison with the Client Representative. The Project Manager prepares all correspondence, submittals, and other documentation required for the project; coordinates schedules; and administers the contract. The Project Manager prepares reports and documentation, supervises inspection personnel, and reviews and approves procurement and subcontract activities.

## **2.3 Project Superintendent**

The Project Superintendent supervises and coordinates all construction crew activities relating to site preparation, excavation, dredging, shipping, and restoration. The Project Superintendent has the operational responsibility for the implementation of the SSHP on this project. This includes establishing an attitude of concern for safety matters by initiating prompt corrective action of hazards brought to his attention, and ensuring that the project safety and health requirements are initiated and observed by all project personnel.

The Superintendent plans and requires that all work be performed in compliance with this SSHP, the Severson Corporate Health and Safety Plan, and/ all applicable local, state, and federal regulations. He will impress upon all subcontractors' supervisory personnel a sense of responsibility and accountability of each individual to maintain a safe workplace and to work in a safe manner.

## **2.4 Safety and Health Manager (SHM)**

The Safety and Health Manager formulates, administers and coordinates programs for the company to reduce the risk of loss due to employee injury, regulatory non-compliance, general liability, fire, theft, or damage. The Safety and Health Manager will develop written detailed policies and. The Safety and Health Manager will:

- Be responsible for the development, implementation, and oversight, of the SSHP.
- Visit the site as needed to audit the effectiveness of the SSHP.
- Provide consultation as needed to ensure that the SSHP is fully implemented.
- Coordinate any modifications to the SSHP with the SSHO and the Client Representative.
- Provide continued support for upgrading/downgrading the level of personal protection for project tasks.

## **2.5 Site Safety and Health Officer (SSHO)**

Under the direction of the Safety and Health Manager, the SSHO will be responsible for the implementation of this SSHP and for the daily coordination of safety activities with the Project Superintendent and the Client Representative to ensure that the planned work objectives reflect adequate safety and health considerations. The SSHO will maintain a complete copy of this plan (and its supplements and addenda) at the site during all field activities and assure that all workers and visitors are familiar with it. He will perform site-specific training and briefing sessions for employee(s) prior to the start of field activities at the site and a briefing session each day before starting work. He will ensure the availability, proper use and maintenance of specified personal protective equipment, decontamination equipment, and other safety and health equipment. He will maintain a high level of safety awareness among team members and communicate pertinent matters to them promptly. The SSHO will:

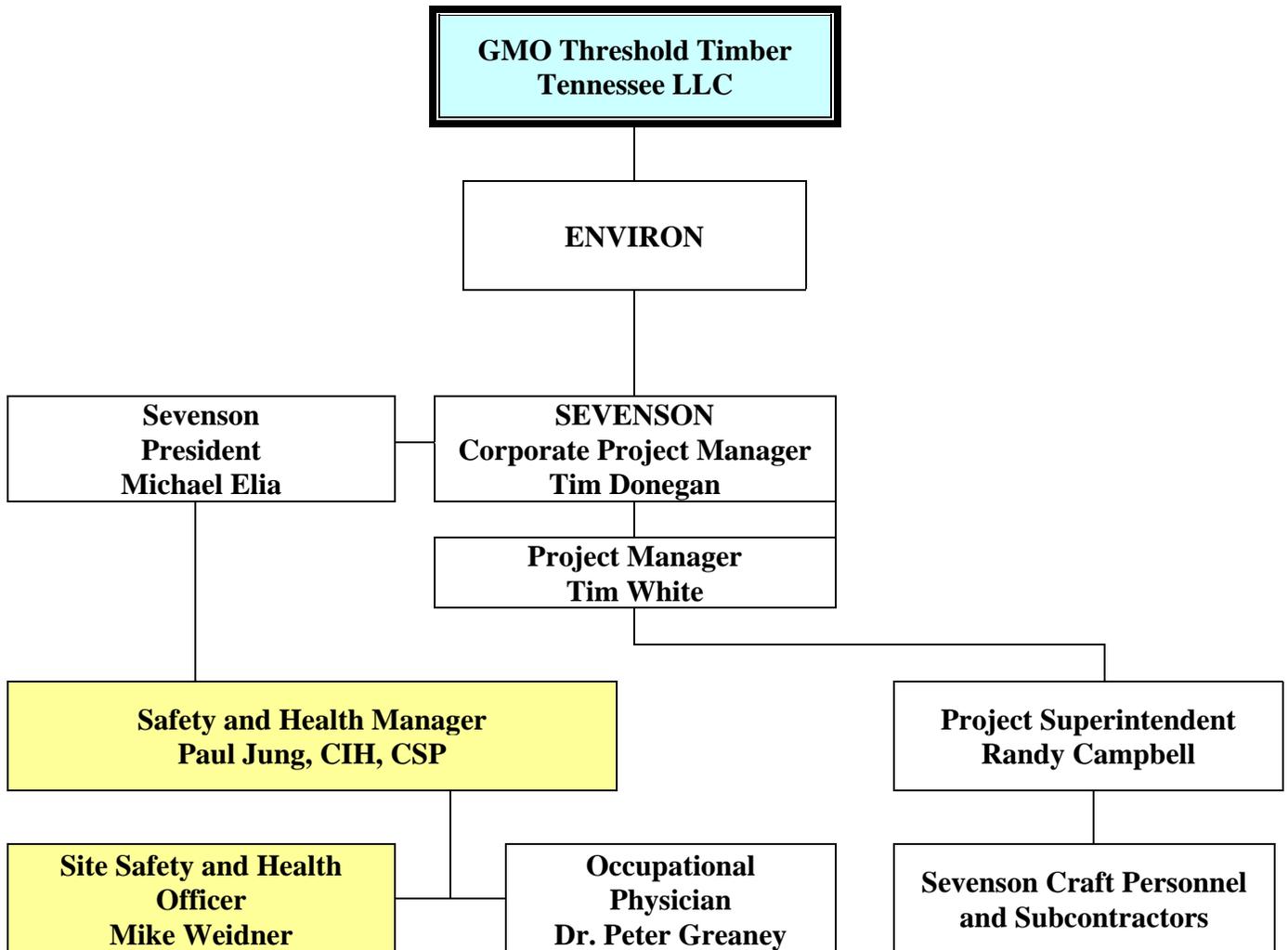
- Assist and represent the Safety and Health Manager in on-site training and the day-to-day on-site implementation and enforcement of the accepted SSHP.
- Be assigned to the site on a full time basis for the duration of field activities.
- Have the authority to ensure site compliance with specified safety and health requirements, Federal, state and OSHA regulations; and all aspects of the SSHP. This includes, but is not limited to, activity hazard analyses, air monitoring, use of PPE, decontamination site control, standard operating procedures used to minimize hazards, safe use of engineering controls; the emergency response plan, confined space entry procedures, spill containment program, and preparation of records. This will be accomplished by performing a daily safety and health inspection and documenting results on the Daily Safety Inspection Log.
- Stop work activities if unacceptable health or safety conditions exist, and take necessary action to re-establish and maintain safe working conditions.
- Consult and coordinate any modifications to the SSHP with the Safety and Health Manager, the Site Superintendent and the Client Representative.
- Conduct accident investigations and prepare accident reports.
- Review results of daily quality control inspections and document safety and health findings in the Daily Safety Inspection Log.
- Coordinate with Site Management and the Safety and Health Manager, recommend corrective actions for identified deficiencies, and oversee the corrective actions.

## **2.6 Subcontractors**

Subcontractors utilized during activities at the Site will be provided a copy of the plan prior to commencing work. The SSHO will verify that subcontractor employee training and will monitor and enforce compliance with the established plan and standard operating procedures. As with all site personnel, subcontractors will be briefed on the provisions of this SSHP and attend all daily toolbox safety meetings.

Subcontractors will be required for their own health and safety. Sevenson will continually monitor a subcontractor’s safety performance. Sevenson will observe subcontractors for hazards or unsafe practices that are both readily observable and occur in common work areas. If non-compliance or unsafe conditions or practices are observed, the subcontractor safety representative will be notified and corrective action will be required. The subcontractor will determine and implement necessary controls and corrective actions. If repeat non-compliance/unsafe conditions are observed, the subcontractor will be required to stop affected work until adequate corrective measures are implemented.

**Figure 2  
Organization Chart**



### 3.0 Hazard/Risk Analysis

Below is a general summary of the risks that this SSHP addresses during work at this site. This is a summary of the major anticipated risks and is not intended to be a complete listing of all potential risks that may be encountered during the project.

1. Working around heavy equipment (struck by, caught in equipment)
2. Materials handling and transfer (ergonomic issues)
3. Heavy lifting (strains, sprains)
4. Biological hazards (plants, animals, insects)
5. High noise levels
6. Cuts/lacerations (saws, wire rope, etc.)
7. Exposure to temperature extremes (heat stress, cold stress)
8. Severe weather conditions (high winds, precipitation, lightning, tornadoes)
9. Exposure to chemical contaminants and chemicals brought on site.
10. Overhead hazards (dead tree branches, falling tree nuts)
11. Community and public roadway motor vehicle traffic

### 3.1 Site Tasks and Operations

Sevenson has developed an Activity Hazard Analysis (AHA) for the major phases of the work. A major phase of work is defined as an operation involving a type of activity presenting hazards not experienced in previous operations, or where a new subcontractor or work crew is to perform the specified phase. The analysis will define the activity being performed and identify the sequence of work, the specific hazards anticipated, and the control measures to be implemented to eliminate or reduce each hazard. An AHA will also be prepared when new tasks are added; job situations change, or when it becomes necessary to alter safety requirements; refer to *Appendix A - "Activity Hazard Analysis"*. Work will not proceed on a particular task/work area until the AHA has been reviewed and site personnel understand the hazards and controls of the activity to be performed.

Additionally, Sevenson has a real-time hazard identification program known as the Safe Plan of Action (SPA). While the AHA is used as a training/auditing tool, the SPA is a planning tool for the work crew to address the details of a work process or activity and any potential changing conditions. The superintendent or foreman as well as the work crew participate in developing the SPA, and this is done before the start of each day's work.

### 3.2 Hazards

The following potential hazards may be encountered during the work activities at the Site.

### 3.2.1 Safety/Physical Hazards

Potential safety hazards include: working on or near water, electrical, heavy equipment/vehicle traffic, material handling, hand and power tools, noise exposure, slip/trips/falls, heat and cold stress, and falls from elevation. Safety/Physical hazards associated with the project are presented below.

#### 3.2.1.1 Electrical

Overhead power lines, downed electrical wires, and buried cables all pose a danger of shock or electrocution if contacted or severed during site operations. A minimum distance of 10 feet will be present between overhead wires and equipment. This distance will vary according to voltage, the greater the voltage, the greater the clearance between any part of the equipment and the power line; refer to **Table 1 - Minimum Clearance from Energized Overhead Electrical Lines**. When required, a spotter will be utilized to maintain a safe distance between equipment and overhead wires. The basic rule is, "Don't locate equipment in a position where it can come in contact with overhead power lines." Maintain the required distance from the lines. Overhead electrical power lines will be considered energized unless the person owning such line, or operating officials of the electrical utility supplying the line assures that it is not energized and it has been visibly grounded. Severson will contact the local power company to determine the voltage of the power lines adjacent to the site if applicable.

<b>Table 1 – Minimum Clearance From Energized Overhead Electrical Lines</b>	
<b>Nominal System Voltage</b>	<b>Minimum Rated Clearance</b>
0 to 50 kV	10 Feet (3 m)
51 to 200 kV	15 Feet (4.5 m)
201 to 350 kV	20 Feet (6 m)
351 to 500 kV	25 Feet (7.5 m)
501 to 650 kV	30 Feet (9.1 m)
651 to 800 kV	35 Feet (10.7 m)
801 to 950 kV	40 Feet (12.2 m)
951 to 1100 kV	45 Feet (13.7 m)
Clearance values calculated using: $(\text{Initial kV} - 50\text{kV}) \times (4 \text{ inches}/10\text{kV}) \times (1 \text{ foot}/12 \text{ inches}) = \text{increased distance (feet) over 10 feet. Add this value to 10 feet to yield minimum rated clearance}$	

Table 11-1 USACE EM-385-1-1 (Sept 2008)

There are various means of insulating the wires, as well as barriers and alarms that may be available to reduce the risk of injury to workers, but the use of such devices does not change the requirements of any other applicable standards or laws. In addition, these and other measures (such as grounding the equipment itself) may not be fully effective and may create a false sense of security. Only the utility

company is authorized to de-energize, insulate, or handle the lines. No one else may attempt these operations.

Electrical equipment used on-site may also pose a hazard to workers. Whenever possible, Severson will use low-voltage equipment with ground-fault interrupters and watertight, corrosion-resistant connecting cables to help minimize this hazard. In addition, lightning is a hazard during outdoor operations, particularly for workers handling metal containers or equipment. In the event of an electrical storm, all operations will cease for the duration of the storm.

No employee will be permitted to work in the proximity of any part of an electrical power circuit unless the person is protected against electric shock by de-energizing the circuit and grounding it, or it has been locked and tagged out. These procedures will be utilized when work has to be performed on energized equipment.

All electrical wiring and equipment will be intrinsically safe for use in potentially explosive environments and atmospheres. Ground-fault circuit interrupters are standard for use at the site.

### **3.2.1.2 Underground Utilities**

There are numerous underground utilities located at the Site. Some of these will be disconnected from service, removed to support remediation, and re-installed during restoration while others will be protected and maintained. Prior to the start of excavation activities Tennessee One Call 811 or 800-351-1111 will be contacted to mark out underground utilities coming into Site area.

### **3.2.1.3 Heavy Equipment/Vehicle Traffic**

Considerations for controlling the movement of personnel and equipment in a construction area are vitally important to any project as injuries may occur while working with or adjacent to such equipment. This category includes all operations that utilize moving heavy equipment: dredges, excavators, loaders, dozers, cranes, and trucks. Severson will take every precaution necessary to ensure the safety of the residents and the on-site personnel during traffic movement operations.

All workers will adhere to all applicable standards and regulations while operating heavy equipment at the site. Operators will be trained and experienced in the use and maintenance of the equipment they are operating. Equipment will be inspected on a daily basis to identify any worn parts, and/or unsafe conditions. Inspections will be documented using the Equipment Checklist. Any unsafe equipment will be removed from service until safety defects can be corrected. Equipment operators will not leave their machine unattended while it is running. All equipment will have electronic backup alarms. Each piece of equipment will be equipped with a 1A:10B:C fire extinguisher. No vehicles or equipment will be operated in a careless or unsafe manner. Personnel will wear high visibility reflective vests when working around equipment/vehicles. All personnel will stay a minimum of four feet clear of the operational area of the equipment.

During construction activities, it is often necessary to have a worker direct the operator. In these cases, close communication between the operator and the laborer is of critical importance. One designated person will give signals to the operator of both equipment and vehicles in the work area. Workers should not take any action unless they have made eye contact with the operator and clearly communicated their intentions. In addition, all machines are equipped with back-up alarms, which are checked daily and repaired immediately. Truck traffic will be controlled by a flagger/spotter, as required.

Maintenance and inspection of vehicles and heavy equipment is a vital part of the overall safety program. Severson has a fully staffed equipment maintenance shop that handles all preventative and overhaul work for our entire vehicle and equipment fleet. As part of the preventative maintenance, all equipment is checked for properly functioning safety devices (e.g., backup alarms, brakes, lights, fire extinguishers, etc.). Before each piece of equipment leaves the shop it must pass a safety checklist. All rental equipment is subjected to a similar inspection when delivered to the job site. Any piece of rental equipment that fails the inspection must be repaired by the vendor before it is accepted for use. In addition, all equipment is inspected in the field prior to the start of each day's activities. If a superintendent, operator, or safety officer detects a defect, the equipment is taken out of service and a properly qualified mechanic is dispatched from the shop to make the repairs on-site. All heavy equipment used at the site will be equipped with rollover protective structures (ROPS).

#### **3.2.1.4 Material Handling**

Various materials and equipment may be handled manually during project operations. Care should be taken when lifting and handling heavy or bulky items to avoid back injuries. The following fundamentals address the proper lifting techniques that are essential in preventing back injuries:

- The size, shape, and weight of the object to be lifted must first be considered. Multiple employees or the use of mechanical lifting devices are required for heavy objects.
- The anticipated path to be taken by the lifter should be considered for the presence of slip, trip, and fall hazards.
- The feet will be placed far enough apart for good balance and stability (typically shoulder width).
- The worker will get as close to the load as possible. The legs will be bent at the knees.
- The back will be kept as straight as possible and abdominal muscles should be tightened.
- Twisting motions should be avoided when performing manual lifts.
- To lift the object, the legs are straightened from their bending position.
- A worker will never carry a load that cannot be seen over or around.

When placing an object down, the stance and position are identical to that for lifting. The legs are bent at the knees and the object lowered. When two or more workers are required to handle the same object, workers will coordinate the effort so that the load is lifted uniformly and that the weight is equally divided between the individuals carrying the load. When carrying the object, each worker, if possible, will face the direction in which the object is being carried. In handling bulky or heavy items, the following guidelines will be followed to avoid injury to the hands and fingers:

- A firm grip on the object is essential; leather gloves will be used if necessary.
- The hands and object will be free of oil, grease, and water which might prevent a firm grip, and the fingers will be kept away from any points that could cause them to be pinched or crushed, especially when setting the object down.

- The item will be inspected for metal slivers, jagged edges, burrs, and rough or slippery surfaces prior to being lifted.

### **3.2.1.5 Hand and Power Tools**

Hand and power tools are used for various site activities. Procedures for using hand and power tools are as follows:

- Persons using power tools will be trained in their use.
- Ground Fault interrupters will be used on all electrical tools.
- Only tools in good condition will be used.
- Tools will be kept clean.
- Guards and shields will be kept on all tools.
- Air couplings will be secured.
- Non-sparking tools will be used in hazardous areas.
- Proper eye protection is critical when using power tools. At a minimum, safety glasses will be required during site operations. Where appropriate, full-face shields will be utilized in addition to the glasses.

### **3.2.1.6 Noise Exposure**

Noise is generated during construction activities in such operations as transportation of materials and operation of heavy construction equipment. Noise has been defined as unwanted sounds. The human ear can tolerate a certain amount of sound without any harmful effects. Personnel will be provided protection against the effects of hazardous noise exposure whenever sound-pressure levels exceed 85 dB(A) steady-state expressed as a time-weighted average (TWA) or 140 dB(A) impulse.

It is usually safe to assume that if you need to shout to be heard at arms-length, the noise level is at 90 dB (A) or above. Personnel operating or working around construction equipment will utilize hearing protection. Severson personnel participate in a Hearing Conservation Program that meets the requirements of OSHA regulation 29 CFR 1910.95.

### **3.2.1.7 Excavation/Trenching Hazards**

The main hazard encountered during soil excavation is the cave in of excavation sides with possible burial or crushing of workers. Causes of cave in may include (a) absence of shoring, (b) misjudgment of stability, (c) defective shoring, and (d) undercut sides. Other potential hazards include falling during access/egress, while monitoring or dismounting equipment, or stumbling into excavation. An overhead hazard can result from material, tools, rock, and/or soil falling into the excavation. Flammable atmospheres may also be encountered in excavation.

Severson will provide adequate shoring or sloping of sides of the excavation. Excavation/trenches will be inspected daily for changing conditions. Excavation/trenches, regardless of the depth or width, will be barricaded. The use of raised berms, caution signs, and caution tape will be instituted to

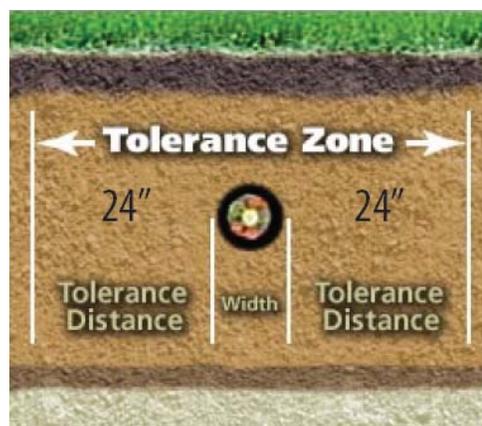
protect personnel on the site. The excavation area will be delineated with caution tape during operations and barricaded/secured with safety fence at the end of each workday. Adequate means of exit, such as ladders, steps, ramps, or other safe means of egress, will be provided and be within 25 feet of lateral travel. At least two means of exit will be provided for personnel working in excavations. Where the width of the excavation exceeds 100 feet, two or more means of exit will be provided on each side of the excavation.

The Project Superintendent is Severson’s excavation and trenching competent person. Tennessee One Call will be contacted (811, or 800-351-1111) for utility mark out at least three working days prior to the start of excavation activities. Handwork is required within 24-inches of a known utility line or service.

Utilities are marked out with various colors or marking paint or flagging. The following charts identify Tennessee One Call Timeframe Matrix and color code describing which utility is identified based on the color of the mark out.

APWA Uniform Color Code for marking underground utility lines.

COLOR	Utility Line
WHITE	Proposed Excavation
PINK	Temporary Survey Markings
RED	Electrical Power Lines, Cables, Conduit and Lighting Cables
YELLOW	Gas, Oil, Steam, Petroleum or Gaseous Materials
ORANGE	Communication, Alarm or Signal Lines, Cables or Conduit
BLUE	Potable Water
PURPLE	Reclaimed Water, Irrigation and Slurry Lines
GREEN	Sewer and Drain Lines



### 3.2.1.8 Slip/Trip/Fall

Slip/trip/hit/fall injuries are the most frequent of all injuries to workers. They occur for a wide variety of reasons, but all injuries can be prevented by the following prudent practices:

- Spot-check the work area to identify hazards.
- Establish and utilize a pathway, which is most free of slip and trip hazards.
- Beware of trip hazards such as wet floors, slippery floors, and uneven surfaces or terrain.
- Carry only loads that you can see over.
- Keep work areas clean and free of clutter, especially in storage rooms and walkways.
- Communicate hazards to on-site personnel.
- Secure all loose clothing, ties, and remove jewelry while around machinery.
- Report and/or remove hazards.
- Keep a safe buffer zone between workers using equipment and tools.

### 3.2.1.9 Heat Stress

Heat stress may be a hazard for workers wearing protective clothing even if the temperature is moderate. The same protective materials that shield the body from chemical exposure prevent heat and moisture from dissipating. Personal protective clothing can therefore create a hazardous condition. Depending on the ambient temperature and the work being performed, heat stress can occur very rapidly - within as little as 15 minutes.

In its early stages, heat stress can cause discomfort and inattention, resulting in impaired functional abilities that can threaten the safety of both the individual and his co-workers. Personnel will be instructed to recognize the symptoms of the onset of heat stress. Frequency of heat stress monitoring and checks for symptoms of heat stress will increase with rises in air temperature, humidity, and the degree of exposure to high temperature areas.

The guidance for workers is specified in the current version of the ACGIH Threshold Limit Values for Heat Stress. If actual clothing differs from the ACGIH standard ensemble in insulation value and/or wind and vapor permeability, changes should be made to the monitoring requirements and work rest period to account for these differences. **Table 2 – “Frequency of Physiological Monitoring”** provides the suggested frequency of physiological monitoring for fit and acclimatized workers.

<b>Table 2 – Frequency of Physiological Monitoring</b>			
Adjusted Calculation	Temperature	Normal Work Clothing	Impermeable Clothing
	90°F (32.2°C) or above	After each 45 minutes of work	After each 15 minutes of work
	87.5 - 90.0°F (30.8 – 32.2°C)	After each 60 minutes of work	After each 30 minutes of work
	82.5 - 87.5°F (28.1 – 30.8°C)	After each 90 minutes of work	After each 60 minutes of work
	77.5 - 82.5°F (25.3 - 28.1°C)	After each 120 minutes of work	After each 90 minutes of work
	72.5 - 77.5°F (22.5 - 25.3°C)	After each 150 minutes of work	After each 120 minutes of work

The following parameters should be used when monitoring workers:

**Heart rate** - Count the radial pulse as early as possible in the rest period to ensure a more accurate reading. If the heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period at the same length. If, at the end of the following work period, the heart rate still exceeds 110 beats per minute, shorten the work period again by one-third.

**Oral Temperature** - The utilization of oral temperature applies to the time immediately after the worker leaves the contamination reduction zone. Using a clinical thermometer, take the temperature for three minutes. If the oral temperature exceeds 99.6°F (37.6°C), shorten the next work cycle by one-third, without a change to the rest period. If the oral temperature still exceeds 99.6°F (37.6°C) at the end of the following work period, shorten the next work cycle by one-third. Do not permit a worker to perform duties requiring a semi permeable or impermeable garment if the oral temperature

exceeds 100.6°F (38.1°C). Ear canal readings are a valid method to monitor the temperature of workers.

The oral temperature shall not exceed 100.4° F. If an employee's pulse rate exceeds the maximum age-adjusted heart rate (0.7(220-AGE)), and/or the oral temperature exceeds 100.4° F, the employee shall be required to stop work and rest at the work site or move to an air-conditioned room after proper decontamination. The affected employee may be allowed to return to work after his/her pulse rate has dropped below 100 beats per minute. The SSHO in consultation with the affected employee, and medical personnel if necessary, shall determine whether an employee is ready to return to work. Fluids shall be provided and rest breaks will be taken. The frequency of breaks will increase with the temperature. Such things as cooling vests, portable fans, and breaks in air-conditioned areas shall be used if necessary.

When practicable, the most labor-intensive tasks should be carried out during the coolest part of the day. If necessary, a work/rest regimen will be instituted. The work/rest regimen consists of alternating periods of work and rest. The duration of these alternating periods will depend on the environmental conditions at the job site, such as, the Wet Bulb Globe Temperature, duration, and type of activities performed.

A worker who becomes irrational or confused, or collapses on the job should be considered a heat stroke victim and medical help should be called immediately. Early recognition of symptoms and prompt emergency treatment is the key to aiding someone with heat stroke. While awaiting the ambulance, begin efforts to cool the victim down by performing the following:

- Move the victim to a cooler environment and remove outer clothing.
- Wet the skin with water, and fan vigorously or repeatedly apply cold packs or immerse the victim in a tub of cool (not ice) water.
- If no water is available, fanning will help promote cooling.

Any individual showing susceptibility to heat stress will be referred to a physician for evaluation. In addition, the use of prescription drugs can also contribute to the effects of heat stress and will be considered during the assignment of work. Cool (50°-60°F) water or a sport drink, such as Gatorade, will be made available to workers and encourage them to drink small amounts frequently, (e.g., one cup every 20 minutes). Ample supplies of liquids will be placed close to the work area.

### **3.2.1.10 Cold Stress**

Cold injury (frostbite and hypothermia) and impaired ability to work are hazards to persons working outdoors in low temperatures at or below freezing. Extreme cold for a short time may cause severe injury to exposed body surfaces (frost nip or frostbite), or result in profound generalized cooling (hypothermia). Areas of the body which have high surface area-to-volume ratio such as fingers, toes, and ears, are the most susceptible to frost nip or frostbite.

Two factors influence the development of a cold weather injury: ambient temperature and the velocity of the wind. Wind chill is used to describe the chilling effect of moving air in combination with low temperature. As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. Additionally, water conducts heat 240 times faster than air. Thus, the body cools suddenly when chemical-protective equipment is removed if the clothing underneath is

perspiration soaked. The wind chill factor is the cooling effect of any combination of temperature and wind velocity or air movement. **Table 3 – Wind Chill Index** should be consulted when planning for exposure to low temperatures and wind. The wind chill index does not take into account the specific part of the body exposed to cold; the level of activity, which affects body heat production; or the amount of clothing being worn.

When practicable, the most sedentary tasks should be carried out during the warmest part of the day. If necessary, a light-work rotation schedule should be instituted or the work area heated. Heavy work that will cause heavy sweating resulting in wet clothing must also be monitored. The work/rest regimen consists of alternating periods of work and rest. The duration of these alternating periods will depend on the environmental conditions at the job site, (i.e., the Wind Chill Temperature, duration, and type of activities performed).

<b>Table 3 – Wind Chill Index</b>													
Wind (mph)	Actual Temperature (°F)												
	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25
	Equivalent Temperature (°F)												
5	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40
10	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47
15	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51
20	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55
25	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58
30	22	16	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60
35	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62
40	20	13	6	-1	-8	-15	-22	-29	-36	-42	-50	-57	-64
Wind Chill (°F) = 35.74 + 0.6215T - 35.75(V0.16) + 0.4275T(V0.16)								Frostbite occurs in 15 minutes or less					
T = Air Temperature (°F)													
V = Wind Speed (mph)													

**Table 4 - Maximum Daily Time Limits for Exposure at Low Temperatures** gives the recommended time limits for working in various low temperature ranges.

<b>Table 4 – Maximum Daily Time Limits for Exposure at Low Temperatures</b>	
Temperature Range (°F)	Maximum Daily Exposure
30 to 0	No limit, providing that the person is properly clothed.
0 to -30	Total work time: 4 hours. Alternate 1 hour in and 1 hour out of the low-temperature area.
-30 to -70	Two periods of 30 minutes each at least 4 hours apart. Total low temperature work time allowed is 1 hour.
-70 to -100	Maximum permissible work time is 5 minutes during an 8-hour working day. At these extreme temperatures, completely enclosed headgear, equipped with a breathing tube running under the clothing and down the leg to preheat the air, is recommended.

**Table 5 - Work/Warm-up Schedule** applies to any 4-hour work period with moderate to heavy work activity, warm-up periods of ten (10) minutes in a warm location and an extended break (e.g., lunch) at the end of the 4-hour period in a warm location. For light-to-moderate work (limited physical movement) apply schedule one step lower. For example, at -35°C (-30°F) with no noticeable wind, a worker at a job with little physical movement should have a maximum work period of 40 minutes with 4 breaks in a 4-hour period.

**Table 5 –  
Work/Warm-up Schedule**

Air Temperature - Sunny Sky		No Noticeable Wind		5 mph Wind		10 mph wind		15 mph wind		20 mph wind	
°C (approx.)	°F (approx.)	Max Work Period	No. of Breaks	Max Work Period	No. of Breaks	Max Work Period	No. of Breaks	Max Work Period	No. of Breaks	Max Work Period	No. of Breaks
-26° to -28°	-15° to -19°	(Norm. Breaks) 1		(Norm. Breaks) 1		75 min	2	55 min	3	40 min	4
-29° to -31°	-20° to -24°	(Norm. Breaks) 1		75 min	2	55 min	3	40 min	4	30 min	5
-32° to -34°	-25° to -29°	75 min	2	55 min	3	40 min	4	30 min	5	Non-Emergency  Work Should Cease	
-35° to -37°	-30° to -34°	55 min	3	40 min	4	30 min	5	Non-Emergency			
-38° to -39°	-35° to -39°	40 min	4	30 min	5	Non-Emergency		Work Should Cease			
-40° to -42°	-40° to -44°	30 min	5	Non-Emergency		Work Should Cease					
-43° & below	-45° & below	Non-Emergency  Work Should Cease		Work Should Cease							

To guard against cold injuries, workers should wear appropriate clothing and use warm shelters for removing personal protective equipment. The personnel decontamination trailer will be used as a warm shelter when required. The SSHO may periodically monitor workers' physical conditions, specifically checking for symptoms of frostbite.

### 3.2.1.11 Oxygen Deficiency

Oxygen deficiency may occur on-site during excavation of cells or inside confined spaces, due to displacement of oxygen by other gases in these areas. The oxygen content of ambient air is 20.9 percent. Physiological effects of oxygen deficiency are readily apparent when the oxygen concentration decreases below 16 percent. Oxygen-deficient conditions may be controlled by air monitoring areas for oxygen concentrations using an O<sub>2</sub>/LEL/CO Meter. Air monitoring will reduce risks by indicating when action levels have been exceeded. Oxygen levels less than 19.5 percent will result in an immediate evacuation of the area.

### 3.2.1.12 Fall From Elevation

To prevent falls and injuries when employees work in areas where fall hazards cannot be eliminated by reasonable means, personnel will be required to use a full body harness and shock-absorbing lanyard. Personnel will make maximum use of primary fall protection systems, such as scaffolding and scissors lifts. These systems will be equipped with standard guardrails and safe means of access/egress.

Before any employee attempts to work in an area where a risk of falls exists, they must equip themselves with suitable fall-arresting equipment. Personnel riding on or working from a scissors lift must secure their safety lanyards to the basket at all times.

The fall protection equipment will be properly fitted and will not restrict the movements of the worker. Full safety harnesses are required for any work performed over six (6) feet in elevation unless work is being performed from a ladder. Work from portable ladders or fixed ladders less than 24 feet in height that are set up and properly used do not require fall protection. However, if fall protection can be properly utilized, it will be.

Lanyards of the shortest workable length must be attached to a secure point in the vicinity of the work area. The line will be long enough not to restrict the worker's movements, but short enough to prevent tripping over the line and falls beyond the worker's extended reach for self-rescue; in any case, not over six (6) feet.

### **3.2.2 Chemical Hazards**

Operational chemicals may be brought to the project-site for use in activities supporting the construction activities. These chemicals are used for fuels in operating heavy equipment, glues for welding pipes, etc. The use of operational chemicals is regulated by OSHA under the Hazard Communication Standard (29 CFR 1910.1200). Material Safety Data Sheets (MSDSs) for operational chemicals are kept on file in the project office trailer. An inventory list of the anticipated operational chemicals (Hazardous Chemical Inventory List) for use at the site will be maintained at the site and updated as new material is received.

After reviewing the environmental sampling results, it has been determined that the primary contaminants of concern are the volatile organic compounds (VOCs), benzene, ethylbenzene, toluene, and xylenes and the semi-volatile organic compounds (SVOCs). A worker protection program and air monitoring program for the chemicals of concern can be found in other sections of this SSHP. The following list identifies the major contaminates of concern at the Site. Chemical Information Sheets for the listed contaminants of concern can be found in Appendix C.

- PCBs

### **3.2.3 Biological Hazards**

There is a potential for encountering biological hazards such as bites from ticks, spiders, rodents, and snakes and exposure to poison ivy and oak. Biological hazards and controls are presented below

#### **3.2.3.1 Needlestick Injuries**

A needle stick injury occurs when a carelessly discarded hypodermic needle penetrates your skin, for example, through stepping on a syringe and/or needle that has been discarded at the site. Needle stick injuries transmit infectious diseases, especially blood-borne viruses. Accidental punctures by contaminated needles can inject hazardous fluids into the body through the skin. There is potential for injection of drugs, but injection of infectious fluids, especially blood, is by far the greatest concern. Accidental injection of blood-borne viruses is the major hazard of needle stick injuries, especially the viruses that cause AIDS (the HIV virus), hepatitis B, and hepatitis C.

General Universal Precautions will be observed to prevent contact with hypodermic needles or other potentially infectious materials. Work practice controls will be used to eliminate or minimize employee exposure (i.e. inspect area prior to work). If you are stuck by a discarded needle, immediately report it to the SSHO. Following a report of an exposure incident, the employer will immediately make available to the exposed employee medical evaluation counseling, treatment, and post-exposure prophylaxis, when medically indicated.

Based on past work experience in this area the chance of encountering a used hypodermic needle is better than average. Only the SSHO will be permitted to collect used hypodermic needles. Collected hypodermic needles shall be placed in a clearly marked biohazard sharps container. Collected sharps shall be properly disposed of.

### **3.2.3.2 Ticks**

Working in tall grass, especially in or at the edge of wooded areas, increases the potential for ticks to affect workers. Ticks are vectors of many different diseases including Lyme disease. They attach to their host's skin and intravenously feed on its blood creating an opportunity for disease transmission. Covering exposed areas of the body and the use of commercially prepared tick repellent, such as N, N-Diethyl-m-toluamide (DEET), help prevent tick bites. Please note that there are some concerns with the use of DEET on skin and associated potential adverse health effects. Periodically during the workday, employees working in tall grass will inspect themselves for the presence of ticks and notify the SSHO of any tick bites as soon as possible.

### **3.2.3.3 Rodents and Wildlife**

During site operations, animals such as mice and rodents may be encountered. Workers will use discretion and avoid all contact with animals. If these animals are interfering with site operations, or if dead animals are observed, the SSHO should be contacted immediately for assistance and advice.

Hanta virus Pulmonary Syndrome (HPS) is a disease that may be contracted when a person comes into contact with Hanta virus-infected rodents, their nesting materials, droppings, urine, or saliva. HPS may develop when virus particles are inhaled, absorbed through broken skin or the eyes, or when bitten by an infected animal. The majority of HPS cases have been reported in the southwest; however, there is the potential for Hanta virus transmission in most regions with rodent populations. Risk to workers at the site is considered to be low; however, the severity of disease is high. Therefore, field personnel should be aware of the potential for exposure and should avoid coming into contact with rodents or their burrows or dens.

Rabies is an acute, infectious, often fatal viral disease transmitted to humans by the bite of warm-blooded, infected animals. This disease affects the central nervous system of humans. A rabid animal may be recognized by signs of raging, uncontrollable movement and possible foaming near or at the mouth. The best control method is avoidance of animals that could be rabid. If bitten by a potentially rabid animal, contact the SSHO immediately. The animal in question must be captured or trapped so that it can be tested for rabies. The bitten individual will seek medical attention immediately.

See Appendix I for additional information on Tennessee wildlife.

### **3.2.3.4 Poisonous Plants**

Poison ivy, poison oak, and poison sumac are identified by three or five leaves radiating from a single stem. Poison ivy is in the form of a vine while oak and sumac are bush-like. All of these plants can produce a delayed allergic reaction. The plant tissues have an oleoresin, which is active in live, dead, and dried parts. The oleoresin may be carried through smoke, dust, contaminated articles, and the hair of animals. Symptoms usually occur 24 to 48 hours after exposure resulting in rashes that itch and blister. Should exposure to any of these plants occur, wash the affected area with a mild soap and water within one-half hour, but do not scrub the area. The best preventative measure for poisonous plants is recognition and avoidance.

### **3.2.3.5 Snakes**

The degree of toxicity resulting from snakebites depends on the potency of the venom, the amount of venom injected, and the size of the person bitten. Poisoning may occur from injection or absorption of venom through cuts or scratches. The most effective way to prevent snakebites is to avoid snakes in the first place. Personnel should avoid walking at night or in high grass and underbrush. Visual inspection of work areas should be performed prior to activities taking place. The use of leather boots and long pants will be required, since more than half of all bites are on the lower part of the leg. No attempts at killing snakes should be made; many people are bitten in such an attempt. Personnel will not put their hands in areas where they cannot be seen.

See Appendix I for additional information on Tennessee wildlife.

### **3.2.3.6 Flying Insects**

Flying insects such as mosquitoes, wasps, hornets, and bees may be encountered while project activities occur. Mosquito bites can be effectively prevented by the use of insect repellants containing DEET. Please note that there are some concerns with the use of DEET on skin and associated potential adverse health effects. Treatment for insect bites and bee stings can be effected by the use of commercially prepared ointments. Personnel who are allergic to bee stings will notify the SSHO prior to working on the project.

### **3.2.3.7 Spiders**

Personnel will be alert to the potential for spider bites. Spiders sometimes establish residence in stored clothing and PPE. It is advisable for personnel to inspect clothing and PPE for spiders prior to donning. Immediate reporting and medical evaluation is necessary if personnel suspect being bitten by the Brown Recluse or Black Widow spider. If a spider bite is sustained, personnel will report it to the SSHO.

## **3.3 Engineering Controls**

The use of engineering controls for the protection of personnel is the first means of mitigation. This involves the elimination of hazards and the isolation of the workers from the hazards. Implementation of engineering controls can reduce the need for personal protective equipment by separating the worker from the contaminated material. During excavation and stockpiling dust may be generated. The SSHO will be constantly alert to the possibility of unacceptable dust levels.

### **3.3.1 Dust Control**

Control measures will be implemented for all operations where dust is likely to be generated. Careful planning and implementation of controls will reduce potential dust concentrations. There are a number of specific construction practices, which will reduce levels of airborne particulates. These include:

- Providing for a misting spray during material handling activities.
- Applying water on haul roads.
- Reducing the active work area surface and limiting the number of concurrent operations.

### **3.3.2 Noise Control**

Noise levels will be controlled to meet the applicable OSHA standards for workers as well as for the off-site community. Construction noise will be kept to a minimum during work hours to minimize the impact on the community. Noise complaints will be evaluated and if possible and practical, additional noise controls will be implemented.

## **4.0 Safety and Health Training**

### **4.1 Site-Specific Training**

All personnel working at the site during construction activities will review this SSHP with the SSHO. Personnel will sign an acknowledgment form to document their review and agreement to comply with the provisions of the SSHP. All visitors must sign the visitor's log and wait in the Severson field office for a briefing before entering the Site.

The SSHO will be responsible for ensuring site visitors are trained in the hazard associated with the site, to explain emergency procedures, and instruct them in the use of protective gear required during the visit.

As a minimum the site-specific training will include:

- Explanation of the overall SSHP.
- Project management and roles.
- Health effects of chemicals present at the site.
- Physical hazards associated with the project.
- Selection, use, and limitations of available safety equipment and proper procedures for its use.
- Personal hygiene and decontamination for chemicals used at the site.
- Site rules and regulations.
- Site communication and the "Buddy System".
- Emergency preparedness procedures.

- Fall Protection Equipment.
- Severson's disciplinary program.
- Review applicable Severson Standard Operating Procedures.
- Site Specific Hazard Communication.
- Safe Plans of Action and Job Safety Enhancement Programs.

#### **4.2 General HAZWOPER Training**

Severson will be responsible for certifying that the employees meet the requirements of pre-assignment training, consistent with OSHA 29 CFR 1926.65 paragraph (e)(3). Severson will provide documentation certifying that each general Site worker entering an exclusion zone or has the potential to be exposed to site contaminants at or above the permissible exposure limit has received a minimum of 40 hours of instruction off site, and a minimum of three days actual field experience under the direct supervision of a trained, experienced supervisor. Personnel that are not assigned to the Site full time and are only entering an exclusion zone to perform inspections, maintenance or repair must have a minimum of 24 hours of instruction off site and at least one day of actual field experience under the direct supervision of a trained, experienced supervisor. All HAZWOPER personnel must also receive 8 hours of refresher training annually. Consistent with OSHA 29 CFR 1926.65 paragraph (e)(4), individuals designated as Site Supervisors require an additional 8 hours of training. A certificate of Worker/Visitor Acknowledgement will be completed and submitted for each site worker and visitor who will enter the contamination reduction zone, and/or exclusion zone.

#### **4.3 Periodic Sessions**

Periodic training will be provided at least weekly and prior to each change of operation. The training will address safety and health procedures, work practices, any changes to SSHP, review activity hazard analysis, work task or schedule, and review of safety discrepancies and accidents.

#### **4.4 Safety Meetings**

A well-ordered flow of information is essential to a good safety program. Severson, through a program of safety meetings at all levels, intends to accomplish the goals of safety awareness, education, and participation.

The SSO will conduct daily safety meetings with ALL on-site personnel. An opportunity will be provided for employees to voice safety-related concerns. A synopsis of each meeting including topics covered, safety-related concerns, action items to be addressed, status of previous items, and a signed attendance list.

#### **4.5 Hazard Communication Training**

OSHA's standard for hazard communication requires that all workers be informed of potentially hazardous materials used in their work area. Severson provides employees with information and training on hazardous chemicals at their work site at the time of their initial assignment, annually, and whenever a new chemical is introduced into their work site that could present a potential hazard. Personnel are briefed on the general requirements of the OSHA hazard communication standard and

duty-specific hazards by their immediate supervisor before they begin any duties on the work site. Personnel transferred from another site are also briefed on the duty-specific hazards by their immediate supervisor before they begin any duties on the work site.

#### **4.6 First Aid/CPR Training**

At least two site personnel will be required to complete first aid and cardiopulmonary resuscitation (CPR) training and receive the appropriate certification. First aid/CPR training will be either American Red Cross, American Heart Association, or National Safety Council approved. Additionally, First Aid/CPR qualified personnel will have received blood borne pathogen training as required by 29 CFR 1910.1030.

#### **5.0 Personal Protective Equipment (PPE)**

This section provides an outline of the PPE and guidelines that will be implemented to minimize chemical, physical, and biological exposures and accidents during construction activities. Where engineering controls and job hazard analyses do not eliminate all job hazards, employees will (where appropriate) wear PPE.

These include items such as, hard hats, face shields, safety goggles, glasses, hearing protection, foot guards, gloves, etc. The SSHO will ensure that equipment selected will meet the following requirements:

- It will be appropriate for the particular hazard.
- It will be maintained in good condition.
- It will be properly stored when not in use to prevent damage or loss.
- It will be kept clean, fully functional, and sanitary.
- Must meet all applicable ANSI standards.

Personal clothing and jewelry can present additional safety hazards. Supervisors will ensure that workers wear appropriate clothing, which will not interfere with the PPE. All PPE will be selected in accordance with 29 CFR 1910.132. Severson will provide proper PPE to all employees (except prescription safety glasses and primary safety shoes). All protective clothing will be properly used, stored, selected, and maintained.

#### **5.1 PPE Hazard Assessment**

Selection of the appropriate PPE is a complex process, which should take into consideration a variety of factors. Key factors involved in this process are identification of the hazards, or suspected hazards, routes of potential exposure to employees (inhalation, skin absorption, ingestion, and eye or skin contact), and the performance of the PPE materials (and clothing seams) in providing a barrier to these hazards. The amount of protection provided by PPE is material-hazard specific. That is, protective equipment materials will protect well against some hazardous substances and poorly, or not at all, against others. In many instances, protective equipment materials cannot be found that will provide continuous protection from the particular hazardous substance. In these cases, the breakthrough time of the protective material should exceed the work duration.

Other factors in this selection process to be considered are matching the PPE to the employee's work requirements and task-specific conditions. The durability of PPE materials, such as tear strength and seam strength, should be considered in relation to the employee's tasks. The effects of PPE in relation to heat stress and task duration are a factor in selecting and using PPE. In some cases, layers of PPE may be necessary to provide sufficient protection, or to protect expensive PPE inner garments, suits, or equipment.

Personal Protective Equipment alone should not be relied on to provide protection against hazards, but should be used in conjunction with guards, engineering controls, and sound work practices.

### **5.1.1 Head Protection**

All personnel will wear a hard hat that meets the requirements and specifications in ANSI Safety Requirements for Industrial Head Protection Z89.1. Exceptions to this requirement are personnel in the site office, rest and eating areas, or in equipment or vehicles equipped with a falling object protection system.

### **5.1.2 Hand Protection**

Outer gloves used on the Site for construction activities will be either chemical resistant or general purpose. The appropriate glove will be determined by the SSHO for a specific work task. Chemical resistant gloves will be selected using appropriate chemical degradation guides. Cut resistant work gloves will be worn when work activities require the handling of sharp and rough-surfaced objects.

### **5.1.3 Eye/Face Protection**

Eye protection will be worn by all personnel. A face shield will be required when power-washing equipment. All eye protection worn or provided will be ANSI Z87 compliant.

### **5.1.4 Footwear**

Footwear will be steel/composite-toed safety boots and will be worn for all field activities. All safety boots will be ASTM F2413 compliant.

### **5.1.5 Respiratory Protection**

To control and or minimize the threat of occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective of this program will be to prevent atmospheric contamination. This will be accomplished as far as feasible by accepted engineering control measures (for example, dust suppression). When effective engineering controls are not feasible, or while they are being instituted, appropriate respiratory protection will be used. A respiratory protection program will be implemented that is compliant to the requirements of 29 CFR 1910.134, "Respiratory Protection." Respiratory protection equipment will be NIOSH-approved, and respirator use will conform to ANSI Z88.2.

Respirators will be provided when such equipment is necessary to protect the health of the employee. Severson will:

- Provide the respirators, which are applicable and suitable for the purpose intended.

- Be responsible for maintaining a written Respiratory Protective Program in accordance with 29 CFR 1910.134. The employee will use the provided respiratory protection in accordance with instructions and training received.
- Respirators will be selected on the basis of hazards to which the worker is exposed.
- The user will be instructed and trained in the proper use of respirators and their limitations.
- Respirators will be regularly cleaned and disinfected.
- Respirators will be stored in a convenient, clean, and sanitary location.
- Respirators used routinely will be inspected during cleaning. Worn or deteriorated parts will be replaced. Respirators for emergency use, such as self-contained devices, will be thoroughly inspected at least once a month and after each use.
- Appropriate surveillance of work area conditions and degree of employee exposure or stress will be maintained.
- There will be regular inspections and evaluations to determine the continued effectiveness of the program.
- Employees will not be assigned to tasks requiring use of respirators unless it has been determined that they are physically able to perform the work and use the equipment. A physician will determine whether an individual is physically fit to wear a respirator. The physician's clearance allows the worker to don a respirator and work in conditions of high ambient temperatures. Heat stress will be closely monitored.

Each respirator will be individually assigned and not interchanged between workers without cleaning and sanitizing. The cartridges/filters will be changed at the first sign of breakthrough based on contaminant warning properties or if the user experiences excessive breathing resistance. Respirators will be cleaned and stored in an uncontaminated atmosphere after each use. Used cartridges will be disposed in the trash.

All employees working at the Site during construction activities who have the potential of wearing a respirator will be fit-tested to ensure they utilize the proper size respirator. Severson will arrange for fit testing. The fit test is conducted according to the manufacturer's suggestions. The test will consist of an odorous vapor qualitative test. As per OSHA regulations, personnel that are unable to pass a fit test will not enter a work area when respiratory protection is required. In addition, facial hair is prohibited from the respirator seal area. Any person with facial hair will not be permitted to enter a work area where respiratory protection is required, regardless of the fit test results. Documentation of the fit testing will be maintained on-site.

Severson Respiratory Protection Program is included as Appendix D.

## **6.0 Medical Surveillance Program**

The Medical Surveillance Program is designed to track the physical condition of employees on a regular basis as well as survey pre-employment or baseline conditions prior to potential exposures. The Medical Surveillance Program is a part of the overall Severson Safety and Health program.

## **6.1 Baseline Medical Monitoring**

Each employee must receive a baseline physical, which can be part of an annual medical monitoring program, prior to being permitted to enter the Exclusion Zone or Contamination Reduction Zone. The content of the physical has been determined by Severson's Occupational Physician as suggested by NIOSH/OSHA/USCG/EPA's Occupational Safety & Health Guidance Manual for Hazardous Waste Site Activities. The minimum medical monitoring requirements for work at the Site are as follows:

- Complete medical and work histories
- Physical examination
- Pulmonary function tests (FVC and FEV1)
- Blood chemistry (CBC & SMAC 24)
- Urinalysis with microscopic examination
- Audiometric Testing
- Eye examination and visual acuity
- Chest X-Ray (as directed by the Occupational Physician)
- Electrocardiogram (as directed by the Occupational Physician)
- Other Biological testing as prescribed by the Occupational Physician
- Drug Screen

The medical surveillance provided to the employee includes a judgment by the medical examiner of the ability of the employee to use either positive- or negative-pressure respiratory protection equipment. Any individual found to have a medical condition, which could directly or indirectly be aggravated by exposure to these site contaminants, will not be employed for the project. Individuals not capable of satisfying the project requirements for wearing respiratory protection equipment will be evaluated on a case-by-case basis. A copy of the medical examination is provided at the employee's request.

The employees will be informed of any medical conditions that would result in work restriction or that would prevent them from working at hazardous waste sites. A certificate of Worker/Visitor Acknowledgement will be completed and submitted for each site worker and visitor who will enter the contamination reduction zone and/or exclusion zone.

## **6.2 Periodic Monitoring**

In addition to a baseline physical, all employees require a physical every 12 months unless the advising physician believes a shorter interval is appropriate. The Occupational Physician has prescribed an adequate medical evaluation, which fulfills OSHA 29 CFR 1910.120 requirements. The pre-assignment medical outlined above is applicable.

All personnel working on the Site that enter an active Exclusion or Contamination Reduction Zone will verify currency (within 12 months) with respect to medical monitoring. Severson will obtain a copy of the physician's written opinion detailing the employee's ability to perform hazardous waste site work. All personnel who work in the Exclusion zone will participate in a biological monitoring program for mercury. These employees will be tested pre-employment and post-employment at the site for mercury in the urine. Additional testing for urine level mercury may be necessary based on air monitoring data. The Safety and Health Manager or Occupational Physician will make the determination on additional sampling.

### **6.3 Exposure/Injury/ Medical Support**

As a follow-up to an injury or possible exposure above established exposure limits, all employees are entitled to and encouraged to seek medical attention and physical testing. Depending upon the type of exposure, it is critical to perform follow-up testing within 24-48 hours. It will be up to the occupational health physician to advise the type of test required to accurately monitor for exposure effects.

Any employee, who develops a time loss illness exceeding one working day, or injury during the period of the contract, must be evaluated by the occupational health physician. A written statement indicating the employee's fitness, signed by the occupational physician must be submitted prior to the employee entering the work site.

### **6.4 Medical Records**

The results of medical testing and full medical records will be maintained in accordance with 29 CFR Part 1910.1020. A copy of the medical certification will be kept on the Site for each person entering the Contamination Reduction Zone and Exclusion Zone.

## **7.0 Air Monitoring**

The primary contaminants of concern are PCBs. Worker exposure to these contaminants of concern primary contaminates will be monitored with the use of real time instrumentation and integrated air monitoring equipment and methodologies.

### **7.1 Real Time Air Monitoring**

#### **7.1.1 PCBs and Dust**

There is no direct reading instrument for the determination of airborne PCBs. However, through the use of a real-time air monitor for dust we can develop a dust action level that will prevent workers from being exposed to PCBs over the permissible exposure limit. Real time dust monitoring will be performed in the breathing zone of workers during activities that can cause dust emissions. Air monitoring will be performed at the work area using a Dust Trak Particulate Monitor. Real-time air monitoring equipment calibration will be performed in accordance with the manufacturer's recommendation prior to field use. Calibration information will be recorded on the Daily Air Monitoring Report. Maintenance and calibration procedures for all air monitoring devices will be maintained on site.

A conservative real time dust action level for PCB exposure is illustrated by the following worksheet.

DUST EXPOSURE CALCULATION WORKSHEET				
DustLevel		Safety Factor for this site =		100
Chemical	Exposure Limit (mg/m <sup>3</sup> )	Maximum Soil Concentration (mg/kg)	Exposure Limit Based on Single Compound (EL Mix, mg/m <sup>3</sup> )	Dust Quotient for Each Compound (level/limit)
PCBs	0.5	1,000	5.	2.00E+03
Dust Exposure Level at Mixture PEL =			Sum	2.00E+03
			5.000	

The Dust Exposure Calculation Worksheet utilizes the average soil concentration for PCBs at the Site. A safety factor of 100 has been applied to the soil concentration. That means the actual soil concentration can be up to one hundred times greater and workers will still be less than the OSHA PEL for PCBs. The real time dust action level (DAL) for the Site workers will be 2.5 mg/m<sup>3</sup>. In the event the real time DAL is exceeded, engineering and administrative controls shall be implemented prior to the use of PPE to control worker exposure.

### 7.1.2 Decision Making for Real Time Data

A decision-making protocol for an upgrade in levels of protection and/or withdrawal of personnel from an area based on atmospheric hazards determined by real time data is outlined in *Table 6 – “Operational Action Levels”*.

Table 6 – Operational Action Levels Active Work Area				
Air Monitoring Instrument	Monitoring Location	Action Level	Site Action	Reason
Dust Meter (PCBs)	Breathing Zone	< 2.5 mg/m <sup>3</sup>	Continue work	No respiratory protection required.
		>2.5 mg/m <sup>3</sup>	Implement dust controls	Water, tarps, foam
		> 2.5 mg/m <sup>3</sup> sustained for greater than 15 minutes	Cease activity, until dust controls can maintain dust generation to less than 2.5 mg/m <sup>3</sup> .	
Oxygen Monitor	Breathing Zone	<19.5%	Stop work	Below standards
		>23.0%	Stop work	Above standards
Combustible Gas Indicator	Breathing Zone	>10%	Stop work	Above standards

### 7.2 Exposure Monitoring

To determine worker exposure to the various contaminants and as a means to determine the accuracy of the real time air monitoring, worker exposure monitoring using various NIOSH and OSHA protocols will be conducted. This monitoring will take place during the first three days of each operation in which there is the potential for airborne exposure the contaminant of concern. Also if the particulate and/or vapor real time action limit is exceeded, exposure monitoring will then occur at the

discretion of the SSHO or Health and Safety Manager. Two of the potentially highest exposed workers per shift will be sampled during each event.

<b>Table 7 – Proposed Site Air Sampling</b>				
<b>Contaminant</b>	<b>Task/Activity</b>	<b>Type of Sample</b>	<b>Sampling Method</b>	<b>Analysis Method</b>
PCBs	Excavation and Soil Handling PCB contaminated soils	Breathing Zone	Personal – sample pump	NIOSH 5503
<b>Frequency for Personal Sampling</b>				
<b>Contaminant</b>	<b>Initial</b>		<b>Periodic</b>	
PCBs	First three days of handling PCB contaminated sediment		Once every month and at the discretion of the SSHO or Safety and Health Manager	

### 7.3 Initial Levels of Protection

Table 8 outlines the initial level of protection for the various tasks.

<b>Table 8 – Initial Levels of Protection</b>	
<b>Task</b>	<b>Level</b>
Mobilization	D
Site Support Facility Construction	D
Tree Removal	D (chainsaw chaps)
Access Road Enhancements	D
Soil/Sediment Excavation	Modified D
Water Treatment Plant Operations	Modified D
Material Handling Pad Operations	Modified D
Truck Loading Operations	Modified D
Restoration	D
Demobilization	D

### 7.4 Perimeter Air Monitoring

Perimeter air monitoring will be performed by others.

## **8.0 Accident Prevention Procedures/Practices**

### **8.1 Medical and First Aid Requirements**

Applicable Standards:

OSHA 29 CFR 1926.23, & 1926.50

First-aid kits/stations and required contents are maintained in a serviceable condition. Unit-type kits have all items in the first-aid kit individually wrapped, sealed, and packaged in comparable sized packages. First-aid stations will be located as close as practicable to the highest concentration of personnel. First-aid stations will be well-marked and available to personnel during all working hours. First-aid stations will be equipped with a first-aid kit, the size of which will be dependent upon the number of personnel normally employed at the work site.

Emergency telephone numbers and Route to the Area Hospital will be clearly posted and easily visible at all times. There should be OSHA posters prominently displayed and warning signs posted for any known or potential hazard(s) present. MSDSs must be available on the job site at all times.

### **8.2 Hazardous Substances**

Applicable Standards:

OSHA 29 CFR 1926.53 & 1910.1200

When hazardous substances are used in the workplace, the hazard communication program dealing with SDSs, labeling, and employee training will be in operation. SDS materials will be readily available for each hazardous substance used. A training program, plus regular question and answer sessions on dealing with hazardous materials will be given to keep employees informed. The program will include an explanation of what an SDS is and how to use and obtain one; SDS contents for each hazardous substance or class of substances; explanation of the "Right to Know" and Global Harmonization Standard; identification of where employees can see the employer's written hazard communication program and where hazardous substances are present in their work area; the health hazards of substances in the work area, how to detect their presence, and specific protective measures to be used; as well as informing them of hazards of non-routine tasks and unlabeled pipes.

Sevenson's Hazardous Communication Program is located in Appendix E.

### **8.3 Fall Protection**

Applicable Standards:

OSHA 29 CFR 1926.500, 501, 502, 503; 1926.106

To access high and low places on jobsites a variety of equipment may be used such as ladders, scaffolding, suspended platforms, aerial lifts, stairways, and climbing lines. The use of these access systems often presents fall hazards. In addition, employees may be exposed to falls while working on elevated structures, climbing onto and off of equipment, and even while walking by falling through holes or by slipping or tripping.

To protect employees when they are exposed to fall hazards, some form of fall protection must be used. The most common forms of fall protection are guardrails, personal fall arrest systems, hole covers, and safety nets. Any one, or all of these forms of fall protection may be used on construction worksites. The current OSHA standards also require that employees receive training regarding fall protection issues, and that the training is documented. An alternate fall arrest program may be implemented in cases where none of the traditional methods of fall protection are feasible. Components of our fall protection plans are listed below:

***Personal Fall Arrest System*** - The three main parts of a personal fall arrest system are the body belt or harness, the lanyard/lifeline, and a suitable anchorage. Particular attention must be paid to the anchorage point(s) to ensure that they are capable of supporting 5,000 lb. (22.2 kN) or two times the maximum load on an engineered system.

***Guardrail Systems*** - Guardrail systems consist of a toprail, midrail, and if necessary a toeboard. Guardrail systems can be made of various materials.

***Training*** - All employees must receive training on the nature of the fall hazards at the site and on how to avoid falls. Employees should be familiar with the use of all personal fall arrest systems and must wear the equipment when necessary.

The requirements of all applicable OSHA regulations notwithstanding, the minimum fall protection requirements on our projects may include the following:

- All fall protection systems must meet the requirements of Part 1926, Subpart M.
- For situations where lifelines are interrupted, double lanyards are necessary to ensure that the worker is continuously protected from falling by attaching one lanyard ahead of the discontinuity prior to unhooking the trailing lanyard.
- Where scaffolds are necessary to provide temporary access to work areas, they must be in compliance with §1926.451. Scaffolds must include a toprail, midrail, and toeboard in compliance with 1926.451, on all open sides and ends. Personal fall arrest systems meeting the criteria of Part 1926 Subpart M are required to protect workers during installation and removal of the railings, and in situations where physical restrictions preclude installation of a standard railing.
- All workers in approved personnel aerial lifts must use a personal fall arrest system meeting the criteria of Part 1926 Subpart M, with the lanyard attached to the boom or basket, as required by OSHA 1926.556.

Sevenson's Fall Protection Program is located in Appendix F.

## **8.4 Electrical**

Applicable Standards:

OSHA 29 CFR 1926.400 through 449, 1910.301 through 399, 1926.550(a)(15)

Electricity is a serious workplace hazard that must be respected at all times. It is important to remember that exposure to even a little electric current can kill! The best protection around electricity

is distance -- ample distance between the worker and the conductive materials. The following safe work practices and procedures will help prevent electrical accidents on the jobsite.

Workers should observe and strictly obey all warning and danger signs around electrical apparatus. They should never close a switch that has a danger tag on it signed by or placed there by someone else. Untrained people must not open any electrical enclosures. The one exception is that the door on a circuit breaker panel board may be opened to operate the switches, but other types of electrical enclosures should not be opened.

Extension cords or any power tools or equipment must not be used when the cords are frayed, worn out, or the wires are bare. Defective equipment should be reported to the supervisor and turned in for repair. Report all unguarded or broken light bulbs. Do not hang lights by their cords unless the light was designed to be suspended in that manner.

***Installation Safety Requirements:*** Live parts of electrical equipment operating at 50 volts or more must be guarded against accidental contact. Entrance to rooms and other guarded locations containing exposed live parts must be marked with conspicuous warning signs forbidding unqualified persons from entering. All pull boxes and breaker boxes must be labeled to indicate the equipment they switch. Electric installations that exceed 600 volts and that are open to unqualified persons must be made with metal-enclosed equipment or enclosed in a vault or area controlled by a lock. In addition, equipment must be marked with appropriate caution signs.

Conductors and equipment must be protected from overcurrent in accordance with their ability to safely conduct current, and the conductors must have sufficient current carrying capacity to carry the load. Fuses and circuit breakers must also be located or shielded so that employees will not be burned or otherwise injured by their operation.

All wiring components and utilization equipment in hazardous locations must be maintained in an explosion-proof condition without loose or missing screws, gaskets, threaded connections, seals, or other impairments to a tight condition. Unless identified for use in the operating environment, no conductors or equipment can be located:

- In damp or wet locations.
- Where exposed to gases, fumes, vapors, liquids, or other agents having a deteriorating effect on the conductors or equipment.
- Where exposed to excessive temperatures.

***Ground Fault Circuit Interrupters*** To ensure electrical safety from shocks on all construction sites, all 120-volt, single-phase, 15- and 20-amp receptacle outlets must be protected by ground fault circuit interrupters (GFCIs), or assured equipment grounding conductor program must be established. In an assured equipment-grounding program, one or more **competent persons** must be designated to implement and enforce the following assured equipment grounding safety procedures at all construction jobsites.

Each 120-volt extension cord, tool, piece of equipment, and receptacle needs to be inspected and tested before first use, before equipment is returned to service following repairs, and before equipment is used after any incident that can be reasonably suspected to have caused damage.

Each extension cord, tool, or piece of equipment should be visually inspected by the user before each day's use to determine signs of damage. Equipment found to be damaged or defective (frayed or damaged insulation, crushed cable, loose or missing covers or screws, and missing ground prong on plugs, etc.) must not be used until repaired. Equipment suspected to be damaged or defective should be inspected and tested prior to use.

***Overhead Transmission and Distribution Lines*** - A significant hazard on construction jobsites is the accidental contact of moving equipment with live overhead power distribution and service lines. Where work must be done near live lines, the movement of all equipment such as cranes, excavators and other equipment must be guided by an observer who can observe the clearance of the equipment from energized lines and give timely warning to equipment operators. The minimum clearance between live lines and any jobsite equipment is 10 feet (3.0 m), and the clearance increases with increasing line voltages. See Table 1 for appropriate clearance distances for voltages greater than 50,000 volts.

## **8.5 Lockout and Tagout**

Applicable Standards:

OSHA 29 CFR 1926.417 & 1910.147

Whenever maintenance, servicing, or repairs are done to equipment, tools and machinery, there is a potential for injury from the accidental energization or movement of the equipment. Prior to beginning any work on equipment, steps must be taken to identify the energy sources present in the equipment, and to ensure that the energy sources are neutralized.

Hazardous energy sources fall into categories such as electrical, pneumatic, hydraulic, and potential (gravity, springs, etc.). One simple control in the construction industry has been to unplug cord-connected equipment. Vehicles and other motorized equipment can be protected from accidental starting by disconnecting the battery. Other controls include the use of identifiable padlocks on disconnects, breaker switches, and valves. Stored energy has the potential for release with great kinetic force and potential for injury.

All machinery or equipment capable of movement must be de-energized or disengaged and blocked or locked out during cleaning, servicing, adjusting or setting up operations, whenever required. The lockout procedure requires that stored energy (i.e. mechanical, hydraulic, air) be released or blocked before equipment is locked out for repairs. Appropriate employees are provided with individually keyed personal safety locks. Employees are required to keep personal control of their key(s) while they have safety locks in use. Employees must check the safety of the lockout by attempting a start up after making sure no one is exposed. Where the power disconnecter does not also disconnect the electrical control circuit, the appropriate electrical enclosures must be identified. The control circuit can also be disconnected and locked out.

Temporary electrical service installation will be performed by a qualified electrician. Work may only be performed on de-energized equipment. Lockout/Tagout procedures will be implemented to assure the safety of personnel during electrical work activities.

Underground electric lines will be located and clearly marked. These utilities will be protected, removed, or relocated as needed to do the work safely. The excavation work will not be allowed to

endanger the underground utility or the people doing the work. Barricades, shoring, or other supports as needed, will protect utilities left in place that are exposed by the excavation.

Sevenson's Control of Hazardous Energy Program is located in Appendix G.

## **8.6 Motor Vehicles and Mechanized Equipment**

Applicable Standards:

OSHA 29 CFR 1926.600 through 606, 1926.1000 through 1003

Many potential hazards are associated with the use of motor vehicles and mechanized equipment on construction projects. Motor vehicles may be involved in accidents due to mechanical failures or operator errors, resulting in injuries to operators themselves or to bystanders. To minimize accidents resulting from the use of motor vehicles, the following safety procedures need to be implemented and enforced on all company projects:

- All equipment left unattended at night, adjacent to highways or construction areas should have lights, reflectors, and/or barricades to identify location of the equipment.
- Supervisory personnel will ensure that all machinery and equipment is inspected prior to each use to verify that it is in safe operating condition.
- Rated load capacities and recommended rules of operation must be conspicuously posted on all equipment at the operator's station.
- Wire rope must be taken out of service when one of the following conditions exist:
  - In running ropes, six random distributed broken wires in one lay or three broken wires in one strand or one lay.
  - Wear of one-third the original diameter or outside individual wires.
  - Kinking, crushing, hoist caging, heat damage, or any other damage resulting in distortion of the rope structure.
  - In standing ropes, more than two broken wires in one lay in sections beyond connections, or more than one broken wire at an end connection.
- A fire extinguisher of 1A:20B:C rating or higher should be available at all operator stations. Where ordinary combustible materials (wood, paper, plastics) are present, an extinguisher suitable for class A fires should also be available for use.
- When vehicles or mobile equipment are stopped or parked, the parking brake must be set. Equipment on inclines must have the wheels chocked as well as the parking brake set.
- All vehicles or combinations of vehicles must have in operable condition at least:
  - Two headlights.
  - Two taillights.

- Brake lights.
- Audible warning device at operator's station.
- Seat belts properly installed.
- Appropriate number of seats for occupants.
- Service, parking, and emergency brake system.
- Operators should not travel in reverse with motor equipment having an obstructed rear view unless:
  - The vehicle is equipped with an audible, functioning reverse signal alarm.
  - The vehicle is backed up only under the guidance of an observer who says that it is safe to do so.
- Only those trained in the use of a specific type of machinery should be allowed to operate the machinery. Operators of heavy equipment and trucks greater than 26,000 lbs (11,794 kg) gross vehicle weight used in traffic must have a commercial driver's license.
- Materials handling equipment such as scrapers, front-end loaders, dozers, and similar equipment must be provided with Rollover Protective Structures (ROPS).
- Accessible areas within the swing radius of cranes, backhoes, and other rotating machinery need to be barricaded to prevent employees from being struck or crushed by the rotating parts of the machinery or their loads.
- Employees should not ride on or in motor vehicles unless seats with seat belts are provided.

## **8.7 Hand and Power Tools**

Applicable Standards:

OSHA 29 CFR 1926.300 through 307

Tools are such a common part of construction work that it is difficult to remember that they may pose hazards. Workers must learn to recognize the hazards associated with the different types of tools and the safety precautions necessary to prevent injuries from those hazards. To prevent accidents resulting from the use of hand- and power-operated hand tools, management personnel need to implement and enforce the following safe work procedures on all construction jobsites.

Broken, defective, burned, or mushroomed tools should not be used. They should be reported and turned in for replacement. The proper tool and equipment should be selected and used for each task. For example, a wrench should not be used as a hammer or a screwdriver as a chisel. Leaving tools on scaffolds, ladders, or any overhead working surfaces is hazardous because they may fall. Racks, bins, hooks, or other suitable storage space must be provided to permit convenient arrangement of tools. Striking two hardened steel surfaces together is hazardous because pieces of metal may break off (i.e., two hammers, or a hammer and hardened steel shafts should not be struck together). The practice of throwing tools from one location to another, from one employee to another, or dropping them to lower

levels will be prohibited. When it is necessary to pass tools or material under the above conditions, suitable containers and/or ropes must be used.

Wooden tool handles must be sound, smooth, in good condition and securely fastened to the tool. Sharp-edged or pointed tools should never be carried in employee's pockets. Only non-sparking tools will be used in locations where sources of ignition may cause a fire or explosion. Tools requiring heat-treating should be tempered, formed, dressed, and sharpened by workmen experienced in these operations. Tools designed to accommodate guards must be equipped with such guards when in use.

All rotating, reciprocating or moving parts of equipment (belts, gears, shafts, flywheels, etc.) must be guarded to prevent contact by employees using such equipment. Guarding must meet requirements set forth in ANSI B15.1-1953. All hand-held power tools (e.g., circular saws, chain saws, and percussion tools) without a positive accessory holding means must be equipped with a constant pressure switch that will shut off the power when pressure is released. A positive "on-off" control must be provided on platen sanders, grinders with wheels 2 inches in diameter or less, routers, planers, laminate trimmers, nibblers, shears, scroll saws, and jigsaws with blade shanks ¼ in wide or less.

A momentary contact "on-off" control must be provided on all hand-held powered drills, tapers, fasteners drivers, horizontal, vertical and angle grinders with wheels greater than 2 inches in diameter. Besides safety hazards, the use of power tools sometimes creates potential health hazards as well. The use of jackhammer and chiseling equipment often results in silica and nuisance dust exposures that can sometimes be controlled by wetting the work surfaces. Many times, however, the use of dust/mist respirators is required to prevent overexposures.

In addition to dust hazards, the hand vibration inherent in the use of some power tools may result in a restriction of blood flow to the hands and fingers, causing numbness or tingling. If workers consistently experience these symptoms after the use of power tools, they should contact their supervisor so that steps may be taken to prevent further harm to the nerves and blood vessels in their hands. The use of a different tool, changes to the offending tool to reduce vibrations, and/or the use of special gloves may be recommended to deal with the vibration problems.

***Electric Tools*** - Electric tools present several dangers to the user; the most serious is the possibility of electrocution. The following safe work procedures for electric tools must be implemented and enforced at all company construction projects. Tools must (1) have a three-wire cord with ground and be grounded, or (2) be double insulated, or (3) be powered by a low-voltage isolation transformer. A Ground Fault Circuit Interrupter (GFCI) must be used or the tool must be double insulated to prevent the worker from electrical shock hazards. Never remove the third prong from the plug. Electric tools should be operated within their design limitations.

In general, gloves and safety footwear are recommended during use of electric tools. However, gloves should not be worn when they are a potential entanglement hazard with reciprocating or rotating tools.

When not in use, tools should be stored in a dry place. Electric tools should not be used in damp or wet locations.

***Powered Abrasive Wheel Tools*** - Power abrasive wheel tools present a special safety problem because they may throw off flying fragments. The following safe work procedures for powered abrasive wheel tools need to be implemented and enforced at all company construction projects. Portable grinding tools must be equipped with safety guards to protect workers from flying fragments as well as the moving wheel surface. Inspecting and sound- or ring-testing abrasive wheels prior to mounting is

required to ensure that they are free from cracks or defects. Checking to ensure that the abrasive wheel RPM rating is appropriate for the tool will also help prevent wheel failures. The following work rules are appropriate for using a powered grinder:

- Always use eye protection and a face shield.
- Turn off the power when not in use.
- Never clamp a hand-held grinder in a vise.
- To prevent the wheel from cracking, the user should ensure that it fits freely on the spindle.
- Grinding wheel users should never stand directly in front of the wheel during start-up because there is always a possibility that the wheel may disintegrate (explode) when accelerating to full speed.

***Pneumatic Tools*** - Pneumatic tools are powered by compressed air and include chippers, drills, hammers, and sanders. The following safe work procedures for pneumatic tools must be implemented and enforced at all company construction projects. Pneumatic tools that shoot nails, rivets, or staples and operate at pressures more than 100 psi must be equipped with a special device to keep fasteners from being ejected unless the muzzle is pressed against the work surface. Eye protection is required and face protection recommended for employees working with pneumatic tools.

Hearing protection is required when working with noisy tools such as jackhammers. When using pneumatic tools, users should check to see that the tools are fastened securely to the hose to prevent the hose from becoming disconnected. All hoses exceeding ½-inch inside diameter must have a safety device at the supply source or branch line to reduce pressure in the event of hose failure.

Airless spray guns that atomize paints and fluids at high pressures (1,000+ psi) must be equipped with automatic or visual manual safety devices that will prevent pulling the trigger until the safety device is manually released. Workers operating a jackhammer are required to wear safety glasses, safety footwear, and hearing protection. Compressed air guns should never be pointed toward anyone. A safety clip or retainer must be installed to prevent attachments from being unintentionally shot from the barrel of the tool.

***Liquid-Fueled Tools*** - Liquid-fueled tools are usually powered by gasoline. Vapors that can burn or explode and give off dangerous exhaust gases are the most serious hazards associated with liquid-fuel tools. The following safe work procedures for liquid-fueled tools need to be implemented and enforced at all company construction projects.

Gas or fuel should be handled, transported, and stored in approved flammable liquid containers. These containers, also known as safety cans, are no more than 5 gallons in capacity and have a spring-closing lid and spout cover that will safely relieve internal pressure when subjected to fire exposure. Before refilling the tank for a fuel-powered tool, the user must shut down the engine and allow it to cool to prevent accidental ignition of hazardous vapors. Effective ventilation and/or personal protective equipment is necessary when using a fuel-powered tool inside a closed area. Fire extinguishers must be readily available in the work area.

***Powder-Actuated Tools*** - Powder-actuated tools operate like a loaded gun and should be treated with the same respect and precautions. Only assigned, qualified operators should operate powder-

actuated tools. The following safe work practices and procedures for powder-actuated tools need to be implemented and enforced at all company construction projects. All powder-actuated tools must meet ANSI A10.3 requirements for design, operation, and maintenance. Powder-actuated tools must never be used in an explosive or flammable atmosphere. Before using a powder-actuated tool, the worker should inspect it to determine that it is clean, that all moving parts operate freely, and that the barrel is free from obstructions.

Never point the tool at anyone. Do not load a tool unless it is to be used immediately. Never leave a loaded tool unattended, especially where it would be available to unauthorized persons. Suitable eye and face protection is essential when using a powder-actuated tool. In case of misfire, the operator should hold the tool in the operating position for at least 30 seconds, and then attempt to operate the tool for a second time. If the tool misfires again, wait another 30 seconds (still holding the tool in the operating position) and then proceed to remove the explosive load from the tool in strict accordance with the manufacturer's instructions.

If the tool develops a defect during use, it should be tagged and taken out of service immediately until it is properly repaired. Warning signs should be posted within the area of operation of any powder-actuated tool. Powder-actuated tool operators must be qualified and carry a card certifying this fact at all times. Failure to comply with any or all safety procedures governing the use of powder-actuated tools will be sufficient cause for the immediate revocation of the operator's card.

## **8.8 Fire Protection and Prevention**

Applicable Standards:

OSHA 29 CFR 1926.150 through 159

Fire on construction projects is a constant hazard that can cause loss of life, equipment and material. To assist in preventing fires on construction projects, all personnel must comply with the following safe work practices and procedures:

***Fire Protection*** - Access to all available firefighting equipment must be maintained at all times. Firefighting equipment must be inspected monthly and maintained in operating condition. Defective or exhausted equipment must be replaced immediately. All firefighting equipment should be conspicuously located at each jobsite. Extinguisher exposed to freezing conditions will be protected from freezing. Employees should not remove or tamper with fire extinguishers installed on equipment or vehicles or in other locations unless authorized to do so or in case of fire. After using a fire extinguisher, it must be recharged or replaced with another fully charged extinguisher. Extinguishers must be selected based on the anticipated fire hazards. To aid in the proper selection of fire extinguishers, the classes of fires are as follows:

- Class A (wood, paper, trash) - use water, dry chemical, or foam extinguisher.
- Class B (flammable liquids, gas, oil, paints, grease) - use foam, carbon dioxide, or dry chemical extinguisher.
- Class C (electrical) - use carbon dioxide or dry chemical extinguisher.
- Class D (combustible metals) - use dry powder extinguisher only.

**Fire Prevention** - Internal combustion engine-powered equipment should be located so that exhausts are away from combustible materials. Smoking is prohibited at all projects. Project will be conspicuously posted, "No Smoking or Open Flame." Portable battery-powered lighting equipment must be approved for the type of hazardous locations encountered. Combustible materials must be piled no higher than 20 feet (6.1 m). Depending on the stability of the material being piled, this height may be reduced.

Portable fire extinguishing equipment, suitable for anticipated fire hazards on the jobsite, must be provided at convenient, conspicuously accessible locations. Firefighting equipment must be kept free from obstacles, equipment, materials, and debris that could delay emergency use of such equipment. Employees should familiarize themselves with the location and use of the project's firefighting equipment. All oily rags, wastes, and similar combustible materials must be placed in metal containers. The containers must be emptied on a daily basis. Storage of flammable substances on equipment or vehicles should be prohibited unless such unit has adequate storage area designed for such use.

**Flammable and Combustible Liquids** - Explosive liquids, such as gasoline, will not be used as cleaning agents. Gasoline and similar combustible liquids must be stored, transported, and handled in approved and labeled containers in well-ventilated areas free from heat sources. Approved wooden or metal storage cabinets must be labeled in conspicuous lettering, "Flammable-Keep Fire Away." Storage in an approved storage cabinet should not exceed 60 gallons of flammable, or 120 gallons of combustible liquids. Storage of containers will not exceed 1,100 gallons in any one pile or area. Separate piles or groups of containers by a 5-foot clearance. Never place a pile or group within 20 feet of a building. A 12-foot wide access way must be provided within 200-feet of each container pile to permit approach of fire control apparatus.

The use of flammable liquids and spray finishing needs to conform to the requirements of 1926.66 and 1926.152. Paints and reducers should be stored away from heat sources and out of the sun. Airless spray-painting apparatus should be of a type approved for hazardous locations. Any electrically or fuel-powered equipment used to mix, convey, and spray flammable and combustible liquids must carry an approval from a nationally recognized testing laboratory. Pneumatically operated equipment is usually suitable for use with flammable and combustible finishes.

**Fire Extinguishers** - Portable fire extinguishers are provided in adequate number and type (4A:80B:C) and are located throughout the site. Fire extinguishers are located in readily accessible locations. Fire extinguishers are recharged regularly and the date of last inspection noted on their tags. Extinguishers should be placed free from obstructions or blockage. All extinguishers must be fully charged and in their designated places unless in use. All employees are periodically instructed in the use of extinguishers and fire protection procedures.

## **8.9 Sanitation**

Applicable Standard:

OSHA 29 CFR 1926.51

Employees should not be required to perform work under unsanitary conditions. Adequate supplies of potable water will be provided at the jobsite. Containers used for drinking water will be clearly marked and not used for any other purpose. Cups must not be shared by employees. Outlets for non-potable water (i.e., firefighting purposes) are not to be used by employees for drinking, washing, or cooking

purposes. All construction projects must have an adequate number of toilets on the jobsite. Hand washing facilities need to be provided in near proximity to the jobsite. Hand washing facilities should also be present when employees are applying paints, coatings, herbicides, and insecticides or in other operations where contaminants may be harmful to the employees.

## 8.10 Confined Space Entry

Applicable Standards:

OSHA 29 CFR 1910.146, 1926.21(b)(6)

A confined space is a space that is large enough and so configured that an employee can physically enter and perform assigned work, has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits) and is not designed for continuous employee occupancy. Simply working in a confined space is not necessarily a hazard. However, if certain hazardous conditions exist prior to, or are created during entry, then the confined space must be treated with utmost care.

Conditions that make a confined space especially dangerous (i.e., make it a permit-required space) are:

- Contains or has the potential to contain a hazardous atmosphere.
- Contains a material that has the potential for engulfing an entrant.
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross-section.
- Contains any other recognized serious safety or health hazard.

A hazardous atmosphere includes spaces that may expose employees to flammable gases, vapors, mists, or dusts; to an oxygen deficiency (<19.5 percent) or oxygen enriched environment (>23.0 percent); to air contaminants in excess of the PEL, or to any other atmospheric condition that is an immediate danger to life and health (IDLH).

When a permit-required space is present, the following hierarchy of controls should be used on the space:

- Avoid entry.
- Eliminate the hazards that make the confined space a permit-required space. Ventilation, lockout/tagout, block and bleed, and other procedures can be used to eliminate hazards. Hazard elimination must be verified by air monitoring and other test procedures.
- Eliminate the hazards to the point that only atmospheric hazards remain. Use the "atmospheric hazard only" procedures entry system discussed in 1910.146(c)(5).
- Minimize and control hazards to the fullest extent possible, and enter only after the requirements of a full permit entry have been satisfied.

Employees must receive training on confined spaces so that they will acquire the understanding, knowledge, and skills necessary for a safe entry into the confined space. Confined space training should be documented.

Sevenson's Confined Space Program is located in Appendix H.

## **8.11 Welding and Cutting**

Applicable Standards:

OSHA 29 CFR 1926.350 through 354

Welding and cutting operations present various safety and health hazards. Welding and cutting operations on lead-painted surfaces often create lead fumes by "boiling off" the lead. These lead fumes may cause lead poisoning if inhaled or ingested in excessive amounts. Other metal fumes such as iron oxide, chromium, zinc, manganese, and cadmium may also be present during welding and cutting operations. Safety hazards such as fire may result in fatalities, serious injuries, and/or property damage. Therefore, in an effort to eliminate or reduce the hazards associated with welding and cutting operations, the following rules and procedures should be included and enforced in any welding safety program.

***Welding and Cutting*** - Only qualified welders should be authorized to do welding, heating, or cutting. Inspect work areas for fire hazards and proper ventilation before welding or cutting. Avoid welding or cutting sparks and hot slag. Be alert to hot surfaces and avoid touching metal surfaces until they have cooled. Place compressed gas cylinders in an upright position and secure in place to prevent dropping or falling. Handle with extreme care and do not store near any sources of heat. Remove any combustibles when welding or cutting must be done. If removal is not feasible, cover combustibles with a noncombustible material. When welding near any combustible material, another employee must be posted to serve as a fire watch. Make sure this person has a fire extinguisher available and keep him/her in the area after welding/cutting is completed until all danger of fire is past.

A hot-work permit system may be used at some jobsites, such as welding in permit-required confined spaces containing hazardous materials. When working in the vicinity of welding operations, wear approved eyewear and avoid looking directly at the flash as serious flash burns could result. When opening valves on tanks that have regulators installed, be sure the pressure adjustment screw is all the way out and do not stand in front of the regulator. An internal failure could rupture the regulator and cause the adjustment screw to become a missile.

Primers, paints, and other coatings should be removed, where feasible, from the area to be heated and for at least 4-inches on all sides.

***Gas Welding and Cutting*** - When transporting, moving, and storing compressed gas cylinders, always ensure that the valve protection caps are in place and secured. Secure cylinders on a cradle, slingboard, or pallet when hoisting. Never hoist or transport the cylinders by means of magnet or choker slings. Move cylinders by tilting and rolling them on their bottom edges. Do not allow cylinders to be dropped, struck, or come into contact with other cylinders violently. Secure cylinders in an upright (vertical) position when transporting by powered vehicles. Do not hoist cylinders by lifting on the valve protection caps. Do not use bars under valves or valve protection caps to pry cylinders loose when frozen. Use warm, not boiling, water to thaw cylinders loose.

Remove regulators and secure valve protection caps prior to moving cylinders, unless cylinders are firmly secured on a special carrier intended for transport. Close the cylinder valve when work is finished, when cylinders are empty, or when cylinders are moved at any time. Secure compressed gas cylinders in an upright position (vertical) except when cylinders are actually being hoisted or carried. Oxygen cylinders should be stored at least 20 feet from other combustible materials such as acetylene. Alternatively, oxygen and fuel gas cylinders may be separated by a 5 feet-high non-combustible barrier with at least a 30-minute fire resistance rating.

***Arc Welding and Cutting*** - Use only manual electrode holders that are specifically designed for arc welding and cutting. All current-carrying parts passing through the portion of the holder must be fully insulated against the maximum voltage encountered to ground. All arc welding and cutting cables must be completely insulated, flexible type, and capable of handling the maximum current requirements of the work in progress. Employees should report any defective equipment to their supervisor immediately and refrain from using such equipment. Shield all arc welding and cutting operations, whenever feasible, by noncombustible or flameproof screens to protect employees and other persons working in the vicinity from the direct rays of the arc.

***Fire Prevention*** - Welders should locate the nearest fire extinguisher in their work area in case of a fire emergency. Fire extinguishing equipment must be immediately available in the work area. Never use matches or cigarette lighters to light torches. Use only friction lighters to light torches. Never strike an arc on gas cylinders. Move objects to be welded, cut, or heated to a designated safe location. If the objects cannot be readily moved, then all movable fire hazards in the vicinity must be taken to a safe place or otherwise protected. Fuel lines should have flashback arrestors. Do not weld, cut, or heat where the application of flammable paints or the presence of other flammable compounds, or heavy dust concentrations creates a hazard. Additional employees must be assigned to guard against fire while the actual welding, cutting, or heating is being performed when the operation is such that normal fire prevention precautions are not sufficient. Prior to applying heat to a drum, container, or hollow structure, provide a vent or opening to release any built-up pressure during the application of heat. Never cut, weld, or heat on drums, tanks, process lines, or containers that have contained flammable liquids until they have been purged and cleaned.

All hot work will be accomplished under a hot work permit.

## **8.12 Stairways and Ladders**

Applicable Standards:

OSHA 29 CFR 1926.1050 through 1060

Stairways and ladders are a major source of injuries and fatalities among construction workers. Because of the potential hazards involved in using stairways and ladders, the following safety practices and procedures need to be implemented and enforced at all construction projects. Ladders that project into passageways or doorways where they could be struck by personnel, moving equipment, or materials being handled must be secured to prevent accidental displacement or be protected by barricades. Workers should always face the ladder and use both hands when going up and down ladders. Materials and tools should be lowered or raised by a rope or other mechanical means. Hold on to the railing on stairways. The areas around the top and base of ladders must be free of tripping hazards such as loose materials, trash, and electrical cords. The same holds true for the bottom of stairways and on stairway platforms.

**Ladders** - Ladders must be capable of supporting four times the maximum intended load. Ladder rungs, cleats, and steps must be parallel, level, and uniformly spaced (not less than 10-inches nor more than 14-inches). Do not tie or fasten ladders together to provide longer sections unless they are specifically designed for such use. All stepladders must be equipped with a metal spreader or locking device. Do not paint wooden ladders, except to stencil for identification. Maintain ladders free from oil, grease, and other slipping hazards. Ladders must extend at least 3-feet above the upper landing surface and be secured. The horizontal distance for the base of the ladder should extend 1-foot for every 4-feet in vertical distance. Wood job-made ladders must be used at an angle so that the horizontal distance is one-eighth the working length of the ladder. Do not use ladders on slippery surfaces unless they have been properly secured or provided with slip-resistant feet. Do not move, shift, or extend ladder while occupied. Never stand on the top step of a stepladder.

A competent person on a periodic basis and after any occurrence that could affect their performance must inspect ladders. Ladders with structural defects must be tagged with "Do Not Use" or similar language and withdrawn from service until repaired. Never use a metal ladder when working on electrical equipment or near electrical equipment where contact is possible. Any employee who uses a ladder or stairway must receive training by a **competent person** in the following areas:

- Types of fall hazards.
- Correct procedures for erecting, securing, maintaining, and disassembling fall protection systems.
- Proper construction (man-made), use, placement, and handling.
- Maximum intended load-carrying capacities.
- Requirements contained within 29 CFR 1926 Subpart X.

**Stairways** - Stairways that are not permanent parts of the structure must have landings of not less than 30 inches in the direction of travel. A platform must be provided where doors or gates open directly on a stairway. Metal pan landings and metal pan treads must be filled in with wood or other materials if they are to be used prior to being finished. Maintain all parts of stairways free from hazardous projections, such as protruding nails. Eliminate slippery conditions on stairways before the stairways are used to reach other levels.

### **8.13 Materials Handling, Storage, Use, and Disposal**

Applicable Standards:

OSHA 29 CFR 1926.250 through 252

In the handling of materials, employees must know the following: There must be safe clearance for equipment through aisles and doorways. Vehicles must be shut off and brakes must be set prior to loading or unloading. Containers of combustibles or flammables, when stacked while being moved, must be separated by dunnage sufficient to provide stability. Trucks and trailers will be secured from movement during loading and unloading operations. Hand trucks must be maintained in safe operating condition. Chutes must be equipped with sideboards of sufficient height to prevent the handled materials from falling off. At the delivery end of rollers or chutes, provisions must be made to brake the movement of the handled materials. Hooks with safety latches or other arrangements will be used

when hoisting materials, so that slings or load attachments won't accidentally slip off the hoist hooks. Securing chains, ropes, chokers, or slings must be adequate for the job to be performed. When hoisting material or equipment, provisions must be made to assure no one will be passing under the suspended loads.

Stack, rack, block, interlock, or otherwise secure all materials and supplies to prevent sliding, falling, or collapse. Post the maximum safe load limits for floors within buildings and structures in a conspicuous location. Never exceed the maximum safe load limit. Keep aisles and passageways clear to provide for the free and safe movement of material handling equipment and employees. Use ramps, blocking, or grading when a difference in road or working levels exists to ensure the safe movement of vehicles between the two levels. Do not place material within 6-feet of any hoistway or floor opening inside buildings under construction, nor within 10-feet of an exterior wall that does not extend above the material being stored. Stack bagged materials by stepping back the layers and cross-keying the bags at least every 10 bags high. Do not store materials on scaffolds or runways in excess of supplies needed for immediate operations. Remove all nails from used lumber prior to stacking. Stack lumber on level and solidly supported sills. Do not stack lumber higher than 20-feet (16-feet if handled manually).

Stack and block structural steel, poles, pipe, bar stock, and other cylindrical materials, unless racked, so as to prevent spreading or tilting. Attach handles or holders to the load to reduce the possibility of pinching or smashing fingers. Unload materials close to the point of final use to avoid unnecessary lifting. Do not stack non-compatible materials in the same pile.

***Manual Materials Handling*** - Employees working alone should not attempt to lift or move a load that is too heavy for one person - get help! When working with materials stored in silos, hoppers, tanks, or similar storage areas, be aware that confined spaces may exist. Attach handles or holders to the load to reduce the possibility of pinching or smashing fingers. Wear protective gloves and clothing (i.e., aprons), if necessary, when handling loads with sharp or rough edges. When pulling or prying objects, workers should be properly positioned. Riding loads, slings, the ball, crane hook, or other material hoisting equipment is prohibited.

***Engineering Controls*** - Engineering controls should be used, if feasible, to redesign the job so that the lifting task becomes less hazardous. This includes reducing the size or weight of the object lifted, changing the height of a pallet or shelf, or installing a mechanical lifting aid

OSHA standard 1926.251 provides guidance about the limitations and uses of slings used in conjunction with other material handling equipment for the movement of material by hoisting. Slings covered by this standard include those made of alloy steel chain, wire rope, metal mesh, natural or synthetic fiber rope, and synthetic web (nylon, polyester, and polypropylene). Some general work practices related to rigging include:

- Rigging equipment must be inspected prior to use on each shift and during its use to ensure that it is safe. Defective rigging equipment will be removed from service.
- Rigging equipment must not be loaded in excess of its recommended safe working load. The standard provides load capacity tables for various types of slings and associated hardware.
- Rigging equipment, when not in use, must be removed from the immediate work area.

- Custom rigging must be marked to indicate the safe working loads and will be proof-tested prior to use to 125 percent of their rated load.

In addition to these general guidelines, the standard has specific requirements related to alloy steel chains, wire rope, natural and synthetic rope, and synthetic webbing. Employees performing rigging work should be adequately trained in the safety and functional aspects of rigging for materials handling operations.

#### **8.14 Signs, Signals, and Barricades**

Applicable Standards:

OSHA 29 CFR 1026.200 – 203

The use of signs, signals, and barricades is essential to make employees aware that an immediate or potential hazard exists. Both traffic and health hazards such as airborne lead are examples of hazards on bridge renovation/demolition sites that require signs and other devices. The following sections discuss the primary ways that employees are made aware of hazards in their work areas.

***Accident Prevention Signs/Tags*** - Signs, signals, regulated areas, and barricades must be used on each construction project as appropriate.

*Danger Signs* are used wherever an immediate hazard (i.e., exposed electrical conductor) exists. The danger signs must have red as the predominant color in the upper panel and a white lower panel for additional sign wording.

*Caution Signs* are used to warn against potential hazards or to caution against unsafe practices. The caution signs must have yellow as the predominant color with a black upper panel (yellow lettering of "caution" on the upper panel) and a yellow lower panel for additional sign wording.

*Exit Signs*, when required, should be in legible red ¾-inch (1.9 cm) stroke letters, not less than 6-inches (15.2 cm) high, on a white field.

*Safety Instruction Signs*, when used, must be white with a green upper panel and white lettering to convey the principal message. Any additional wording must be in black lettering on the white background.

*Directional Signals* must be white with a black panel and a white directional symbol. Any additional wording must be in black lettering on the white background.

*Traffic Signs* must be posted at points of hazards in all construction areas. All traffic control signs or devices must conform to the DOT MUTCD and ANSI D6.1-1971, *Manual on Uniform Traffic Control Devices for Streets and Highways*.

*Accident Prevention Tags* are used as a temporary means of warning employees of an existing hazard, such as defective tools, equipment, etc.

*Out of Order Tags* are used to designate equipment that requires repair or maintenance. Equipment with such a tag may not be used until the tag is removed.

**Signaling** - Flagmen or other appropriate traffic controls must be provided for operations where signs, signals, and barricades do not provide the necessary protection on or adjacent to a highway or street. Signaling directions must conform to DOT *Manual on Uniform Traffic Control Devices* (MUTCD) and ANSI D6.1-1971, *Manual on Uniform Traffic Control Devices for Streets and Highways*. Stop/Slow sign paddles must be used by flagmen when hand signaling. Red flags, at least 18 in<sup>2</sup>, may be temporarily used in traffic control. Flagmen are required to wear a red or orange reflective warning vest and a hard hat while flagging. Required signs and symbols must be visible at all times when work is being done, and removed or covered promptly when the hazard no longer exists.

**Cones, Barrels, Barricades, and Barriers** - Channeling devices such as cones, barrels, or barricades are required for jobsite roadways presenting a hazard to motorized equipment or vehicles. Barriers may also provide a greater degree of work zone protection. Consult traffic control resources such as the DOT MUTCD for guidance on establishing and working in road construction work zones.

## 8.15 Cranes and Hoists

*Applicable Standards:*

*OSHA 29 CFR 1926.1400 - 1501*

The target goal of a crane safety program is zero crane accidents. To achieve this goal, the following safe work procedures must be implemented and enforced at all company projects:

- Crane operators are required to comply with crane manufacturer's specifications and limitations applicable to the operation of any and all cranes, derricks, and hoists.
- Rated load limits and recommended operating speeds, special hazard warnings, or instructions must be posted on all equipment.
- Hand signals to crane and derrick operators must conform to the applicable ANSI standard for the type of crane being used.
- A **competent person** who is knowledgeable in proper crane setup and operation activities must inspect all machinery and equipment prior to each use, and during use, to ensure it is in safe operating condition.
- Any defective parts must be repaired or replaced before use.
- A **competent person** who is knowledgeable in crane inspection techniques must perform an annual inspection of the hoisting machinery and provide a copy of the dates and results of inspections for each hoisting machine and piece of equipment to the site superintendent.
- All moving parts or equipment (belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheel, etc.) must be guarded to prevent contact by employees.
- Accessible areas within the swing radius of the rotating superstructure of the crane must be barricaded to prevent an employee from being struck or crushed by the crane.
- Exhaust pipes must be guarded or insulated to prevent contact by employees.
- Windows in cabs must be of safety glass, or equivalent, that introduces no visible distortions.

- Where necessary, a ladder or steps must be provided to allow access to a cab roof.
- Platforms and walkways must have anti-skid surfaces.
- A 3A:40B:C rated fire extinguisher must be accessible at all operator stations or cabs of equipment. No part of a crane or load is permitted within 10 feet (3.0 m) of electric power lines, except where electrical distribution and transmission lines have been de-energized and visibly grounded. A person will be designated to observe clearance of the equipment and provide timely warning to the crane operator.
- No employee is permitted to work beneath a suspended load.
- Employees that are required to work with in the fall zone of an operation such as sheet pile threading, shall have completed a Fall Zone Training course.

As part of a crane safety program, site superintendents will develop a working knowledge of the client's requirements for operating construction cranes, derricks, or hoists on project property. Interview prospective crane operators prior to site employment to ascertain competence and qualifications and check the prospective crane operator's past experience with previous employers, if possible. The Superintendent or his designee will conduct daily inspections to observe compliance with established company and client crane and rigging procedures and immediately shut down any crane operations that jeopardize the safety of any jobsite personnel.

## **8.16 Housekeeping**

Applicable Standard:

29 CFR 1910.25

A policy of trash removal and the maintenance of good housekeeping practices should be implemented on all jobsites. The accumulation of construction debris may pose a significant fire hazard in addition to tripping and falling hazards.

Good housekeeping practices are the result of planning and organization. All personnel on the site must work together to maintain a clean worksite. The prompt removal of waste materials will permit a free flow of traffic through the work areas. Daily, or more frequent, inspections will be conducted by the general contractor to verify that the housekeeping controls are in place and being enforced.

Housekeeping activities in themselves may pose health hazards such as exposures to dusts, biological agents, and discarded chemicals. Liquid and solid waste chemicals must be placed in leak-proof containers for proper disposal.

## **8.17 Severe Weather**

### **8.17.1 Torrential Rain**

In the event of torrential rain or flash flood warnings issued by NOAA or local news/weather stations, all work in the creek area shall be suspended. All equipment shall be removed from the flood plain area of the creek bed until waters recede. .

### **8.17.2 Lightning**

Work will not be permitted in open areas, near trees or other equipment outside during lightning storms. Work will cease and field personnel provided appropriate shelter until the storm passes. Work shall not resume until at least 30 minutes after lightning was last observed. A lightning detection meter shall be utilized at the Site to monitor for storms that may produce lightning. When an approaching storm is within 20 minutes of the Site, operations will be suspended and all personnel will be required to seek appropriate shelter.

### **8.17.3 Tornadoes**

In the event of a tornado watch/warning all activities will be immediately suspended and workers brought to shore. In the event of a tornado warning all site activities will be suspended immediately and all workers will seek appropriate shelter.

## **9.0 Site Control Measures**

This section outlines site control measures to be implemented to minimize potential exposure to and accidental spread of hazardous substances during construction activities. Listed below are the work zones that will be established. The zone boundaries may be modified as necessary as new information becomes available.

### **9.1 Work Zones**

The Site will be divided into Exclusion, Contamination Reduction, and Support Zones. It should be recognized that the Site control zones will be modified continually. A map showing the work zones will be updated daily and posted in the Site office. The SSHO will review the location of work zones at the daily safety briefing.

The SSHO and at least one person who has completed Supervisor Training will be present at the Site whenever work is performed in the Exclusion Zone or Contamination Reduction Zone. Similarly, at least one First aid/CPR-trained individual will be present at the Site when work is performed in those zones.

#### **9.1.1 Exclusion Zone**

This zone, commonly known as the Hot Zone, is where there will be direct contact with the potentially contaminated material. PPE will be required in this zone. The SSHO will enforce these requirements. The level of PPE required will be based on hazard, site condition and air monitoring performed. Modification to the size and boundary of the Exclusion Zone will be made in the field by the SSHO based on operations and wind direction. The Exclusion Zone may be subdivided into different areas of contamination and different levels of PPE may be assigned based upon the expected type and degree of hazard.

All activities in exclusion zone will be conducted using the "buddy system". This involves a buddy who is able to provide his or her partner with assistance, observe for signs of chemical or heat exposure, check integrity of PPE and go for help when needed.

### **9.1.2 Contamination Reduction Zone**

This zone, commonly known as the Warm Zone, is where workers and equipment will be decontaminated. This will minimize the spread of contaminants from the Exclusion Zone into clean areas. The Contamination Reduction Zone will consist of the area located in front of or next to the exclusion zone so that personnel or equipment exiting the Exclusion Zone can be decontaminated and doff the PPE. Emergency equipment to be located in this area will include eye wash stations, fire extinguishers, first aid kits and other appropriate equipment. The Contamination Reduction Zones or personal decontamination stations will be established adjacent to the Exclusion Zones. These stations will provide a means for prompt removal of potentially contaminated outer PPE at a location convenient to operations.

### **9.1.3 Support Zone**

This zone, commonly known as the Clean Zone, is considered to be uncontaminated. This area will be used as a storage area for operations equipment and where break and toilet facilities will be located.

## **9.2 Site Entry and Control Log**

All site personnel on this project will undergo safety orientation by the SSHO prior to starting work at the site. This training will include general site safety rules, hazardous locations, personal protective equipment guidelines, and onsite emergency procedures. All site personnel will satisfy the following requirements before initiating work onsite within the Exclusion or Contamination Reduction Zones:

- Receive and pass a physical examination, including certification of ability to wear respiratory protection.
- Receive adequate hazardous waste training according to 29 CFR 1910.120 or 29 CFR 1926.65.
- Receive a briefing on all aspects of the SSHP.
- Are properly dressed, equipped, and trained in accordance with all personal protective guidelines.
- Are thoroughly trained regarding decontamination procedures.
- All personnel performing tasks when respiratory protection is needed will comply with the requirements of this plan

All personnel entering and exiting the Exclusion and Contamination Reduction Zones will sign in and out through the Support Zone. The log will indicate the date and time entering and exiting, the location entered, personal protective equipment utilized and decontamination procedures.

## **10.0 Personal Hygiene and Decontamination**

Decontamination (Decon) is the process of removing or neutralizing potentially harmful contaminants that have accumulated on personnel and equipment in order to reduce the spread of contamination outside the work area. Decontamination is critical to the safety and health of Site workers and it protects the community by minimizing the off-site migration of contaminants. One of the most

important aspects of controlling contaminated material migration is the prevention of the spread of contamination. Good contamination prevention will minimize employee and public exposure.

All personnel and equipment leaving the Exclusion Zone must be decontaminated in the Contamination Reduction Zone prior to entering the Support Zone. The decontamination process is composed of a series of steps performed in a specific sequence. The basic concept is that more heavily contaminated items will be decontaminated and removed first, followed by decontamination and removal of inner, less contaminated items.

During construction activities at the Site, all items taken into the Exclusion Zone must be considered contaminated and must be carefully inspected and/or decontaminated before leaving the Site. All contaminated vehicles; equipment and material will be cleaned and decontaminated to the satisfaction of the SSHO prior to leaving the Site. Decontamination procedures will be posted at every decontamination station throughout the project.

### **10.1 Personal Decontamination**

Personnel exiting the Exclusion Zone during construction activities at the Site will follow the procedure below.

Decontamination of personnel and equipment will be performed using mild soap and lukewarm water, brushes, and pressures washers as applicable.

As the worker leaves the Exclusion Zone, he places his equipment and tools in the Exclusion Zone or Contamination Reduction Zone. After the worker places his equipment and tools down, gross contamination will be removed from outer clothing and boots. Workers will then remove their outer boots and outer gloves and place them in plastic garbage bag-lined containers.

Once outer gloves are removed, workers will remove all outer garments and place them in plastic garbage bag lined containers. Once workers are fully decontaminated and all garments are removed, workers will remove their respirators (applicable to level C) followed by removal of inner gloves. Used cartridges and inner gloves will be placed into plastic garbage bags.

The change trailer will be used by the on-site staff for short breaks during the workday. The trailer will have an area for changing, washbasins, and counters. This trailer is considered part of the Support Zone and cannot be entered from the Contamination Reduction Zone unless the individual has completed the outlined decontamination procedures. All equipment will be decontaminated before being brought into the trailer.

### **10.2 Respirator Decontamination**

If utilized, respirators are to be decontaminated, cleaned and sanitized before reuse. Cartridges and/or filters must be replaced as needed and, as a minimum, changed daily. The respirators are then cleaned with cleaning and sanitizing solutions, wiped dry and placed into sanitary containers or bags and sealed closed. Before departing the change locker facility, respirators are placed into storage compartments for next day use.

### **10.3 Equipment Decontamination**

Nearly all contractor hardware (not consumable) is considered to be recoverable. As such, they will be decontaminated using the proper equipment, (i.e. brushes, sprayers, detergent and, if necessary, other appropriate solvents). Large heavy equipment will be decontaminated with pressure steam wash as required.

The decontamination area for vehicles and equipment leaving the Exclusion Zone will be located within the Contamination Reduction Zone. Scrapers and brushes will be used to remove gross contamination prior to final decontamination. A pressure washer will be used for the final cleaning and decontamination of the equipment. The combination of dry removal with the brushes and use of the steam cleaner will minimize the generation of contaminated liquid. All solids and liquids will be collected for disposal. Efforts will be made to minimize soil (even non-contaminated soil) from being tracked off-site. Dirt and mud will be removed from trucks and vehicles leaving the Site to the extent practicable.

### **10.4 Decontamination Log**

A decontamination log will be maintained and will list the equipment name and model number, the equipment I.D. number, the activities the equipment was used for, the method of decontamination, amount of decontamination, date and time of decontamination and names of personnel doing the decontamination. This log will be maintained by the SSHO and included in the Safety and Health Report.

### **10.5 Decontamination Residue**

Decontamination residue consists of disposable PPE (such as Tyvek, gloves, tape and cartridges) and settled solids. Decontamination residue will be drummed and stored in the Exclusion Zone until subsequent disposal or for treatment.

### **10.6 Personal Hygiene and Sanitation**

Hands and face will be thoroughly washed before eating, smoking, drinking, chewing gum or tobacco.

When possible, avoid contact with contaminated materials.

Temporary support facilities such as wash facilities, eating areas, changing areas, and portable toilets will be located in the Support Zone. This area will remain “clean” and free of contamination.

An adequate supply of potable water will be provided to the employees working at the Site. Clearly labeled potable containers will be used to dispense drinking water. Containers will be cleaned at the beginning of each day. The containers will be equipped with taps to access the water. Clean disposable cups will be provided daily.

Portable toilet facilities will be provided on-site for employees and will be located in the Support Zone.

Eating, drinking, smoking, chewing gum or tobacco, or any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited during construction activities except in designated eating or smoking areas outside the Exclusion and Contaminant Reduction Zones.

Sevenson employees, subcontractor employees, and service personnel are required to thoroughly decontaminate themselves prior to entering the Support Zone

Hands and face will be thoroughly washed before eating, smoking, drinking, chewing gum or tobacco.

When possible, avoid contact with hazardous materials.

Temporary support facilities such as wash facilities, eating areas, changing areas, and portable toilets will be located in the support area.

An adequate supply of potable water will be provided to the employees working at the Site. Clearly labeled potable containers will be used to dispense drinking water. Containers will be cleaned at the beginning of each day. The containers will be equipped with taps to access the water. Clean disposable cups will be provided daily.

### **11.0 Emergency Contingency Plan**

This section describes the emergency response plan that will be implemented by Sevenson employees to handle emergencies. The nature of the project, the contaminants present and the activities planned for the site are such that there is little potential for an emergency, which would result in a significant release of hazardous substances, and in any way threaten the adjoining community. However, there is always the potential at any construction site for emergency situations to occur which threaten the on-site workers. Possible examples of emergency situations during construction activities include equipment fires or contact of equipment with overhead power lines. In all of these cases, procedures will be implemented to minimize the possibility of an emergency situation. The procedures outlined below are designed to ensure that the workforce reacts quickly and appropriately to emergency situations, thereby protecting the health and well being of the individual workers. It is expected that modifications may be necessary upon actual site set-up and conditions.

NOTE: In the event of a serious or life threatening emergency the primary consideration is the immediate health of the individual rather than routine contamination controls. Standard contamination control protocols shall not interfere with the prompt medical attention required of a seriously injured worker.

#### **11.1 Pre-Emergency Planning**

During the site safety briefings held daily, all employees will be informed of the location of this plan, the procedures outlined in this plan, and the communication systems and evacuation routes to be used during an emergency.

On a continual basis, individual personnel should be constantly alert for indicators of potentially hazardous situations and for signs and symptoms in themselves and others that warn of hazardous conditions and exposures. Rapid recognition of dangerous situations can avert an emergency.

A coordination meeting with local emergency response agencies (fire, police, rescue and medical facility) will be conducted prior to work starting at the site. The site activities and potential hazards that may be encountered by responders will be reviewed during this meeting.

## **11.2 Personnel Responsibilities**

All on-site employees have a role in mitigating an emergency incident. The Project Superintendent has primary responsibility for responding to and directing emergency response operations to correct emergency situations. This includes taking appropriate measures to ensure the safety of site personnel and the public. He is additionally responsible for ensuring that corrective measures have been implemented, appropriate authorities notified, and follow-up reports completed. The SSHO will assist and advise the Project Superintendent, and will direct any emergency medical responses.

The following is an outline of job titles and corresponding responsibilities during an emergency.

- The Site Superintendent directs emergency response activities and serves as liaison with appropriate Client and Client representative's personnel and subcontractors. In the event of an emergency the Project Superintendent will be the Incident Commander.
- The SSHO recommends that work be stopped if any operation threatens worker or public health or safety and advises Site Manager of emergency procedures if necessary. Provides emergency medical care on site. Notifies emergency services. The SSHO will assume the responsibility of Incident Commander if the Project superintendent is off-site.

## **11.3 Evacuation Routes and Procedures**

In the event of an emergency that necessitates an evacuation of the Site, on-site personnel will be notified by hand-held or mobile two-way radios to leave the area by immediate emergency exit. An alternate method of communication will be the use of a portable air horn sounded in regularly spaced, repeated blasts.

During an evacuation, all non-emergency radio transmissions will cease. The SSHO, in conjunction with the Project Superintendent, will control the scene until the appropriate municipal and state agencies arrive. Since site conditions, (i.e., wind direction, precipitation, and work location), change often, the SSHO will determine the appropriate evacuation procedures.

All personnel will assemble/muster at the Contamination Reduction Zone or Support Zone. Access to the site will be restricted.

## **11.4 Emergency Decontamination Procedures**

Decontamination of an injured or exposed worker will be performed if decontamination does not interfere with essential treatment. The objective is to successfully administer first aid without exposing rescue workers and the victim to contaminants. Project personnel will meet with the local hospital to discuss the possibility of having to treat injured personnel from the site.

If the hazards are low and decontamination can be performed, then a wash, rinse and removal of protective clothing will be performed.

If the hazards are high and decontamination cannot be done, then the following procedures will be performed:

- Wrap the victim in blankets or plastic sheeting to reduce contamination of rescue workers or other personnel.

- Alert emergency and medical personnel to potential contamination. Emergency entry into the exclusion zone will be controlled by the SSHO. The SSHO will determine if the victim can be moved from the exclusion zone. If entrance into the exclusion zone is required, the SSHO will ensure that the emergency workers don the proper PPE.
- If required, arrange to have the SSHO accompany the victim to the hospital if required.

### **11.5 Medical Treatment/First Aid**

The SSHO will be trained in CPR and First Aid as well as one other person at the site and will have first aid kits for use in a medical emergency. First Aid Kits will be located in the main support area, Contamination Reduction Zone and at the work activity locations. Eyewash stations will be available at the Contamination Reduction Zone. Eyewash stations will be of the pressurized, 15-minute discharge type. On-site employees have a basic knowledge of first aid and will assist the Site Superintendent and SSHO. Community emergency services (EMS, Fire, and Police) will be notified immediately if their resources are needed on site.

For injuries and illnesses that are not immediately life threatening or require the services of local emergency medical services WorkCare Injury Intervention (888-449-7787) will be utilized by the SSHO to help assess the injury or illness. WorkCare Injury Intervention is staffed by registered nurses and doctors that specialize in occupational injury and illness. WorkCare Injury Intervention will interview the affected employee over the phone and will recommend the next course of action for the employee.

If necessary, the injured or sick party will be taken to Wayne Medical Center – Please refer to **Figure 3** – for directions to this facility. Routes to this medical center will be posted in job site trailers and Severson vehicles and will be easily visible at all times.

### **11.6 Emergency Alarms/Notifications and Procedures**

When any emergency occurs on-site the SSHO and Project Superintendent will be notified immediately. The Project Superintendent or the SSHO will notify the client and his representatives. Please refer to the **Table 9 – “Emergency Telephone Numbers”** for emergency telephones. Emergency Telephones will be posted and easily visible at all times.

To notify any site workers of an emergency, workers can be signaled by way of hand held or mobile two-way radios or as a backup, the use of an emergency alarm (portable air horn). Any audible pattern of blasts from a portable air horn becomes difficult to interpret due to distance and the inhibitory effects of a respirator.

All emergency communications will flow through the radio network. Outside emergency services will be notified, as necessary. The site evacuation alarm consists of one long blast on a horn, every 10 seconds. Any time the alarm system is activated; on site personnel will be notified immediately. Personnel will extinguish any nearby ignition source and prepare for emergency response activities. This alarm will also be used to alert personnel of a sudden release of hazardous materials.

The observer of the emergency condition will brief the responding personnel as to the nature and location of the incident. When they have assessed the situation, a decision whether or not to implement these procedures will be made. If these Emergency Contingency Procedures are not implemented, supervisory personnel will give the “All Clear” verbally. The "All Clear" will be used to

indicate a return to normal (non-emergency) conditions following emergency response activities. The alarm signals will be prominently posted at the site. The audible alarm system will be discussed with each resident within hearing range of the alarm system.

### **11.7 Implementation of the Plan**

There is a logical sequence of steps to follow in responding to emergencies, which should be followed by site personnel. This sequence involves identifying the emergency, investigating the extent of the emergency, deciding on the proper initial course of action, taking corrective action to rectify the situation, and following up with a post-emergency investigation.

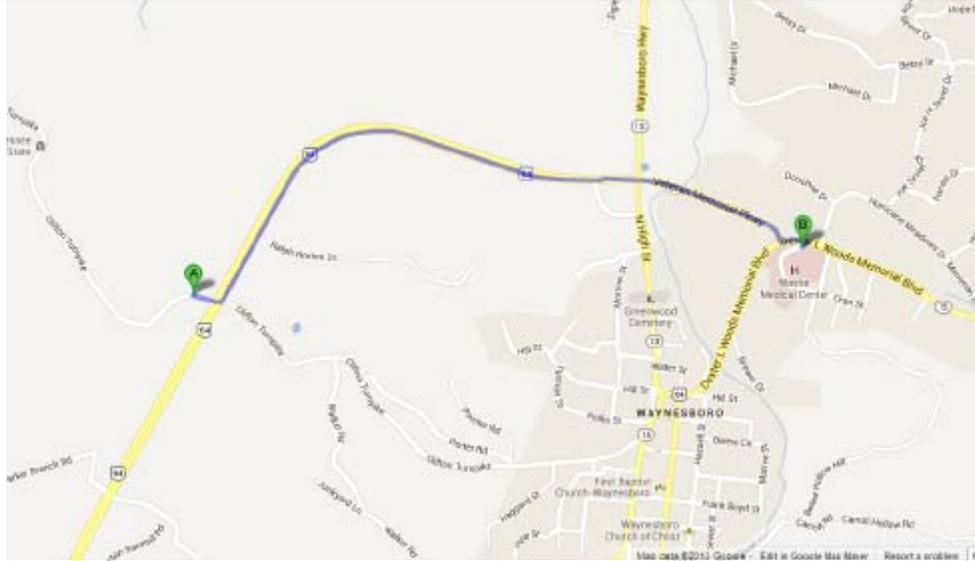
Equipment breakdowns, power failures, injuries, and natural disasters are usually rather dramatic and will capture the individual's attention immediately upon occurrence. In other cases, the individual may have prior warning of impending emergencies through weather reports in the case of natural disasters and trends in equipment performance in the case of some breakdowns.

Some emergency situations exist long before the operator is aware that an emergency exists. These cases may produce situations, which then become immediate and obvious. For example, unattended equipment may have minor breakdowns which go unnoticed; further operation thus leading to complete breakdown of the equipment resulting in possible injury to the unwary bystander.

In the event of a fire, explosion, accidental material release, or any other emergency, response activities will be initiated following the evaluation of the event. An assessment of the situation will be performed by the SSHO immediately upon notification. The Superintendent/SSHO is authorized to commit resources to the extent detailed in this plan. If it is determined that an emergency situation exists, he will then implement the appropriate emergency response activities.

In the event that a medical emergency or accident occurs in the Exclusion Zone, all personnel responding to the emergency should be outfitted in the PPE appropriate for the situation. As a general rule, personnel should not enter the Exclusion Zone without donning the minimal level of PPE required. In the event that a worker is overcome or disabled for an unknown reason, the Superintendent/SSHO must make a determination as to the level of respiratory protection, which is appropriate. Specifically, a determination must be made as to whether supplied air respirators are necessary for the protection of the responders.

**Figure 3**  
**Route to Wayne Medical Center**



**Directions**

1. Head EAST on Clifton Turnpike toward US-64 Bypass
2. Turn LEFT onto US-64 Bypass/Veteran Memorial Parkway
3. Turn LEFT onto Dexter L Woods Memorial Boulevard
4. Turn RIGHT onto JV Mangubat/Oran Street
5. End 103 JV Mangubat Drive/Oran Street, Waynesboro, Tennessee 38482

Hospital Phone Number: 931-722-5411

**Table 9 –  
Emergency Telephone List**

Police (Waynesboro)	911 or 931-722-5486
Fire (Waynesboro)	911 or 931-722-3602
Ambulance	911
<b>Hospital – Wayne Medical Center 103 JV Mangubat Drive Waynesboro, TN 38485</b>	931-722-5411
Dr. Greaney – Occupational Physician (Work Care)	714-456-2154
WorkCare Injury Intervention	888-449-7787
<b>Sevenson Environmental Services, Inc.</b>	
Paul Jung - Safety and Health Manager	716-284-0431 716-609-1767 (cell)
Tim White – Project Manager	716-998-4946
Randy Campbell– Site Superintendent	724-493-3394
Mike Weidner - Site Health and Safety Officer	423-504-5438
Sevenson Site Office	TBD
<b>Engineer</b>	
Angela DeDolph – Project Manger	312-288-3816
TBD	TBD
<b>OTHERS</b>	
<b>Tennessee One Call</b>	811 or 800-351-1111
<b>Tennessee DEC</b>	888-891-8332
<b>National Response Center</b>	800-424-8802
<b>Poison Control Center</b>	800-222-1222
<b>CHEMTREC</b>	800-424-9300

### **11.7.1 Conditions for Implementation**

The contingency plan will be activated by the Superintendent/SSHO immediately in the event of a fire or explosion, or emissions of toxic chemicals in excess of limits set forth by Federal, State, and local agencies. In the event of a spill or material release, it will be up to the Superintendent/SSHO to make a determination as to when emergency conditions exist, as opposed to routine maintenance of the site. His determination will depend upon the location of the spill, the size of the spill, weather conditions and the proximity of the release to workers, the community and environmental receptors.

Once it becomes apparent that an emergency situation exists or that a disaster is impending, the Project Superintendent or his designee should immediately be notified and an immediate investigation conducted. Assessment of the emergency should include assessing the severity of the situation and collecting enough information to make an initial action decision.

Assessing the emergency should include identifying injured persons (if any), damage to buildings and equipment, noting potential impending damage if corrective action is not taken immediately, and itemizing resources required to correct the situation.

#### **11.7.1.1 Fire or Explosion**

Although the potential for fire or explosion is minimal, sources of risk do exist. These sources include welding gases, gasoline for portable equipment, diesel fuel for the heavy equipment and combustible debris. In the event of an explosion, possible emergency conditions would exist. Unless extinguished immediately, a fire or explosion will trigger implementation of these procedures.

#### **11.7.1.2 Material Spills**

Material Spills could occur during truck loading and from vehicle accidents. Additionally, equipment fueling operations could produce spills. Ultimately, a spill could contaminate receiving surface water or cause a release of vapors to the air. A spill of fuel could also ignite. A small spill should be cleaned up immediately, but should not trigger activation of these procedures. Should an onsite spill occur, the immediate response will include closing off the source of the spill, if possible, application of the sorbent material or sand bagging, and street sweeping, as appropriate. Any spill that results in a discharge to offsite surface water will be contained with sorbent booms as needed. All spills will be investigated, and a written report will be provided to the regulatory agencies in accordance with applicable regulations.

#### **11.7.1.3 Severe Weather**

In the event of severe weather, the Site Superintendent and/or the SSHO have the authority to stop operations and direct evacuation procedures, if conditions warrant. All equipment will be secured and grounded. After the storm, a visual inspection will be performed by the Superintendent and/or the SSHO to check for damage and hazards. These will be performed before any work is resumed. If damage or hazards are noted, the designated or other Severson personnel will evaluate the conditions and implement corrective actions to repair the damage or eliminate the hazard. These actions will begin as soon as possible and will take precedence over other site activities.

### **11.7.2 Initial Action**

Once the extent of the emergency is known, the Superintendent and the SSHO will make an immediate decision as to what initial steps should be taken to remedy the emergency situation. This first action, in the case of large-scale emergencies, usually consists of notifying responsible authorities and/or calling for the necessary assistance in order of priority.

The individual(s) should not unduly endanger him or herself or others by attempting tasks for which the proper equipment is not available or with which he or she is unfamiliar. In all cases, if in doubt, wait until qualified help arrives before taking action.

### **11.7.3 Corrective Action**

When help arrives, the site superintendent/SSHO should immediately inform those called of the pertinent details of the situation. Corrective action should be continued until the situation is either under control or completely rectified. If corrective actions will take considerable time, a long-term effort to complete the task should be developed.

### **11.7.4 Follow-Through**

After the situation is corrected, the cause of the emergency event is to be determined and review of the corrective actions taken, etc. In the case of equipment failure, if negligence was not a factor, then revising maintenance procedures would be the most likely first preventive step. For natural disasters that cannot be prevented from recurring, the procedures followed in dealing with them can be reviewed to develop more effective action plans. The entire event, along with all of the responses, will be thoroughly documented for review by management and project supervisory personnel.

## **11.8 Spill Response and Control Plan**

The purpose of this section is to define practices and procedures for the prevention, containment, and cleanup of accidental discharges of hazardous substances during the project. These substances include both the contaminated material encountered as a result of the construction project, such as contaminated soils and decontamination liquids, and construction materials typically found on any construction site, such as lubricating fluids, diesel fuel, gasoline, etc.

Spill prevention applies to all types of spills and can be described as the first and simplest approach to spill control. Human error is a major contributing factor to spills and releases. An awareness of spill consequences, preventive measures, and countermeasures will greatly reduce spill occurrences. A sound prevention program includes careful work practices, constant inspection, and immediate notification and correction of deficiencies. In the event that a spill does occur, proper containment and cleanup procedures must then be followed in order to reduce the effect of the spill.

### **11.8.1 Prevention**

Prevention of unnecessary spills is of first priority. Prevention measures include:

- Operators and drivers will exercise extreme caution when transporting material around the site.

- When removing hoses from machines an appropriate and adequate supply of absorbents will be on hand. A supply of the following absorbents will be kept on-site, oil sorbent booms, rolls and pillows, universal towels and sheets, and vermiculite.
- Hoses will be capped when not connected to their appropriate fitting.
- All containers will be inspected daily for decay. No open container will be exposed to rainfall, snowfall, etc. without being emptied and cleaned of residue.
- All equipment will be inspected for leaks before and after service.
- Storage of material such as fuels, oils, and solvents on-site will be limited to the minimum required. All fluids will be stored in individual fluid containers appropriate and approved for the material. Most of the individual fluids containers will be further secured by storage in large, locked tool and equipment storage containers. Drums or other containers too large to be stored in containers will be stored raised off the ground on a liner and covered by plastic.

### **11.8.2 Reporting**

All spills will be reported immediately to appropriate field and office management personnel. The sequence of reporting will be as follows:

- Notification by workers to the Project Superintendent or SSHO.
- The Project Superintendent or SSHO will immediately notify the Client Representative regardless of the size of the spill.
- Severson and the Client Representative will jointly determine the nature of the spill, its size, direction of travel, if anyone has been injured as a result of the spill and whether it requires immediate notification to regulatory agencies.
- Severson will have primary responsibility for notifying the regulatory agencies unless Severson is directed otherwise. Severson will have follow-up responsibility to verify that the notification is made in a timely manner. A full list of emergency contacts and telephone numbers is included this plan. This list includes Severson personnel, as well as federal, state and local authorities. This list will be posted in all trailers on-site.

Upon notification of a spill, all project activity will be immediately suspended and all necessary equipment and personnel will be diverted to spill control and containment. In the event of a spill, and regardless of the size, a Spill Incident Report will be submitted to the Client Representative with a copy within 48 hours of the incident.

### **11.8.3 Spill Response Equipment**

Given the nature of this project, all the necessary equipment and personnel necessary to deal with a release of hazardous substances will be available on site. In addition to the heavy equipment and personal protective equipment, which is critical to spill control, Severson will have on hand an ample amount of sorbent materials, UN1A2 open top drums and overpacks.

#### **11.8.4 Confinement and Containment**

Prior to entering a spill area, all workers must be protected from any adverse effects of the spilled material. No one will enter any spill area alone. The SSHO will determine the level of protection required for response activities. To the extent practicable, the area will immediately be cordoned off and, if appropriate, exclusion, contamination reduction, and support zones will be established.

The decision to use confinement techniques such as diversion, diking and retention, are generally based on time, personnel, equipment, and supplies. As mentioned above, all necessary resources will be available on-site at all times. To the extent the nature of the material is known, the decision should be made based upon a review of the harmful effects of the material. In the event of a large migrating spill, an unlikely circumstance, diversion techniques, such as placing a soil wall or absorbent boom ahead of the spill, will be implemented first. Subsequently, diking techniques, such as using material such as sand covered with liner material (PVC, hypalon) should be implemented.

#### **11.8.5 Cleanup**

Once a spill has been contained and the source of the spill corrected and controlled, cleanup can begin. Spill cleanup can proceed at the same time as containment if feasible. Supervisory personnel will determine the appropriate cleanup methods. The SSHO will determine the appropriate level of protection depending upon the nature of the material.

- The first action will be to absorb free liquids with absorbent pads, booms, pillows, or clay. The absorbent material will be placed in drums and moved to an appropriate storage location. Subsequent to the removal of free liquids, soil believed to be contaminated will be excavated and containerized in drums or stockpiled on poly sheeting and covered for further testing.
- Dry spills, while posing less of a risk of migration, will still require appropriate and immediate action. The nature of the spilled material will be ascertained. The spilled material will be recovered for reuse if appropriate. Material which cannot be recovered, and residual contaminated soil will be shoveled into 55-gallon drums, placed in the drum storage area, and sampled and analyzed for waste characterization and disposal.
- Once containerized, Severson will provide for the appropriate sampling and analysis for waste characterization and disposal facility acceptance. Results of waste characterization analysis, waste profiles, and manifests will be provided to the Client Representative for review.
- All spilled material and visually contaminated soil will be excavated and containerized in the initial spill response. If there appears to be a possibility that contaminants have migrated into the surrounding soil, post-construction sampling will be initiated. Soil samples will be taken from the areas of suspected contamination and analyzed for the compounds, which were released.

Personnel Decontamination - In general, all spill response operations will be performed in accordance with the provisions of this SSHP.

## **11.9 Report/Review**

A written report will be made within 24 hours of incident resolution. The Client Representative will be provided with a copy. In addition, all key personnel will have a meeting within 48 hours of the incident to discuss and critique all of the aspects of the Emergency Contingency Plan according to new site conditions and lessons learned.

## **12.0 Inspection and Reporting**

### **12.1 Safety and Health Inspections**

Safety and Health inspections will be conducted to discover, through specific, methodical auditing, checking, or inspection procedures, conditions and work practice that lead to job accidents and illnesses.

The Health and Safety Manager shall be responsible for ensuring that inspections are conducted at the frequency stated, reviewing the Daily Safety and Inspection Logs for completeness, thoroughness, and trends; performing monthly project inspections; and training site personnel on proper inspection techniques. The SSHO shall be responsible for ensuring that daily inspections are conducted, reviewing the inspections findings and corrective actions for applicability and thoroughness, and providing the site management personnel with a summary of inspection findings each month.

### **12.2 Weekly Safety Reports**

A weekly safety report will be submitted to the Client Representative. The weekly report will include:

- The names of all Severson and subcontractor personnel employed at the site at any time during the week, and the names and duties of key personnel including the Project Manager, Project Superintendent, SSHO, excavation competent person, and crane operation-competent person (if applicable).
- A summary of all health and safety incidents describing any medical treatment that was provided during the week, the current work status of any individuals affected, the names of the individuals that observed the incident, and actions taken to address the unsafe act or unsafe condition.
- A summary of all health and safety near misses or observations providing an opportunity for shared learning and future hazard avoidance. For any health or safety incident or near miss, list the date, the nature of the incident or near miss, and the names of the individuals involved.
- The total number of labor hours worked at the site during the week and project.
- Internal health and safety audits performed as part of the SSHP.
- Results of behavior based observations and feedback evaluations.

### **12.3 Certification of Worker/Visitor Acknowledgment**

A Certification of Worker/Visitor Acknowledgment will be submitted to the Client's Representative prior to initial entry onto the Site. The certification/acknowledgment will include both formal, field

and site-specific training received, personal protective equipment supplied and trained in use, and medical certification. Certificates and Medical certification will be kept on file at the site.

#### **12.4 Incident Reports**

Incident reporting will ensure an immediate report on all incident/accidents and provide an effective follow-up for corrective action in order to eliminate unsafe practices and unsafe conditions. An **Incident/Accident Form** must be completed within 24 hours of the Incident/Accident. This report is utilized in the event of injuries, off-site releases, utility breaks, or accidents. Immediately following the incident/accident, the Site Superintendent and the SSHO will initiate an Incident/Accident Investigation. An Accident Report will be completed and submitted to the Client's Representative within 24 hours (based on the complexity or severity of the incident a final version may not be available within 24 hours, a report marked preliminary will be submitted within 24 hours with an estimated completion date for the final. "Near misses" will be documented by the SSHO and discussed at the morning safety briefings to educate the work force to potentially hazardous operations or practices.

#### **12.5 Daily Air Monitoring Report**

The Daily Air Monitoring Report will be prepared by the SSHO. The Report will include all air monitoring data collected including real-time monitoring, personal monitoring within the Exclusion Zone, and perimeter monitoring.

#### **12.6 Daily Tool Box Talks**

A daily site briefing will be held to discuss current work activities and hazards for the day along with the air monitoring results from the previous day. The SSHO/Superintendent will conduct Daily Tool Box Talks and Weekly Safety Meetings with ALL on-site personnel.

#### **12.7 Safe Plan of Action**

Prior to the start of the job, an activity hazard analysis will be performed by the Health and Safety Department or SSHO. The health and safety hazards for each operation will be noted, then the appropriate control(s) for each hazard will be recommended. Prior to the start of any operation, the tasks, possible hazards, and their associated control techniques will be discussed with the affected employees through the Safe Plan of Action (SPA).

As part of Project's Activity Hazard Analysis Program a daily SPA is to be completed for job tasks assigned during the day. This program is to supplement, not replace the Activity Hazard Analysis already prepared prior to work assignments. The SPA is to be completed by the supervisor assigning the work and the personnel who are to perform the work. The Activity Hazard Analysis may be used as a generic temple to complete the SPA but should not be the SPA. The expectation of the SPA is for the worker and supervisor to identify each specific hazard present, determine how to minimize the hazard, resources required to minimize the hazard, and where to find those resources.

Example, the Activity Hazard Analysis identifies pinch points as a hazard associated with the job task. The supervisor and worker(s) will evaluate the work area and identify the pinch point such as drill being used near an object where the torque on the drill could cause pressure to place on the fingers or hand between the drill and the object.

Once all specific hazards have been identified and written on the SPA form a pre job briefing can occur to ensure all affected personnel understand the hazards present. The SPA may be modified at any time during the day as new hazards develop.

### **12.8 Job Safety Enhancement Program (JSEP)**

The Job Safety Enhancement Program (JSEP) is a tool used at Severson projects to identify behaviors and unsafe work place conditions. These reports are reviewed and discussed by the Project Manager, Site Superintendent, Quality Control Manager, and the SSHO to determine if corrective actions are required. Each completed form is recorded on a tracking matrix to ensure the report has been reviewed, responsible person for corrections properly closed out and discussed with the affected site personnel. Severson encourages all personnel involved in a project to complete a JSEP Form.

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Appendix A  
Activity Hazard Analysis

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# Activity Hazard Analysis (AHA)

Activity/Work Task: Site Mobilization	Overall Risk Assessment Code (RAC) (Use highest code)				<b>H</b>	
Project: Beech Creek Superfund Site	<b>Risk Assessment Code (RAC) Matrix</b>					
Project Location: Wayne County, Tennessee	<b>Severity</b>	<b>Probability</b>				
Date Prepared: April 20, 2015		Frequent	Likely	Occasional	Seldom	Unlikely
Prepared by (Name/Title): Paul Jung-Safety and Health Manager	Catastrophic	<b>E</b>	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>
	Critical	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>L</b>
<b>Notes:</b> (Field Notes, Review Comments, etc.)	Marginal	<b>H</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>L</b>
	Negligible	<b>M</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>
	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.				<b>RAC Chart</b>	
"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible				<b>E = Extremely High Risk</b>		
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.				<b>H = High Risk</b>		
				<b>M = Moderate Risk</b>		
				<b>L = Low Risk</b>		
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>				<b>RAC</b>
1. Pre-job set up	1. Emergency Response	<b>1.</b> Rallying points. Notification of proper authorities in event of an emergency <b>2.</b> Only qualified employees will be authorized to operate heavy equipment. Equipment properly secured when not in use. Equipped with operable backup alarms and seat belts. ROPS are required on all heavy equipment. Inspect equipment daily. <b>3.</b> Ensure personnel are trained on specific tools. Inspect tools before each use. Use correct tool for the job. Make use of all safety devices and ensure they are functioning.				<b>1. L</b>
	2. Heavy equipment inspection					<b>2. L</b>
	3. Hand tool inspection					<b>3. L</b>
2. Mobilize equipment	1. Biological (i.e., Plants, Insects, Snake, and Infectious Material)	<b>1.</b> Avoid insect nest, spiders and spider webs, or likely habitats of snakes and use tick insect repellent. Check skin and clothing for tick periodically throughout the day. Use Wasp/Bee spray for nests. Use Poison Ivy Barrier cream in brush clearing activities. Use cool water and mild soap to wash of any oils. (Hot water opens skin pores, which allows increased contact with the irritating oils.). Use loud sounds to scare animals. Do NOT approach animals. Survey the area for biological hazards before commencing work. Avoid insect nests or likely habitats of snakes. Use appropriate insect repellents i.e., DEET for the insects. Check skin and clothing for ticks periodically throughout the day. Use wasp/bee spray for nests. Protect bare skin from poison ivy by wearing long				<b>1. M</b>

	<p>2. Struck by/against heavy equipment</p>	<p>sleeves. Use Poison Ivy Barrier cream in brush clearing activities. Use cool water and mild soap to wash off any oils. (Hot water opens skin pores, which allows increased contact with the irritating oils).</p> <p><b>2.</b> Approach equipment within the operators view. Only qualified employees will be authorized to operate heavy equipment. Equipment properly secured when not in use. Equipped with operable backup alarms and seat belts. ROPS are required on all heavy equipment. Inspect equipment regularly. Flaggers/spotters assigned where necessary. Use safety reflective vest when working around equipment. Hand signal by ONE (1) DESIGNATED worker. Keep heavy equipment at least 10 feet from power lines. Restrict pedestrian traffic. Do not walk, work, or stand near equipment being loaded or unloaded. Stay out of swing radius of equipment. For stationary equipment-rope off or guard swing radius.</p>	<p><b>2. M</b></p>
	<p>3. Chemical spill</p>	<p><b>3.</b> Good housekeeping practices. Maintain spill response equipment onsite. Practice spill prevention at all times. Proper chemical storage. Spill control and countermeasures plan in place for spills encountered during work activities. Turn off equipment when fuelling. Report all spills to the SSHO. Subcontractors to supply MSDSs for chemicals to be used.</p>	<p><b>3. M</b></p>
	<p>4. Contact with sharp objects/material</p>	<p><b>4.</b> Ensure personnel are trained on specific tools. Use correct tool for the job. Make use of all safety devices and ensure they are functioning. Use care with utility knives, replace dull blades, store properly. Wear appropriate PPE (i.e., gloves, long-sleeved shirts and long pants) to avoid scratches. Be aware of body positioning, and ensure that tools are handled correctly. Take care to cut in a direction away from the body. Avoid placing hands in tight places while moving materials. Inspect tools before each use. If tool is not fit for use, report the condition to SSHO, so that it will be taken out of service. If unsure about use of any tool ask SSHO before attempting to utilize tool or equipment.</p>	<p><b>4. L</b></p>
	<p>5. Excavation Cave In</p>	<p><b>5.</b> Barricade open excavations. Be aware of cave in potential. Competent person on site during activity. Contact local mark out. Authority to identify and mark underground utilities. Keep vehicles/equipment at sufficient distance from edge of excavation. Maintain proper slope for soil classification. Maintain spoils two feet from edge of excavation. Perform daily excavation/trench inspection. Provide access/egress to excavation. When an unknown hazard has been encountered, work will stop until hazards and controls are identified and in place.</p>	<p><b>5. M</b></p>

	<p>6. Exposed to vehicle traffic</p> <p>7. Exposure to high noise</p> <p>8. Exposure to high/low ambient temperatures</p> <p>9. Flying Debris</p> <p>10. Hand/Power tools</p> <p>11. Walking/Working surface</p>	<p><b>6.</b> Traffic in and out of the site must be maintained and orderly throughout the workday as needed. Traffic control required for any work where work is performed on/adjacent to an active street. Pedestrian traffic must be controlled. Flaggers/spotters assigned where necessary, by the Superintendent, to specifically control the flow of traffic in and out of the site. Traffic control flaggers must be courteous, professional, and alert at all times. Ground crew and flagger/spotters shall use safety reflective vest when working around active traffic and on site equipment. Drivers are to follow the direction of flaggers/spotters. Drivers are required to wear safety reflective vests whenever they are outside their vehicle. Drivers shall obey all safe-driving regulations, including wearing seat belts. Observe speed limit of 5 miles per hour onsite or other posted speeds limits. Site vehicles and trucks will be equipped with backup alarms. Signal personnel to use standard traffic control signals. NOTE: When driver is concerned about a location or condition that may cause an incident, injury, or property damage based on their knowledge as a driver and their equipment, the driver is to stop and review the situation with the superintendent and safety officer.</p> <p><b>7.</b> Wear appropriate PPE (i.e., ear plugs/muffs). Instruct personnel on use of hearing protection. Employees on hearing conservation program.</p> <p><b>8.</b> Discuss signs/symptoms of heat/cold stress. Conduct periodic safety briefs about heat/cold stress. If work takes place in cold weather: Dress properly and protect exposed skin when performing work outdoors. Workers should have extra clothing to change into if they get wet. Watch for symptoms of exposure. Drink warm liquids as needed. Monitor core temperatures of workers periodically throughout the workday. If work takes place in hot weather: Plan activity early in the day (if possible). Dress properly and protect exposed skin when performing work outdoors. Drink plenty of fluids and review the signs and symptoms of heat related illness. Rest as needed. Wear sunscreen and tinted safety glasses. Drink cool liquids as appropriate. Monitor core temperatures of workers periodically throughout the workday.</p> <p><b>9.</b> Ensure guards are installed and working on tools/equipment. Initiate dust control measures. Wear appropriate PPE (i.e., Safety glasses/goggles/faceshield).</p> <p><b>10.</b> Ensure personnel are trained on specific tools. Inspect tools before each use. Use correct tool for the job. Make use of all safety devices and ensure they are functioning.</p> <p><b>11.</b> Good housekeeping practices. Keep walkways and work</p>	<p><b>6. M</b></p> <p><b>7. L</b></p> <p><b>8. M</b></p> <p><b>9. M</b></p> <p><b>10. M</b></p> <p><b>11. L</b></p>
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	<p>12. Hand injuries from pinch points</p> <p>13. Falls from elevation</p> <p>14. Fire/Explosion</p> <p>15. Severe Weather</p> <p>16. Fueling operation</p>	<p>areas clear of hoses, cords, and clutter. Restrict site to essential personnel. Wear steel toe/composite boots.</p> <p><b>12.</b> Ensure site personnel utilize appropriate hand protection. Avoid placing hands in tight spaces while moving materials.</p> <p><b>13.</b> Personnel/workers shall not ride on moving equipment unless a seat with seatbelt is provided. Maintain three points of contact when climbing on or off equipment. Fall protection required when working from heights greater than 6 feet. Workers shall use the proper sized ladders or stairs to climb to a different height.</p> <p><b>14.</b> Fire extinguisher inspected and in place. It may be necessary to wet down work area when combustible material cannot be moved. Fire watch during and 30 minutes after hot work procedures. Obtain Hot Work Permit from SSHO for any activity that involves welding radiation, flashes, sparks, molten metal, and slag. Follow hot work permit procedures. No such activity will be permitted in the presence of explosive atmospheres. Use good housekeeping practices. All ignition sources shall be eliminated or protected.</p> <p><b>15.</b> Monitor weather for severe conditions. Discuss severe conditions with client rep and Superintendents when it poses a hazard to workers (i.e. Tornado warnings/watches, Thunderstorms, etc.)</p> <p><b>16.</b> All equipment will be shut down prior to fueling. Do not stage equipment in areas of high vegetation. Observe site smoking policies. Do not smoke during fueling operations. NOTE: Smoking is never permitted while in the Exclusion Zone! Fueling will be accomplished in well-ventilated areas away from ignition sources. Equipment and fuel tank do not need to be bonded or grounded if the metal nozzle is in contact with the metal of the equipment's fuel tank. Practice good housekeeping habits. Maintain spill response equipment, and ensure that the spill cleanup materials are compatible with materials to be cleaned up. Practice spill prevention at all times. Keep only enough materials on hand for use (to minimize potential amount to spill/leak). Perform proper chemical use and storage. Refer to MSDS for proper handling procedures, disposal, cleanup and PPE requirements. Keep a Spill Control and Countermeasures Plan in place, and review/update it periodically. Report all spills/leaks to the SSHO. If any spills/leaks occur, they will be contained, identified, and disposed of in accordance with Federal, State, and Local regulations.</p>	<p><b>12. M</b></p> <p><b>13. M</b></p> <p><b>14. M</b></p> <p><b>15. L</b></p> <p><b>16. M</b></p>
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<p>3. Site clearing and grubbing</p>	<p>1. Struck by/against heavy equipment</p> <p>2. Chemical spill</p> <p>3. Exposed to vehicle traffic</p> <p>4. Exposure to high noise</p> <p>5. Exposure to high/low ambient temperatures</p>	<p>1. Approach equipment within the operators view. Only qualified employees will be authorized to operate heavy equipment. Equipment properly secured when not in use. Equipped with operable backup alarms and seat belts. ROPS are required on all heavy equipment. Inspect equipment regularly. Flaggers/spotters assigned where necessary. Use safety reflective vest when working around equipment. Hand signal by ONE (1) DESIGNATED worker. Keep heavy equipment at least 10 feet from power lines. Follow EM 385 1-1 guidelines for power line requirements. Restrict pedestrian traffic. Do not walk, work, or stand near equipment being loaded or unloaded. Stay out of swing radius of equipment. For stationary equipment-rope off or guard swing radius.</p> <p>2. Good housekeeping practices. Maintain spill response equipment onsite. Practice spill prevention at all times. Proper chemical storage. Spill control and countermeasures plan in place for spills encountered during work activities. Turn off equipment when fuelling. Report all spills to the SSHO. Subcontractors to supply MSDSs for chemicals to be used.</p> <p>3. Traffic in and out of the site must be maintained and orderly throughout the workday as needed. Traffic control required for any work where work is performed on/adjacent to an active street. Pedestrian traffic must be controlled. Flaggers/spotters assigned where necessary, by the Superintendent, to specifically control the flow of traffic in and out of the site. Traffic control flaggers must be courteous, professional, and alert at all times. Ground crew and flagger/spotters shall use safety reflective vest when working around active traffic and on site equipment. Drivers are to follow the direction of flaggers/spotters. Drivers are required to wear safety reflective vests whenever they are outside their vehicle. Drivers shall obey all safe-driving regulations, including wearing seat belts. Observe speed limit of 15 miles per hour onsite or other posted speeds limits. Site vehicles and trucks will be equipped with backup alarms. Signal personnel to use standard traffic control signals. NOTE: When driver is concerned about a location or condition that may cause an incident, injury, or property damage based on their knowledge as a driver and their equipment, the driver is to stop and review the situation with the superintendent and safety officer.</p> <p>4. Wear appropriate PPE (i.e., ear plugs/muffs). Instruct personnel on use of hearing protection. Employees on hearing conservation program.</p> <p>5. Discuss signs/symptoms of heat/cold stress. Conduct periodic safety briefs about heat/cold stress. If work takes</p>	<p>1. <b>M</b></p> <p>2. <b>L</b></p> <p>3. <b>M</b></p> <p>4. <b>M</b></p> <p>5. <b>M</b></p>
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		place in cold weather: Dress properly and protect exposed skin when performing work outdoors. Workers should have extra clothing to change into if they get wet. Watch for symptoms of exposure. Drink warm liquids as needed. Monitor core temperatures of workers periodically throughout the workday. If work takes place in hot weather: Plan activity early in the day (if possible). Dress properly and protect exposed skin when performing work outdoors. Drink plenty of fluids and review the signs and symptoms of heat related illness. Rest as needed. Wear sunscreen and tinted safety glasses. Drink cool liquids as appropriate. Monitor core temperatures of workers periodically throughout the workday.	
	6. Flying Debris	6. Ensure guards are installed and working on tools/equipment. Initiate dust control measures. Wear appropriate PPE (i.e., Safety glasses/goggles/faceshield).	6. H
	7. Falls from elevation	7. Personnel/workers shall not ride on moving equipment unless a seat with seatbelt is provided. Maintain three points of contact when climbing on or off equipment. Fall protection required when working from heights greater than 6 feet. Workers shall use the proper sized ladders or stairs to climb to a different height.	7. L
	8. Walking/Working surface	8. Good housekeeping practices. Keep walkways and work areas clear of hoses, cords, and clutter. Restrict site to essential personnel. Wear steel toe/composite boots.	8. M
	9. Fire/Explosion	9. Fire extinguisher inspected and in place. It may be necessary to wet down work area when combustible material cannot be moved. Fire watch during and 30 minutes after hot work procedures. Obtain Hot Work Permit from SSHO for any activity that involves welding radiation, flashes, sparks, molten metal, and slag. Follow hot work permit procedures. No such activity will be permitted in the presence of explosive atmospheres. Use good housekeeping practices. All ignition sources shall be eliminated or protected.	9. M
	10. Severe Weather	10. Monitor weather for severe conditions. Discuss severe conditions with client rep and Superintendents when it poses a hazard to workers (i.e. Tornado warning/watch, Thunderstorm, Blizzard conditions, etc.)	10. L
	11. Hand/Power tools	11. Ensure personnel are trained on specific tools. Inspect tools before each use. Use correct tool for the job. Make use of all safety devices and ensure they are functioning.	11. M
	12. Fueling operation	12. All equipment will be shut down prior to fueling. Do not stage equipment in areas of high vegetation. Observe site smoking policies. Do not smoke during fueling operations. NOTE: Smoking is never permitted while in the Exclusion Zone! Fueling will be accomplished in well-ventilated areas	12. M

	<p>13. Biological (i.e., Plants, Insects, Snake, and Infectious Material)</p> <p>14. Chainsaw operation</p>	<p>away from ignition sources. Equipment and fuel tank do not need to be bonded or grounded if the metal nozzle is in contact with the metal of the equipment's fuel tank. Practice good housekeeping habits. Maintain spill response equipment, and ensure that the spill cleanup materials are compatible with materials to be cleaned up. Practice spill prevention at all times. Keep only enough materials on hand for use (to minimize potential amount to spill/leak). Perform proper chemical use and storage. Refer to MSDS for proper handling procedures, disposal, cleanup and PPE requirements. Keep a Spill Control and Countermeasures Plan in place, and review/update it periodically. Report all spills/leaks to the SSHO. If any spills/leaks occur, they will be contained, identified, and disposed of in accordance with Federal, State, and Local regulations</p> <p><b>13.</b> Avoid insect nest, spiders and spider webs, or likely habitats of snakes and use tick insect repellent. Check skin and clothing for tick periodically throughout the day. Use Wasp/Bee spray for nests. Use Poison Ivy Barrier cream in brush clearing activities. Use cool water and mild soap to wash of any oils. (Hot water opens skin pores, which allows increased contact with the irritating oils.) Use loud sounds to scare animals. Do NOT approach animals. Survey the area for biological hazards before commencing work. Avoid insect nests or likely habitats of snakes. Use appropriate insect repellants i.e., DEET for the insects. Check skin and clothing for ticks periodically throughout the day. Use wasp/bee spray for nests. Protect bare skin from poison ivy by wearing long sleeves. Use Poison Ivy Barrier cream in brush clearing activities. Use cool water and mild soap to wash off any oils. (Hot water opens skin pores, which allows increased contact with the irritating oils).</p> <p><b>14.</b> Workers operating the chainsaw will understand how the chainsaw works and will have experience using one. The chainsaw will be inspected prior to use and all guards will be attached and functioning properly. Dull blades will be replaced, as needed. Workers will be required to wear a hardhat, faceshield, safety glasses, hearing protection, gloves, and chaps while operating the chainsaw. The chainsaw will be turned off when fueling. Care will be taken to ensure fuel does not contact hot parts. Refer to the recommended controls for Fire/Explosion for more controls when working with flammable liquids.</p>	<p><b>13. M</b></p> <p><b>14. H</b></p>
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<p>4. Construction of support facility</p>	<p>1. Biological (i.e., Plants, Insects, Snake, and Infectious Material)</p> <p>2. Struck by/against heavy equipment</p> <p>3. Chemical spill</p> <p>4. Contact with sharp objects/material</p>	<p><b>1.</b> Avoid insect nest, spiders and spider webs, or likely habitats of snakes and use tick insect repellent. Check skin and clothing for tick periodically throughout the day. Use Wasp/Bee spray for nests. Use Poison Ivy Barrier cream in brush clearing activities. Use cool water and mild soap to wash of any oils. (Hot water opens skin pores, which allows increased contact with the irritating oils.). Use loud sounds to scare animals. Do NOT approach animals. Survey the area for biological hazards before commencing work. Avoid insect nests or likely habitats of snakes. Use appropriate insect repellants i.e., DEET for the insects. Check skin and clothing for ticks periodically throughout the day. Use wasp/bee spray for nests. Protect bare skin from poison ivy by wearing long sleeves. Use Poison Ivy Barrier cream in brush clearing activities. Use cool water and mild soap to wash off any oils. (Hot water opens skin pores, which allows increased contact with the irritating oils).</p> <p><b>2.</b> Approach equipment within the operators view. Only qualified employees will be authorized to operate heavy equipment. Equipment properly secured when not in use. Equipped with operable backup alarms and seat belts. ROPS are required on all heavy equipment. Inspect equipment regularly. Flaggers/spotters assigned where necessary. Use safety reflective vest when working around equipment. Hand signal by ONE (1) DESIGNATED worker. Keep heavy equipment at least 10 feet from power lines. Restrict pedestrian traffic. Do not walk, work, or stand near equipment being loaded or unloaded. Stay out of swing radius of equipment. For stationary equipment-rope off or guard swing radius.</p> <p><b>3.</b> Good housekeeping practices. Maintain spill response equipment onsite. Practice spill prevention at all times. Proper chemical storage. Spill control and countermeasures plan in place for spills encountered during work activities. Turn off equipment when fuelling. Report all spills to the SSHO. Subcontractors to supply MSDSs for chemicals to be used.</p> <p><b>4.</b> Ensure personnel are trained on specific tools. Use correct tool for the job. Make use of all safety devices and ensure they are functioning. Use care with utility knives, replace dull blades, store properly. Wear appropriate PPE (i.e., gloves, long-sleeved shirts and long pants) to avoid scratches. Be aware of body positioning, and ensure that tools are handled correctly. Take care to cut in a direction away from the body. Avoid placing hands in tight places while moving materials. Inspect tools before each use. If tool is not fit for use, report</p>	<p><b>1. M</b></p> <p><b>2. M</b></p> <p><b>3. M</b></p> <p><b>4. M</b></p>
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	<p>5. Excavation Cave In</p>	<p>the condition to SSHO, so that it will be taken out of service. If unsure about use of any tool ask SSHO before attempting to utilize tool or equipment.</p> <p><b>5.</b> Barricade open excavations. Be aware of cave in potential. Competent person on site during activity. Contact local mark out. Authority to identify and mark underground utilities. Keep vehicles/equipment at sufficient distance from edge of excavation. Maintain proper slope for soil classification. Maintain spoils two feet from edge of excavation. Perform daily excavation/trench inspection. Provide access/egress to excavation. When an unknown hazard has been encountered, work will stop until hazards and controls are identified and in place.</p>	<p><b>5. M</b></p>
	<p>6. Exposed to vehicle traffic</p>	<p><b>6.</b> Traffic in and out of the site must be maintained and orderly throughout the workday as needed. Traffic control required for any work where work is performed on/adjacent to an active street. Pedestrian traffic must be controlled. Flaggers/spotters assigned where necessary, by the Superintendent, to specifically control the flow of traffic in and out of the site. Traffic control flaggers must be courteous, professional, and alert at all times. Ground crew and flagger/spotters shall use safety reflective vest when working around active traffic and on site equipment. Drivers are to follow the direction of flaggers/spotters. Drivers are required to wear safety reflective vests whenever they are outside their vehicle. Drivers shall obey all safe-driving regulations, including wearing seat belts. Observe speed limit of 15 miles per hour onsite or other posted speeds limits. Site vehicles and trucks will be equipped with backup alarms. Signal personnel to use standard traffic control signals. NOTE: When driver is concerned about a location or condition that may cause an incident, injury, or property damage based on their knowledge as a driver and their equipment, the driver is to stop and review the situation with the superintendent and safety officer.</p>	<p><b>6. M</b></p>
	<p>7. Exposure to high noise</p>	<p><b>7.</b> Wear appropriate PPE (i.e., ear plugs/muffs). Instruct personnel on use of hearing protection. Employees on hearing conservation program.</p>	<p><b>7. M</b></p>
	<p>8. Exposure to high/low ambient temperatures</p>	<p><b>8.</b> Discuss signs/symptoms of heat/cold stress. Conduct periodic safety briefs about heat/cold stress. If work takes place in cold weather: Dress properly and protect exposed skin when performing work outdoors. Workers should have extra clothing to change into if they get wet. Watch for symptoms of exposure. Drink warm liquids as needed. Monitor core temperatures of workers periodically throughout the workday. If work takes place in hot weather: Plan activity early</p>	<p><b>8. M</b></p>

		in the day (if possible). Dress properly and protect exposed skin when performing work outdoors. Drink plenty of fluids and review the signs and symptoms of heat related illness. Rest as needed. Wear sunscreen and tinted safety glasses. Drink cool liquids as appropriate. Monitor core temperatures of workers periodically throughout the workday.	
	9. Flying Debris	<b>9.</b> Ensure guards are installed and working on tools/equipment. Initiate dust control measures. Wear appropriate PPE (i.e., Safety glasses/goggles/faceshield).	<b>9. M</b>
	10. Hand/Power tools	<b>10.</b> Ensure personnel are trained on specific tools. Inspect tools before each use. Use correct tool for the job. Make use of all safety devices and ensure they are functioning.	<b>10. M</b>
	11. Walking/Working surface	<b>11.</b> Good housekeeping practices. Keep walkways and work areas clear of hoses, cords, and clutter. Restrict site to essential personnel. Wear steel toe/composite boots.	<b>11. M</b>
	12. Hand injuries from pinch points	<b>12.</b> Ensure site personnel utilize appropriate hand protection. Avoid placing hands in tight spaces while moving materials.	<b>12. M</b>
	13. Falls from elevation	<b>13.</b> Personnel/workers shall not ride on moving equipment unless a seat with seatbelt is provided. Maintain three points of contact when climbing on or off equipment. Fall protection required when working from heights greater than 6 feet. Workers shall use the proper sized ladders or stairs to climb to a different height.	<b>13. M</b>
	14. Fire/Explosion	<b>14.</b> Fire extinguisher inspected and in place. It may be necessary to wet down work area when combustible material cannot be moved. Fire watch during and 30 minutes after hot work procedures. Obtain Hot Work Permit from SSHO for any activity that involves welding radiation, flashes, sparks, molten metal, and slag. Follow hot work permit procedures. No such activity will be permitted in the presence of explosive atmospheres. Use good housekeeping practices. All ignition sources shall be eliminated or protected.	<b>14. M</b>
	15. Severe Weather	<b>15.</b> Monitor weather for severe conditions. Discuss severe conditions with client rep and Superintendents when it poses a hazard to workers (i.e. Tornado watch/warning, Thunderstorm, Blizzard conditions, etc.)	<b>15. L</b>
	16. Fueling operation	<b>16.</b> All equipment will be shut down prior to fueling. Do not stage equipment in areas of high vegetation. Observe site smoking policies. Do not smoke during fueling operations. NOTE: Smoking is never permitted while in the Exclusion Zone! Fueling will be accomplished in well-ventilated areas away from ignition sources. Equipment and fuel tank do not need to be bonded or grounded if the metal nozzle is in contact with the metal of the equipment's fuel tank. Practice good housekeeping habits. Maintain spill response equipment,	<b>16. M</b>

	<p>17. Lockout/Tag-out</p> <p>18. Electrical work</p>	<p>and ensure that the spill cleanup materials are compatible with materials to be cleaned up. Practice spill prevention at all times. Keep only enough materials on hand for use (to minimize potential amount to spill/leak). Perform proper chemical use and storage. Refer to MSDS for proper handling procedures, disposal, cleanup and PPE requirements. Keep a Spill Control and Countermeasures Plan in place, and review/update it periodically. Report all spills/leaks to the SSHO. If any spills/leaks occur, they will be contained, identified, and disposed of in accordance with Federal, State, and Local regulations.</p> <p><b>17.</b> Equipment or circuits that are de-energized shall be rendered inoperative and have tags attached at all points where such equipment or circuits can be energized.</p> <p><b>18.</b> Work done by licensed electricians. Work done in compliance with National Electric Code and the contract specifications</p>	<p><b>17. H</b></p> <p><b>18. H</b></p>
<p>5. Construction of haul/ access road</p>	<p>1. Struck by/against heavy equipment</p> <p>2. Chemical spill</p> <p>3. Exposed to vehicle traffic</p>	<p><b>1.</b> Approach equipment within the operators view. Only qualified employees will be authorized to operate heavy equipment. Equipment properly secured when not in use. Equipped with operable backup alarms and seat belts. ROPS are required on all heavy equipment. Inspect equipment regularly. Flaggers/spotters assigned where necessary. Use safety reflective vest when working around equipment. Hand signal by ONE (1) DESIGNATED worker. Keep heavy equipment at least 10 feet from power lines. Restrict pedestrian traffic. Do not walk, work, or stand near equipment being loaded or unloaded. Stay out of swing radius of equipment. For stationary equipment-rope off or guard swing radius.</p> <p><b>2.</b> Good housekeeping practices. Maintain spill response equipment onsite. Practice spill prevention at all times. Proper chemical storage. Spill control and countermeasures plan in place for spills encountered during work activities. Turn off equipment when fuelling. Report all spills to the SSHO. Subcontractors to supply MSDSs for chemicals to be used.</p> <p><b>3.</b> Traffic in and out of the site must be maintained and orderly throughout the workday as needed. Traffic control required for any work where work is performed on/adjacent to an active street. Pedestrian traffic must be controlled. Flaggers/spotters assigned where necessary, by the Superintendent, to specifically control the flow of traffic in and out of the site. Traffic control flaggers must be courteous, professional, and alert at all times. Ground crew and flagger/spotters shall use</p>	<p><b>1. M</b></p> <p><b>2. M</b></p> <p><b>3. M</b></p>

	<p>4. Exposure to high noise</p> <p>5. Exposure to high/low ambient temperatures</p> <p>6. Flying Debris</p> <p>7. Falls from elevation</p> <p>8. Walking/Working surface</p> <p>9. Fire/Explosion</p>	<p>safety reflective vest when working around active traffic and on site equipment. Drivers are to follow the direction of flaggers/spotters. Drivers are required to wear safety reflective vests whenever they are outside their vehicle. Drivers shall obey all safe-driving regulations, including wearing seat belts. Observe speed limit of 15 miles per hour onsite or other posted speeds limits. Site vehicles and trucks will be equipped with backup alarms. Signal personnel to use standard traffic control signals. NOTE: When driver is concerned about a location or condition that may cause an incident, injury, or property damage based on their knowledge as a driver and their equipment, the driver is to stop and review the situation with the superintendent and safety officer.</p> <p><b>4.</b> Wear appropriate PPE (i.e., ear plugs/muffs). Instruct personnel on use of hearing protection. Employees on hearing conservation program.</p> <p><b>5.</b> Discuss signs/symptoms of heat/cold stress. Conduct periodic safety briefs about heat/cold stress. If work takes place in cold weather: Dress properly and protect exposed skin when performing work outdoors. Workers should have extra clothing to change into if they get wet. Watch for symptoms of exposure. Drink warm liquids as needed. Monitor core temperatures of workers periodically throughout the workday. If work takes place in hot weather: Plan activity early in the day (if possible). Dress properly and protect exposed skin when performing work outdoors. Drink plenty of fluids and review the signs and symptoms of heat related illness. Rest as needed. Wear sunscreen and tinted safety glasses. Drink cool liquids as appropriate. Monitor core temperatures of workers periodically throughout the workday.</p> <p><b>6.</b> Ensure guards are installed and working on tools/equipment. Initiate dust control measures. Wear appropriate PPE (i.e., Safety glasses/goggles/faceshield).</p> <p><b>7.</b> Personnel/workers shall not ride on moving equipment unless a seat with seatbelt is provided. Maintain three points of contact when climbing on or off equipment. Fall protection required when working from heights greater than 6 feet. Workers shall use the proper sized ladders or stairs to climb to a different height.</p> <p><b>8.</b> Good housekeeping practices. Keep walkways and work areas clear of hoses, cords, and clutter. Restrict site to essential personnel. Wear steel toe/composite boots.</p> <p><b>9.</b> Fire extinguisher inspected and in place. It may be necessary to wet down work area when combustible materiel cannot be moved. Fire watch during and 30 minutes after hot</p>	<p><b>4. L</b></p> <p><b>5. M</b></p> <p><b>6. M</b></p> <p><b>7. M</b></p> <p><b>8. M</b></p> <p><b>9. M</b></p>
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		for ticks periodically throughout the day. Use wasp/bee spray for nests. Protect bare skin from poison ivy by wearing long sleeves. Use Poison Ivy Barrier cream in brush clearing activities. Use cool water and mild soap to wash off any oils. (Hot water opens skin pores, which allows increased contact with the irritating oils).	
<b>Equipment to be Used</b>	<b>Training Requirements/Competent or Qualified Personnel name(s)</b>	<b>Inspection Requirements</b>	
<p>Level D PPE (Gloves, Safety Glasses, Work boots, Hardhat, Hi visibility clothing (Class II reflective apparel required when exposed to public vehicle traffic))</p> <p>Walkie Talkie Radios Tracked excavator Dump Trucks Bull dozer Mules/gators Misc. Hand tools (shovels, rakes, etc.) Chainsaw (Workers will be required to wear a hardhat, faceshield, safety glasses, hearing protection, gloves, and chaps while operating the chainsaw)</p>	<p>The SSHO shall be the Competent person for the following:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Fall Protection Program</li> <li><input type="checkbox"/> Respiratory Protection Program</li> <li><input type="checkbox"/> Hazardous Communication Program</li> <li><input type="checkbox"/> Confined Space Program</li> </ul> <p>The Superintendent shall be the competent or qualified person for the following:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Excavations</li> <li><input type="checkbox"/> General Operations</li> </ul> <p>Site Specific:</p> <ol style="list-style-type: none"> <li>1. OSHA HAZWOPER</li> <li>2. HTRW activity training</li> <li>3. Site specific</li> <li>4. Daily tailgate safety meetings at which the affected employees can voice their concerns and/or recommendations of the site-specific training requirements.</li> <li>5. Hazard communication</li> </ol> <p>Supervisory Personnel:</p> <ol style="list-style-type: none"> <li>1. OSHA supervisor's training</li> </ol> <p>Motor Vehicle:</p> <ol style="list-style-type: none"> <li>1. Operators shall hold a valid license for the type and class of vehicle they are operating.</li> </ol> <p>Heavy Equipment:</p> <ol style="list-style-type: none"> <li>1. Trained and qualified operators.</li> </ol> <p>Equipment General:</p> <ol style="list-style-type: none"> <li>1. Employees will be qualified and trained to operate or service mechanical equipment.</li> </ol>	<p>Site Inspection:</p> <ol style="list-style-type: none"> <li>1. Daily inspection by Health and Safety Officer</li> </ol> <p>Motor Vehicles:</p> <ol style="list-style-type: none"> <li>1. Before initial use vehicles will be inspected by a mechanic and found to be in a safe operating condition.</li> </ol> <p>Equipment:</p> <ol style="list-style-type: none"> <li>1. Before equipment is placed in use it will be inspected and tested by a competent person.</li> <li>2. Inspections and tests will be done in accordance with manufacturer's instructions.</li> <li>3. All equipment will be inspected daily when in use by the operator.</li> <li>4. Inspections and tests will be documented and records will be maintained at the site.</li> </ol> <p>Personal Protective Equipment (PPE):</p> <ol style="list-style-type: none"> <li>1. Disposal PPE shall be inspected before each use.</li> <li>2. Reusable PPE shall be inspected before use. Any defective PPE shall be repaired or replaced before use. All reusable PPE shall be decontaminated and stored properly before reuse.</li> </ol>	

# Activity Hazard Analysis (AHA)

Activity/Work Task: Site Tree Clearing	Overall Risk Assessment Code (RAC) (Use highest code)				<b>H</b>	
Project: Beech Creek Superfund Site	<b>Risk Assessment Code (RAC) Matrix</b>					
Project Location: Wayne County, Tennessee	<b>Severity</b>	<b>Probability</b>				
Date Prepared: April 20, 2015		Frequent	Likely	Occasional	Seldom	Unlikely
Prepared by (Name/Title): Paul Jung-Safety and Health Manager	Catastrophic	<b>E</b>	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>
	Critical	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>L</b>
<b>Notes:</b> (Field Notes, Review Comments, etc.)	Marginal	<b>H</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>L</b>
	Negligible	<b>M</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>
	Step 1: Review each <b>"Hazard"</b> with identified safety <b>"Controls"</b> and determine RAC (See above)					
	<b>"Probability"</b> is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.				<b>RAC Chart</b>	
<b>"Severity"</b> is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible				<b>E = Extremely High Risk</b>		
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.				<b>H = High Risk</b>		
				<b>M = Moderate Risk</b>		
				<b>L = Low Risk</b>		
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>			<b>RAC</b>	
1. Pre-job set up	1. Emergency Response	1. Rallying points. Notification of proper authorities in event of an emergency			1. L	
	2. Heavy equipment inspection	2. Only qualified employees will be authorized to operate heavy equipment. Equipment properly secured when not in use. Equipped with operable backup alarms and seat belts. ROPS are required on all heavy equipment. Inspect equipment daily.			2. L	
	3. Hand tool inspection	3. Ensure personnel are trained on specific tools. Inspect tools before each use. Use correct tool for the job. Make use of all safety devices and ensure they are functioning.			3. L	
2. Tree Clearing	1. Biological (i.e., Plants, Insects, Snake, and Infectious Material)	1. Avoid insect nest, spiders and spider webs, or likely habitats of snakes and use tick insect repellent. Check skin and clothing for tick periodically throughout the day. Use Wasp/Bee spray for nests. Use Poison Ivy Barrier cream in brush clearing activities. Use cool water and mild soap to wash of any oils. (Hot water opens skin pores, which allows increased contact with the irritating oils.). Use loud sounds to scare animals. Do NOT approach animals. Survey the area for biological hazards before commencing work. Avoid insect nests or likely habitats of snakes. Use appropriate insect repellents i.e., DEET for the insects. Check skin and clothing for ticks periodically throughout the day. Use wasp/bee spray			1. M	

	<p>2. Struck by/against heavy equipment</p> <p>3. Chemical spill</p> <p>4. Contact with sharp objects/material</p> <p>5. Truck loading</p> <p>6. Exposed to vehicle traffic</p>	<p>for nests. Protect bare skin from poison ivy by wearing long sleeves. Use Poison Ivy Barrier cream in brush clearing activities. Use cool water and mild soap to wash off any oils. (Hot water opens skin pores, which allows increased contact with the irritating oils).</p> <p><b>2.</b> Approach equipment within the operators view. Only qualified employees will be authorized to operate heavy equipment. Equipment properly secured when not in use. Equipped with operable backup alarms and seat belts. ROPS are required on all heavy equipment. Inspect equipment regularly. Flaggers/spotters assigned where necessary. Use safety reflective vest when working around equipment. Hand signal by ONE (1) DESIGNATED worker. Keep heavy equipment at least 10 feet from power lines. Restrict pedestrian traffic. Do not walk, work, or stand near equipment being loaded or unloaded. Stay out of swing radius of equipment. For stationary equipment-rope off or guard swing radius.</p> <p><b>3.</b> Good housekeeping practices. Maintain spill response equipment onsite. Practice spill prevention at all times. Proper chemical storage. Spill control and countermeasures plan in place for spills encountered during work activities. Turn off equipment when fuelling. Report all spills to the SSHO. Subcontractors to supply MSDSs for chemicals to be used.</p> <p><b>4.</b> Ensure personnel are trained on specific tools. Use correct tool for the job. Make use of all safety devices and ensure they are functioning. Use care with utility knives, replace dull blades, store properly. Wear appropriate PPE (i.e., gloves, long-sleeved shirts and long pants) to avoid scratches. Be aware of body positioning, and ensure that tools are handled correctly. Take care to cut in a direction away from the body. Avoid placing hands in tight places while moving materials. Inspect tools before each use. If tool is not fit for use, report the condition to SSHO, so that it will be taken out of service. If unsure about use of any tool ask SSHO before attempting to utilize tool or equipment.</p> <p><b>5.</b> Truck to be turned off before entering the bed to place liner. A ladder is to be used to access the truck bed. A spotter shall be used in lieu of a tie off to hold the ladder while in use. Do not stretch away from the ladder to undo hold down straps. Tyvek is to be worn while lining the truck bed to reduce personal contamination. Once truck bed is loaded, signal excavator operator that truck bed is clear and to commence loading.</p> <p><b>6.</b> Traffic in and out of the site must be maintained and orderly</p>	<p><b>2. M</b></p> <p><b>3. M</b></p> <p><b>4. M</b></p> <p><b>5. M</b></p> <p><b>6. M</b></p>
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	<p>7. Exposure to high noise</p> <p>8. Exposure to high/low ambient temperatures</p> <p>9. Flying Debris</p> <p>10. Hand/Power tools</p> <p>11. Walking/Working surface</p>	<p>throughout the workday as needed. Traffic control required for any work where work is performed on/adjacent to an active street. Pedestrian traffic must be controlled. Flaggers/spotters assigned where necessary, by the Superintendent, to specifically control the flow of traffic in and out of the site. Traffic control flaggers must be courteous, professional, and alert at all times. Ground crew and flagger/spotters shall use safety reflective vest when working around active traffic and on site equipment. Drivers are to follow the direction of flaggers/spotters. Drivers are required to wear safety reflective vests whenever they are outside their vehicle. Drivers shall obey all safe-driving regulations, including wearing seat belts. Observe speed limit of 5 miles per hour onsite or other posted speeds limits. Site vehicles and trucks will be equipped with backup alarms. Signal personnel to use standard traffic control signals. NOTE: When driver is concerned about a location or condition that may cause an incident, injury, or property damage based on their knowledge as a driver and their equipment, the driver is to stop and review the situation with the superintendent and safety officer.</p> <p><b>7.</b> Wear appropriate PPE (i.e., ear plugs/muffs). Instruct personnel on use of hearing protection. Employees on hearing conservation program.</p> <p><b>8.</b> Discuss signs/symptoms of heat/cold stress. Conduct periodic safety briefs about heat/cold stress. If work takes place in cold weather: Dress properly and protect exposed skin when performing work outdoors. Workers should have extra clothing to change into if they get wet. Watch for symptoms of exposure. Drink warm liquids as needed. Monitor core temperatures of workers periodically throughout the workday. If work takes place in hot weather: Plan activity early in the day (if possible). Dress properly and protect exposed skin when performing work outdoors. Drink plenty of fluids and review the signs and symptoms of heat related illness. Rest as needed. Wear sunscreen and tinted safety glasses. Drink cool liquids as appropriate. Monitor core temperatures of workers periodically throughout the workday.</p> <p><b>9.</b> Ensure guards are installed and working on tools/equipment. Initiate dust control measures. Wear appropriate PPE (i.e., Safety glasses/goggles/faceshield).</p> <p><b>10.</b> Ensure personnel are trained on specific tools. Inspect tools before each use. Use correct tool for the job. Make use of all safety devices and ensure they are functioning.</p> <p><b>11.</b> Good housekeeping practices. Keep walkways and work areas clear of hoses, cords, and clutter. Restrict site to</p>	<p><b>7. L</b></p> <p><b>8. M</b></p> <p><b>9. M</b></p> <p><b>10. M</b></p> <p><b>11. M</b></p>
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	<p>12. Hand injuries from pinch points</p> <p>13. Falls from elevation</p> <p>14. Fire/Explosion</p> <p>15. Severe Weather</p> <p>16. Fueling operation</p>	<p>essential personnel. Wear steal toe/composite boots. During winter, maintain work areas clear of accumulating snow or ice.</p> <p><b>12.</b> Ensure site personnel utilize appropriate hand protection. Avoid placing hands in tight spaces while moving materials.</p> <p><b>13.</b> Personnel/workers shall not ride on moving equipment unless a seat with seatbelt is provided. Maintain three points of contact when climbing on or off equipment. Fall protection required when working from heights greater than 6 feet. Workers shall use the proper sized ladders or stairs to climb to a different height.</p> <p><b>14.</b> Fire extinguisher inspected and in place. It may be necessary to wet down work area when combustible materiel cannot be moved. Fire watch during and 30 minutes after hot work procedures. Obtain Hot Work Permit (Open Flame Permit) from SSHO for any activity that involves welding radiation, flashes, sparks, molten metal, and slag. Follow hot work permit procedures. No such activity will be permitted in the presence of explosive atmospheres. Use good housekeeping practices. All ignition sources shall be eliminated or protected.</p> <p><b>15.</b> Monitor weather for severe conditions. Discuss severe conditions with the client and Superintendents when it poses a hazard to workers (i.e. Thunderstorm, etc.) Work suspended with lightning is within 20 minutes of the site, workers to seek shelter</p> <p><b>16.</b> All equipment will be shut down prior to fueling. Do not stage equipment in areas of high vegetation. Observe site smoking policies. Do not smoke during fueling operations. NOTE: Smoking is never permitted while in the Exclusion Zone! Fueling will be accomplished in well-ventilated areas away from ignition sources. Equipment and fuel tank do not need to be bonded or grounded if the metal nozzle is in contact with the metal of the equipment's fuel tank. Practice good housekeeping habits. Maintain spill response equipment, and ensure that the spill cleanup materials are compatible with materials to be cleaned up. Practice spill prevention at all times. Keep only enough materials onhand for use (to minimize potential amount to spill/leak). Perform proper chemical use and storage. Refer to MSDS for proper handling procedures, disposal, cleanup and PPE requirements. Keep a Spill Control and Countermeasures Plan in place, and review/update it periodically. Report all spills/leaks to the SSHO. If any spills/leaks occur, they will be contained, identified, and disposed of in accordance with Federal, State, and Local regulations.</p>	<p><b>12. M</b></p> <p><b>13. M</b></p> <p><b>14. M</b></p> <p><b>15. L</b></p> <p><b>16. M</b></p>
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	<p>17. Inhalation/contact with hazardous material</p> <p>18. Chainsaw operation</p>	<p><b>17.</b> Ensure site personnel have the appropriate HAZWOPER, medical clearance and Site Specific training. Follow decontamination procedures. Follow emergency contingency procedures. Implement site control areas. Perform real time air monitoring. Wear appropriate PPE for task/activity performed.</p> <p><b>18.</b> Workers operating the chainsaw will understand how the chainsaw works and will have experience using one. The chainsaw will be inspected prior to use and all guards will be attached and functioning properly. Dull blades will be replaced, as needed. Workers will be required to wear a hardhat, faceshield, safety glasses, hearing protection, gloves, and chaps while operating the chainsaw. The chainsaw will be turned off when fueling. Care will be taken to ensure fuel does not contact hot parts. Refer to the recommended controls for Fire/Explosion for more controls when working with flammable liquids.</p>	<p><b>17. M</b></p> <p><b>18. H</b></p>
<b>Equipment to be Used</b>	<b>Training Requirements/Competent or Qualified Personnel name(s)</b>	<b>Inspection Requirements</b>	
<p>Level D PPE (Gloves, Safety Glasses, Work boots, Hardhat, Hi visibility clothing (Class II reflective apparel required when exposed to public vehicle traffic))</p> <p>Modified Level D PPE to include: Hardhat, face shield, safety glasses (not store brand sunglasses), Hi visibility clothing (Class II reflective apparel required when exposed to public vehicle traffic, steel toe-work boots, (NO shorts, Tank Tops), Tyvek coveralls, and inner and outer nitrile gloves.</p> <p>Walkie Talkie Radios Tracked excavator Misc. Hand tools (shovels, rakes, etc.) Trucks End dumps (Moxy) Mules/gators Chainsaw (Workers will be required to wear a hardhat, faceshield, safety glasses, hearing protection, gloves, and chaps while operating the chainsaw) Lightning Detector</p>	<p>The SSHO shall be the Competent person for the following:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Fall Protection Program</li> <li><input type="checkbox"/> Respiratory Protection Program</li> <li><input type="checkbox"/> Hazardous Communication Program</li> <li><input type="checkbox"/> Confined Space Program</li> </ul> <p>The Superintendent shall be the competent or qualified person for the following:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Excavations</li> <li><input type="checkbox"/> General Operations</li> </ul> <p>Site Specific:</p> <ol style="list-style-type: none"> <li>1. OSHA HAZWOPER</li> <li>2. HTRW activity training</li> <li>3. Site specific</li> <li>4. Daily tailgate safety meetings at which the affected employees can voice their concerns and/or recommendations of the site-specific training requirements.</li> <li>5. Hazard communication</li> </ol> <p>Supervisory Personnel:</p>	<p>Site Inspection:</p> <ol style="list-style-type: none"> <li>1. Daily inspection by Health and Safety Officer</li> </ol> <p>Motor Vehicles:</p> <ol style="list-style-type: none"> <li>1. Before initial use vehicles will be inspected by a mechanic and found to be in a safe operating condition.</li> </ol> <p>Equipment:</p> <ol style="list-style-type: none"> <li>1. Before equipment is placed in use it will be inspected and tested by a competent person.</li> <li>2. Inspections and tests will be done in accordance with manufacturer's instructions.</li> <li>3. All equipment will be inspected daily when in use by the operator.</li> <li>4. Inspections and tests will be documented and records will be maintained at the site.</li> </ol>	

	<p>1. OSHA supervisor's training</p> <p>Motor Vehicle:</p> <p>1. Operators shall hold a valid license for the type and class of vehicle they are operating.</p> <p>Heavy Equipment:</p> <p>1. Trained and qualified operators.</p> <p>Equipment General:</p> <p>1. Employees will be qualified and trained to operate or service mechanical equipment</p>	<p>Personal Protective Equipment (PPE):</p> <p>1. Disposal PPE shall be inspected before each use.</p> <p>2. Reusable PPE shall be inspected before use. Any defective PPE shall be repaired or replaced before use. All reusable PPE shall be decontaminated and stored properly before reuse.</p>
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# Job Safety Analysis (JSA)

Activity/Work Task: Excavation	Overall Risk Assessment Code (RAC) (Use highest code)				<b>M</b>	
Project: Beech Creek Superfund Site	<b>Risk Assessment Code (RAC) Matrix</b>					
Project Location: Wayne County, Tennessee	<b>Severity</b>	<b>Probability</b>				
Date Prepared: April 20, 2015		Frequent	Likely	Occasional	Seldom	Unlikely
Prepared by (Name/Title): Paul Jung-Safety and Health Manager	Catastrophic	<b>E</b>	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>
	Critical	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>L</b>
<b>Notes:</b> (Field Notes, Review Comments, etc.)	Marginal	<b>H</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>L</b>
	Negligible	<b>M</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>
	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.				<b>RAC Chart</b>	
"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible				<b>E = Extremely High Risk</b>		
Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on JSA. Annotate the overall highest RAC at the top of JSA.				<b>H = High Risk</b>		
				<b>M = Moderate Risk</b>		
				<b>L = Low Risk</b>		
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>			<b>RAC</b>	
1. Pre-job set up	1. Emergency Response	1. Rallying points. Notification of proper authorities in event of an emergency			1. L	
	2. Heavy equipment inspection	2. Only qualified employees will be authorized to operate heavy equipment. Equipment properly secured when not in use. Equipped with operable backup alarms and seat belts. ROPS are required on all heavy equipment. Inspect equipment daily.			2. L	
	3. Hand tool inspection	3. Ensure personnel are trained on specific tools. Inspect tools before each use. Use correct tool for the job. Make use of all safety devices and ensure they are functioning.			3. L	
2. Excavation of material	1. Biological (i.e., Plants, Insects, Snake, and Infectious Material)	1. Avoid insect nest, spiders and spider webs, or likely habitats of snakes and use tick insect repellent. Check skin and clothing for tick periodically throughout the day. Use Wasp/Bee spray for nests. Use Poison Ivy Barrier cream in brush clearing activities. Use cool water and mild soap to wash of any oils. (Hot water opens skin pores, which allows increased contact with the irritating oils.). Use loud sounds to scare animals. Do NOT approach animals. Survey the area for biological hazards before commencing work. Avoid insect nests or likely habitats of snakes. Use appropriate insect repellents i.e., DEET to protect skin from insects and Repel Permanone (permethrins) or equivalent for clothing in tick			1. M	

	<p>2. Struck by/against heavy equipment</p> <p>3. Chemical spill</p> <p>4. Contact with sharp objects/material</p> <p>5. Exposed to vehicle traffic</p>	<p>infested areas. Check skin and clothing for ticks periodically throughout the day. Use wasp/bee spray for nests. Protect bare skin from poison ivy by wearing long sleeves. Use Poison Ivy Barrier cream in brush clearing activities. Use cool water and mild soap to wash off any oils. (Hot water opens skin pores, which allows increased contact with the irritating oils).</p> <p><b>2.</b> Approach equipment within the operators view. Only qualified employees will be authorized to operate heavy equipment. Equipment properly secured when not in use. Equipped with operable backup alarms and seat belts. ROPS are required on all heavy equipment. Inspect equipment regularly. Flaggers/spotters assigned where necessary. Use safety reflective vest when working around equipment. Hand signal by ONE (1) DESIGNATED worker. Keep heavy equipment at least 10 feet from power lines. Restrict pedestrian traffic. Do not walk, work, or stand near equipment being loaded or unloaded. Stay out of swing radius of equipment. For stationary equipment-rope off or guard swing radius.</p> <p><b>3.</b> Good housekeeping practices. Maintain spill response equipment onsite. Practice spill prevention at all times. Proper chemical storage. Spill control and countermeasures plan in place for spills encountered during work activities. Turn off equipment when fuelling. Report all spills to the SSHO. Subcontractors to supply MSDSs for chemicals to be used.</p> <p><b>4.</b> Ensure personnel are trained on specific tools. Use correct tool for the job. Make use of all safety devices and ensure they are functioning. Use care with utility knives, replace dull blades, store properly. Wear appropriate PPE (i.e., gloves, long-sleeved shirts and long pants) to avoid scratches. Be aware of body positioning, and ensure that tools are handled correctly. Take care to cut in a direction away from the body. Avoid placing hands in tight places while moving materials. Inspect tools before each use. If tool is not fit for use, report the condition to SSHO, so that it will be taken out of service. If unsure about use of any tool ask SSHO before attempting to utilize tool or equipment.</p> <p><b>5.</b> Traffic in and out of the site must be maintained and orderly throughout the workday as needed. Traffic control required for any work where work is performed on/adjacent to an active street. Pedestrian traffic must be controlled. Flaggers/spotters assigned where necessary, by the Superintendent, to specifically control the flow of traffic in and out of the site. Traffic control flaggers must be courteous, professional, and alert at all times. Ground crew and flagger/spotters shall use</p>	<p><b>2. M</b></p> <p><b>3.M</b></p> <p><b>4. L</b></p> <p><b>5. M</b></p>
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	<p>6. Exposure to high noise</p> <p>7. Exposure to high/low ambient temperatures</p> <p>8. Flying Debris</p> <p>9. Hand/Power tools</p> <p>10. Walking/Working surface</p> <p>11. Hand injuries from pinch points</p> <p>12. Falls from elevation</p>	<p>safety reflective vest when working around active traffic and on site equipment. Drivers are to follow the direction of flaggers/spotters. Drivers are required to wear safety reflective vests whenever they are outside their vehicle. Drivers shall obey all safe-driving regulations, including wearing seat belts. Site vehicles and trucks will be equipped with backup alarms. Signal personnel to use standard traffic control signals. NOTE: When driver is concerned about a location or condition that may cause an incident, injury, or property damage based on their knowledge as a driver and their equipment, the driver is to stop and review the situation with the superintendent and safety officer.</p> <p><b>6.</b> Wear appropriate PPE (i.e., ear plugs/muffs). Instruct personnel on use of hearing protection. Employees on hearing conservation program.</p> <p><b>7.</b> Discuss signs/symptoms of heat/cold stress. Conduct periodic safety briefs about heat/cold stress. If work takes place in cold weather: Dress properly and protect exposed skin when performing work outdoors. Workers should have extra clothing to change into if they get wet. Watch for symptoms of exposure. Drink warm liquids as needed. Monitor core temperatures of workers periodically throughout the workday. If work takes place in hot weather: Plan activity early in the day (if possible). Dress properly and protect exposed skin when performing work outdoors. Drink plenty of fluids and review the signs and symptoms of heat related illness. Rest as needed. Wear sunscreen and tinted safety glasses. Drink cool liquids as appropriate. Monitor core temperatures of workers periodically throughout the workday.</p> <p><b>8.</b> Ensure guards are installed and working on tools/equipment. Initiate dust control measures. Wear appropriate PPE (i.e., Safety glasses/goggles/faceshield).</p> <p><b>9.</b> Ensure personnel are trained on specific tools. Inspect tools before each use. Use correct tool for the job. Make use of all safety devices and ensure they are functioning.</p> <p><b>10.</b> Good housekeeping practices. Keep walkways and work areas clear of hoses, cords, and clutter. Restrict site to essential personnel. Wear steel toe/composite boots. During winter, maintain work areas clear of accumulating snow or ice.</p> <p><b>11.</b> Ensure site personnel utilize appropriate hand protection. Avoid placing hands in tight spaces while moving materials.</p> <p><b>12.</b> Personnel/workers shall not ride on moving equipment unless a seat with seatbelt is provided. Maintain three points of contact when climbing on or off equipment. Fall protection required when working from heights greater than 6 feet.</p>	<p><b>6. M</b></p> <p><b>7. L</b></p> <p><b>8. M</b></p> <p><b>9. M</b></p> <p><b>10.M</b></p> <p><b>11. M</b></p> <p><b>12. M</b></p>
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	<p>13. Fire/Explosion</p> <p>14. Severe Weather</p> <p>15. Excavation cave-in</p> <p>16. Fueling operation</p>	<p>Workers shall use the proper sized ladders or stairs to climb to a different height.</p> <p><b>13.</b> Fire extinguisher inspected and in place. It may be necessary to wet down work area when combustible materiel cannot be moved. Fire watch during and 30 minutes after hot work procedures. Obtain Hot Work Permit (Open Flame Permit) from SSHO for any activity that involves welding radiation, flashes, sparks, molten metal, and slag. Follow hot work permit procedures. No such activity will be permitted in the presence of explosive atmospheres. Use good housekeeping practices. All ignition sources shall be eliminated or protected.</p> <p><b>14.</b> Monitor weather for severe conditions. Discuss severe conditions with USACE and Superintendents when it poses a hazard to workers (i.e. Thunderstorm, tornadoes, etc.). Work suspended when storm is within 20 minutes of site. Workers to seek appropriate shelter. May resume work 30 minutes after last lightning strike or storm no longer localized to site.</p> <p><b>15.</b> Barricade open excavations. Be aware of cave in potential. Competent person on site during activity. Contact local mark out. Authority to identify and mark underground utilities. Keep vehicles/equipment at sufficient distance from edge of excavation. Maintain proper slope for soil classification. Maintain spoils two feet from edge of excavation. Perform daily excavation/trench inspection. Provide access/egress to excavation. When an unknown hazard has been encountered, work will stop until hazards and controls are identified and in place. Perry Novak (Superintendent) is the competent person for excavations. When persons will be in or around an excavation, a Competent Person shall inspect the excavation, the adjacent area and protective systems daily: before each work shift; throughout the work shifts as dictated by the work being done; after every rain storm; after events that could increase hazards, e.g., snowstorm, windstorm, thaw, earthquake, etc.; when fissures, tension cracks, sloughing, undercutting, water seepage, bulging at the bottom or similar conditions occur; when there is a change in size, location or placement of the spoil pile; and where there is any indication or change in adjacent structures.</p> <p><b>Note:</b> In excavations 4 feet or greater in depth, air in the excavation shall be tested prior to the start of each shift or more often if directed by the COR. A log or all test results shall be maintained at the work site.</p> <p><b>16.</b> All equipment will be shut down prior to fueling. Do not stage equipment in areas of high vegetation. Observe site</p>	<p><b>13.M</b></p> <p><b>14. L</b></p> <p><b>15. M</b></p> <p><b>16. M</b></p>
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	<p>17. Inhalation/contact with hazardous material</p> <p>18. Overhead transmission and distribution lines</p>	<p>smoking policies. Do not smoke during fueling operations. NOTE: Smoking is never permitted while in the Exclusion Zone! Fueling will be accomplished in well-ventilated areas away from ignition sources. Equipment and fuel tank do not need to be bonded or grounded if the metal nozzle is in contact with the metal of the equipment's fuel tank. Practice good housekeeping habits. Maintain spill response equipment, and ensure that the spill cleanup materials are compatible with materials to be cleaned up. Practice spill prevention at all times. Keep only enough materials on hand for use (to minimize potential amount to spill/leak). Perform proper chemical use and storage. Refer to MSDS for proper handling procedures, disposal, cleanup and PPE requirements. Keep a Spill Control and Countermeasures Plan in place, and review/update it periodically. Report all spills/leaks to the SSHO. If any spills/leaks occur, they will be contained, identified, and disposed of in accordance with Federal, State, and Local regulations.</p> <p><b>17.</b> Ensure site personnel have the appropriate HAZWOPER, medical clearance and Site Specific training. Follow decontamination procedures. Follow emergency contingency procedures. Implement site control areas. Perform real time air monitoring. Wear appropriate PPE for task/activity performed.</p> <p><b>18.</b> There are several overhead transmission and distribution lines at the Site. The two lines on the west side of the substation carry 34.5kV. The lines on the east side of the substation carry 4.2kV. The minimum required distance from these lines is 10 feet. Use line height measurement instrument to determine exact line height. Lines expand and contract with temperature changes. Line sag must be checked several times during the day as temperatures change. Use ground signs every 50 feet to alert workers and drivers of overhead lines</p>	<p><b>17. M</b></p> <p><b>18. M</b></p>
<p>3. Loading of truck</p>	<p>1. Biological (i.e., Plants, Insects, Snake, and Infectious Material)</p>	<p><b>1.</b> Avoid insect nest, spiders and spider webs, or likely habitats of snakes and use tick insect repellent. Check skin and clothing for tick periodically throughout the day. Use Wasp/Bee spray for nests. Use Poison Ivy Barrier cream in brush clearing activities. Use cool water and mild soap to wash of any oils. (Hot water opens skin pores, which allows increased contact with the irritating oils.) Use loud sounds to scare animals. Do NOT approach animals. Survey the area for biological hazards before commencing work. Avoid insect nests or likely habitats of snakes. Use appropriate insect repellants i.e., DEET for the insects. Check skin and clothing</p>	<p><b>1. M</b></p>

	<p>2. Struck by/against heavy equipment</p> <p>3. Chemical spill</p> <p>4. Contact with sharp objects/material</p> <p>5. Truck loading</p>	<p>for ticks periodically throughout the day. Use wasp/bee spray for nests. Protect bare skin from poison ivy by wearing long sleeves. Use Poison Ivy Barrier cream in brush clearing activities. Use cool water and mild soap to wash off any oils. (Hot water opens skin pores, which allows increased contact with the irritating oils).</p> <p><b>2.</b> Approach equipment within the operators view. Only qualified employees will be authorized to operate heavy equipment. Equipment properly secured when not in use. Equipped with operable backup alarms and seat belts. ROPS are required on all heavy equipment. Inspect equipment regularly. Flaggers/spotters assigned where necessary. Use safety reflective vest when working around equipment. Hand signal by ONE (1) DESIGNATED worker. Keep heavy equipment at least 10 feet from power lines. Follow EM 385 1-1 guidelines for power line requirements. Restrict pedestrian traffic. Do not walk, work, or stand near equipment being loaded or unloaded. Stay out of swing radius of equipment. For stationary equipment-rope off or guard swing radius.</p> <p><b>3.</b> Good housekeeping practices. Maintain spill response equipment onsite. Practice spill prevention at all times. Proper chemical storage. Spill control and countermeasures plan in place for spills encountered during work activities. Turn off equipment when fuelling. Report all spills to the SSHO. Subcontractors to supply MSDSs for chemicals to be used.</p> <p><b>4.</b> Ensure personnel are trained on specific tools. Use correct tool for the job. Make use of all safety devices and ensure they are functioning. Use care with utility knives, replace dull blades, store properly. Wear appropriate PPE (i.e., gloves, long-sleeved shirts and long pants) to avoid scratches. Be aware of body positioning, and ensure that tools are handled correctly. Take care to cut in a direction away from the body. Avoid placing hands in tight places while moving materials. Inspect tools before each use. If tool is not fit for use, report the condition to SSHO, so that it will be taken out of service.</p> <p><b>5.</b> Truck is to be turned off before entering the bed to install liner. A ladder with hooks is to be used to access the truck bed. A spotter shall be used in lieu of hooks or tie off to hold the ladder while in use. Ladder is to be used only for entry and egress. Do not stretch away from the ladder to undo hold down straps or climb sides of trucks. Tyvek is to be worn while lining the truck bed to reduce personal contamination. Once truck bed is lined, spotter will signal excavator operator that truck bed is clear of personnel and to commence loading. No persons shall stand along sides of truck while being loaded to</p>	<p><b>2. M</b></p> <p><b>3. M</b></p> <p><b>4. L</b></p> <p><b>5. H</b></p>
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	<p>6. Exposed to vehicle traffic</p> <p>7. Exposure to high noise</p> <p>8. Exposure to high/low ambient temperatures</p> <p>9. Flying Debris</p> <p>10. Hand/Power tools</p>	<p>avoid falling debris.</p> <p><b>6.</b> Traffic in and out of the site must be maintained and orderly throughout the workday as needed. Traffic control required for any work where work is performed on/adjacent to an active street. Pedestrian traffic must be controlled. Flaggers/spotters assigned where necessary, by the Superintendent, to specifically control the flow of traffic in and out of the site. Traffic control flaggers must be courteous, professional, and alert at all times. Ground crew and flagger/spotters shall use safety reflective vest when working around active traffic and on site equipment. Drivers are to follow the direction of flaggers/spotters. Drivers are required to wear safety reflective vests whenever they are outside their vehicle. Drivers shall obey all safe-driving regulations, including wearing seat belts. Observe speed limit of 5 miles per hour onsite or other posted speeds limits. Site vehicles and trucks will be equipped with backup alarms. Signal personnel to use standard traffic control signals. NOTE: When driver is concerned about a location or condition that may cause an incident, injury, or property damage based on their knowledge as a driver and their equipment, the driver is to stop and review the situation with the superintendent and safety officer.</p> <p><b>7.</b> Wear appropriate PPE (i.e., ear plugs/muffs). Instruct personnel on use of hearing protection. Employees on hearing conservation program.</p> <p><b>8.</b> Discuss signs/symptoms of heat/cold stress. Conduct periodic safety briefs about heat/cold stress. If work takes place in cold weather: Dress properly and protect exposed skin when performing work outdoors. Workers should have extra clothing to change into if they get wet. Watch for symptoms of exposure. Drink warm liquids as needed. Monitor core temperatures of workers periodically throughout the workday. If work takes place in hot weather: Plan activity early in the day (if possible). Dress properly and protect exposed skin when performing work outdoors. Drink plenty of fluids and review the signs and symptoms of heat related illness. Rest as needed. Wear sunscreen and tinted safety glasses. Drink cool liquids as appropriate. Monitor core temperatures of workers periodically throughout the workday.</p> <p><b>9.</b> Ensure guards are installed and working on tools/equipment. Initiate dust control measures. Wear appropriate PPE (i.e., Safety glasses/goggles/faceshield).</p> <p><b>10.</b> Ensure personnel are trained on specific tools. Inspect tools before each use. Use correct tool for the job. Make use of all safety devices and ensure they are functioning.</p>	<p><b>6. M</b></p> <p><b>7. L</b></p> <p><b>8. M</b></p> <p><b>9. M</b></p> <p><b>10. L</b></p>
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	<p>11. Walking/Working surface</p> <p>12. Hand injuries from pinch points</p> <p>13. Falls from elevation</p> <p>14. Fire/Explosion</p> <p>15. Severe Weather</p> <p>16. Fueling operation</p>	<p><b>11.</b> Good housekeeping practices. Keep walkways and work areas clear of hoses, cords, and clutter. Restrict site to essential personnel. Wear steel toe/composite boots. During winter, maintain work areas clear of accumulating snow or ice.</p> <p><b>12.</b> Ensure site personnel utilize appropriate hand protection. Avoid placing hands in tight spaces while moving materials.</p> <p><b>13.</b> Personnel/workers shall not ride on moving equipment unless a seat with seatbelt is provided. Maintain three points of contact when climbing on or off equipment. Fall protection required when working from heights greater than 6 feet. Workers shall use the proper sized ladders or stairs to climb to a different height.</p> <p><b>14.</b> Fire extinguisher inspected and in place. It may be necessary to wet down work area when combustible material cannot be moved. Fire watch during and 30 minutes after hot work procedures. Obtain Hot Work Permit (Open Flame Permit) from SSHO for any activity that involves welding radiation, flashes, sparks, molten metal, and slag. Follow hot work permit procedures. No such activity will be permitted in the presence of explosive atmospheres. Use good housekeeping practices. All ignition sources shall be eliminated or protected.</p> <p><b>15.</b> Monitor weather for severe conditions. Discuss severe conditions with USACE and Superintendents when it poses a hazard to workers (i.e. Thunderstorm, tornadoes, etc.). Work suspended when storm is within 20 minutes of site. Workers to seek appropriate shelter. May resume work 30 minutes after last lightning strike or storm no longer localized to site</p> <p><b>16.</b> All equipment will be shut down prior to fueling. Do not stage equipment in areas of high vegetation. Observe site smoking policies. Do not smoke during fueling operations. NOTE: Smoking is never permitted while in the Exclusion Zone! Fueling will be accomplished in well-ventilated areas away from ignition sources. Equipment and fuel tank do not need to be bonded or grounded if the metal nozzle is in contact with the metal of the equipment's fuel tank. Practice good housekeeping habits. Maintain spill response equipment, and ensure that the spill cleanup materials are compatible with materials to be cleaned up. Practice spill prevention at all times. Keep only enough materials on hand for use (to minimize potential amount to spill/leak). Perform proper chemical use and storage. Refer to MSDS for proper handling procedures, disposal, cleanup and PPE requirements. Keep a Spill Control and Countermeasures Plan in place, and review/update it periodically. Report all spills/leaks to the</p>	<p><b>11. M</b></p> <p><b>12. L</b></p> <p><b>13. M</b></p> <p><b>14. M</b></p> <p><b>15. L</b></p> <p><b>16. M</b></p>
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	<p>17. Inhalation/contact with hazardous material</p> <p>18. Overhead transmission and distribution lines</p>	<p>SSHO. If any spills/leaks occur, they will be contained, identified, and disposed of in accordance with Federal, State, and Local regulations.</p> <p><b>17.</b> Ensure site personnel have the appropriate HAZWOPER, medical clearance and Site Specific training. Follow decontamination procedures. Follow emergency contingency procedures. Implement site control areas. Perform real time air monitoring. Wear appropriate PPE for task/activity performed.</p> <p><b>18.</b> There are several overhead transmission and distribution lines at the Site. The two lines on the west side of the substation carry 34.5kV. The lines on the east side of the substation carry 4.2kV. The minimum required distance from these lines is 10 feet. Use line height measurement instrument to determine exact line height. Lines expand and contract with temperature changes. Line sag must be checked several times during the day as temperatures change. Use ground signs every 50 feet to alert workers and drivers of overhead lines</p>	<b>17. M</b>
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<b>Equipment to be Used</b>	<b>Training Requirements/Competent or Qualified Personnel name(s)</b>	<b>Inspection Requirements</b>
<p>Level D PPE (Gloves, Safety Glasses, Work boots, Hardhat, Hi visibility clothing (Class II reflective apparel required when exposed to public vehicle traffic)</p> <p>Modified Level D PPE to include: Hardhat, face shield, safety glasses (not store brand sunglasses), Hi visibility clothing (Class II reflective apparel required when exposed to public vehicle traffic, steel toe-work boots, (NO shorts, Tank Tops), Tyvek coveralls, and inner and outer nitrile gloves.</p> <p>Walkie Talkie Radios Tracked excavator Misc. Hand tools (shovels, rakes, etc.) Monitoring Instruments (PID and dust monitor) Dump Trucks</p> <p>Lightning detector</p>	<p>The SSHO shall be the Competent person for the following:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Fall Protection Program</li> <li><input type="checkbox"/> Respiratory Protection Program</li> <li><input type="checkbox"/> Hazardous Communication Program</li> <li><input type="checkbox"/> Confined Space Program</li> </ul> <p>The Superintendent shall be the competent or qualified person for the following:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Excavations</li> <li><input type="checkbox"/> General Operations</li> </ul> <p>Site Specific:</p> <ol style="list-style-type: none"> <li>1. OSHA HAZWOPER</li> <li>2. HTRW activity training</li> <li>3. Site specific</li> <li>4. Daily tailgate safety meetings at which the affected employees can voice their concerns and/or recommendations of the site-specific training requirements.</li> <li>5. Hazard communication</li> </ol> <p>Supervisory Personnel:</p>	<p>Site Inspection:</p> <ol style="list-style-type: none"> <li>1. Daily inspection by Health and Safety Officer</li> <li>2. Excavation inspection by the Competent Person as described in Excavation Cave In.</li> </ol> <p>Motor Vehicles:</p> <ol style="list-style-type: none"> <li>1. Before initial use vehicles will be inspected by a mechanic and found to be in a safe operating condition.</li> </ol> <p>Equipment:</p> <ol style="list-style-type: none"> <li>1. Before equipment is placed in use it will be inspected and tested by a competent person.</li> <li>2. Inspections and tests will be done in accordance with manufacturer's instructions.</li> <li>3. All equipment will be inspected daily when in use by the operator.</li> <li>4. Inspections and tests will be documented and records will be maintained at the site.</li> </ol>

	<p>1. OSHA supervisor's training</p> <p>Motor Vehicle:</p> <p>1. Operators shall hold a valid license for the type and class of vehicle they are operating.</p> <p>Heavy Equipment:</p> <p>1. Trained and qualified operators.</p> <p>Equipment General:</p> <p>1. Employees will be qualified and trained to operate or service mechanical equipment.</p>	<p>Personal Protective Equipment (PPE):</p> <p>1. Disposal PPE shall be inspected before each use.</p> <p>2. Reusable PPE shall be inspected before use. Any defective PPE shall be repaired or replaced before use. All reusable PPE shall be decontaminated and stored properly before reuse.</p>
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# Activity Hazard Analysis (AHA)

Activity/Work Task: Transportation & Disposal of Contaminated Material	Overall Risk Assessment Code (RAC) (Use highest code)				<b>M</b>	
Project: Beech Creek Superfund Site	<b>Risk Assessment Code (RAC) Matrix</b>					
Project Location: Wayne County, Tennessee	<b>Severity</b>	<b>Probability</b>				
Date Prepared: April 20, 2015		Frequent	Likely	Occasional	Seldom	Unlikely
Prepared by (Name/Title): Paul Jung-Safety and Health Manager	Catastrophic	<b>E</b>	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>
<b>Notes:</b> (Field Notes, Review Comments, etc.)	Critical	<b>E</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>L</b>
	Marginal	<b>H</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>L</b>
	Negligible	<b>M</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>
	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.					<b>RAC Chart</b>	
"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible					<b>E = Extremely High Risk</b>	
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.					<b>H = High Risk</b>	
					<b>M = Moderate Risk</b>	
					<b>L = Low Risk</b>	
<b>Job Steps</b>	<b>Hazards</b>	<b>Controls</b>				<b>RAC</b>
1. Pre-job set up	1. Emergency Response	<b>1.</b> Rallying points. Notification of proper authorities in event of an emergency <b>2.</b> Only qualified employees will be authorized to operate heavy equipment. Equipment properly secured when not in use. Equipped with operable backup alarms and seat belts. ROPS are required on all heavy equipment. Inspect equipment daily. <b>3.</b> Ensure personnel are trained on specific tools. Inspect tools before each use. Use correct tool for the job. Make use of all safety devices and ensure they are functioning.				<b>1. L</b>
	2. Heavy equipment inspection					<b>2. L</b>
	3. Hand tool inspection					<b>3. L</b>
2. Loading of truck	1. Biological (i.e., Plants, Insects, Snake, and Infectious Material)	<b>1.</b> Avoid insect nest, spiders and spider webs, or likely habitats of snakes and use tick insect repellent. Check skin and clothing for tick periodically throughout the day. Use Wasp/Bee spray for nests. Use Poison Ivy Barrier cream in brush clearing activities. Use cool water and mild soap to wash of any oils. (Hot water opens skin pores, which allows increased contact with the irritating oils.) Use loud sounds to scare animals. Do NOT approach animals. Survey the area for biological hazards before commencing work. Avoid insect nests or likely habitats of snakes. Use appropriate insect repellents i.e., DEET for the insects. Check skin and clothing for ticks periodically throughout the day. Use wasp/bee spray				<b>1. M</b>

	<p>2. Struck by/against heavy equipment</p> <p>3. Chemical spill</p> <p>4. Contact with sharp objects/material</p> <p>5. Truck loading</p> <p>6. Exposed to vehicle traffic</p>	<p>for nests. Protect bare skin from poison ivy by wearing long sleeves. Use Poison Ivy Barrier cream in brush clearing activities. Use cool water and mild soap to wash off any oils. (Hot water opens skin pores, which allows increased contact with the irritating oils).</p> <p><b>2.</b> Approach equipment within the operators view. Only qualified employees will be authorized to operate heavy equipment. Equipment properly secured when not in use. Equipped with operable backup alarms and seat belts. ROPS are required on all heavy equipment. Inspect equipment regularly. Flaggers/spotters assigned where necessary. Use safety reflective vest when working around equipment. Hand signal by ONE (1) DESIGNATED worker. Keep heavy equipment at least 10 feet from power lines. Follow EM 385 1-1 guidelines for power line requirements. Restrict pedestrian traffic. Do not walk, work, or stand near equipment being loaded or unloaded. Stay out of swing radius of equipment. For stationary equipment-rope off or guard swing radius.</p> <p><b>3.</b> Good housekeeping practices. Maintain spill response equipment onsite. Practice spill prevention at all times. Proper chemical storage. Spill control and countermeasures plan in place for spills encountered during work activities. Turn off equipment when fuelling. Report all spills to the SSHO. Subcontractors to supply MSDSs for chemicals to be used.</p> <p><b>4.</b> Ensure personnel are trained on specific tools. Use correct tool for the job. Make use of all safety devices and ensure they are functioning. Use care with utility knives, replace dull blades, store properly. Wear appropriate PPE (i.e., gloves, long-sleeved shirts and long pants) to avoid scratches. Be aware of body positioning, and ensure that tools are handled correctly. Take care to cut in a direction away from the body. Avoid placing hands in tight places while moving materials. Inspect tools before each use. If tool is not fit for use, report the condition to SSHO, so that it will be taken out of service. If unsure about use of any tool ask SSHO before attempting to utilize tool or equipment.</p> <p><b>5.</b> Truck to be turned off before entering the bed to place liner. A ladder is to be used to access the truck bed. A spotter shall be used in lieu of a tie off to hold the ladder while in use. Do not stretch away from the ladder to undo hold down straps. Tyvek is to be worn while lining the truck bed to reduce personal contamination. Once truck bed is loaded, signal excavator operator that truck bed is clear and to commence loading.</p> <p><b>6.</b> Traffic in and out of the site must be maintained and orderly</p>	<p><b>2. M</b></p> <p><b>3. M</b></p> <p><b>4. L</b></p> <p><b>5. M</b></p> <p><b>6. M</b></p>
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	<p>7. Exposure to high noise</p> <p>8. Exposure to high/low ambient temperatures</p> <p>9. Flying Debris</p> <p>10. Hand/Power tools</p> <p>11. Walking/Working surface</p>	<p>throughout the workday as needed. Traffic control required for any work where work is performed on/adjacent to an active street. Pedestrian traffic must be controlled. Flaggers/spotters assigned where necessary, by the Superintendent, to specifically control the flow of traffic in and out of the site. Traffic control flaggers must be courteous, professional, and alert at all times. Ground crew and flagger/spotters shall use safety reflective vest when working around active traffic and on site equipment. Drivers are to follow the direction of flaggers/spotters. Drivers are required to wear safety reflective vests whenever they are outside their vehicle. Drivers shall obey all safe-driving regulations, including wearing seat belts. Observe speed limit of 5 miles per hour onsite or other posted speeds limits. Site vehicles and trucks will be equipped with backup alarms. Signal personnel to use standard traffic control signals. NOTE: When driver is concerned about a location or condition that may cause an incident, injury, or property damage based on their knowledge as a driver and their equipment, the driver is to stop and review the situation with the superintendent and safety officer.</p> <p><b>7.</b> Wear appropriate PPE (i.e., ear plugs/muffs). Instruct personnel on use of hearing protection. Employees on hearing conservation program.</p> <p><b>8.</b> Discuss signs/symptoms of heat/cold stress. Conduct periodic safety briefs about heat/cold stress. If work takes place in cold weather: Dress properly and protect exposed skin when performing work outdoors. Workers should have extra clothing to change into if they get wet. Watch for symptoms of exposure. Drink warm liquids as needed. Monitor core temperatures of workers periodically throughout the workday. If work takes place in hot weather: Plan activity early in the day (if possible). Dress properly and protect exposed skin when performing work outdoors. Drink plenty of fluids and review the signs and symptoms of heat related illness. Rest as needed. Wear sunscreen and tinted safety glasses. Drink cool liquids as appropriate. Monitor core temperatures of workers periodically throughout the workday.</p> <p><b>9.</b> Ensure guards are installed and working on tools/equipment. Initiate dust control measures. Wear appropriate PPE (i.e., Safety glasses/goggles/faceshield).</p> <p><b>10.</b> Ensure personnel are trained on specific tools. Inspect tools before each use. Use correct tool for the job. Make use of all safety devices and ensure they are functioning.</p> <p><b>11.</b> Good housekeeping practices. Keep walkways and work areas clear of hoses, cords, and clutter. Restrict site to</p>	<p><b>7. L</b></p> <p><b>8. M</b></p> <p><b>9. M</b></p> <p><b>10. L</b></p> <p><b>11. M</b></p>
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	<p>12. Hand injuries from pinch points</p> <p>13. Falls from elevation</p> <p>14. Fire/Explosion</p> <p>15. Severe Weather</p> <p>16. Fueling operation</p>	<p>essential personnel. Wear steel toe/composite boots. During winter, maintain work areas clear of accumulating snow or ice.</p> <p><b>12.</b> Ensure site personnel utilize appropriate hand protection. Avoid placing hands in tight spaces while moving materials.</p> <p><b>13.</b> Personnel/workers shall not ride on moving equipment unless a seat with seatbelt is provided. Maintain three points of contact when climbing on or off equipment. Fall protection required when working from heights greater than 6 feet. Workers shall use the proper sized ladders or stairs to climb to a different height.</p> <p><b>14.</b> Fire extinguisher inspected and in place. It may be necessary to wet down work area when combustible material cannot be moved. Fire watch during and 30 minutes after hot work procedures. Obtain Hot Work Permit (Open Flame Permit) from SSHO for any activity that involves welding radiation, flashes, sparks, molten metal, and slag. Follow hot work permit procedures. No such activity will be permitted in the presence of explosive atmospheres. Use good housekeeping practices. All ignition sources shall be eliminated or protected.</p> <p><b>15.</b> Monitor weather for severe conditions. Discuss severe conditions with USACE and Superintendents when it poses a hazard to workers (i.e. Thunderstorm, tornadoes, etc.). Work suspended when storm is within 20 minutes of site. Workers to seek appropriate shelter. May resume work 30 minutes after last lightning strike or storm no longer localized to site.</p> <p><b>16.</b> All equipment will be shut down prior to fueling. Do not stage equipment in areas of high vegetation. Observe site smoking policies. Do not smoke during fueling operations. NOTE: Smoking is never permitted while in the Exclusion Zone! Fueling will be accomplished in well-ventilated areas away from ignition sources. Equipment and fuel tank do not need to be bonded or grounded if the metal nozzle is in contact with the metal of the equipment's fuel tank. Practice good housekeeping habits. Maintain spill response equipment, and ensure that the spill cleanup materials are compatible with materials to be cleaned up. Practice spill prevention at all times. Keep only enough materials onhand for use (to minimize potential amount to spill/leak). Perform proper chemical use and storage. Refer to MSDS for proper handling procedures, disposal, cleanup and PPE requirements. Keep a Spill Control and Countermeasures Plan in place, and review/update it periodically. Report all spills/leaks to the SSHO. If any spills/leaks occur, they will be contained, identified, and disposed of in accordance with Federal, State,</p>	<p><b>12. M</b></p> <p><b>13. M</b></p> <p><b>14. M</b></p> <p><b>15. L</b></p> <p><b>16. M</b></p>
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	<p>17. Inhalation/contact with hazardous material</p>	<p>and Local regulations.  17. Ensure site personnel have the appropriate HAZWOPER, medical clearance and Site Specific training. Follow decontamination procedures. Follow emergency contingency procedures. Implement site control areas. Perform real time air monitoring. Wear appropriate PPE for task/activity performed.</p>	<p><b>17. M</b></p>
<p>3. Weighing/ Manifesting of truck</p>	<p>1. Struck by/against heavy equipment</p> <p>2. Chemical spill</p> <p>3. Exposed to vehicle traffic</p>	<p><b>1.</b> Approach equipment within the operators view. Only qualified employees will be authorized to operate heavy equipment. Equipment properly secured when not in use. Equipped with operable backup alarms and seat belts. ROPS are required on all heavy equipment. Inspect equipment regularly. Flaggers/spotters assigned where necessary. Use safety reflective vest when working around equipment. Hand signal by ONE (1) DESIGNATED worker. Keep heavy equipment at least 10 feet from power lines. Restrict pedestrian traffic. Do not walk, work, or stand near equipment being loaded or unloaded. Stay out of swing radius of equipment. For stationary equipment-rope off or guard swing radius.</p> <p><b>2.</b> Good housekeeping practices. Maintain spill response equipment onsite. Practice spill prevention at all times. Proper chemical storage. Spill control and countermeasures plan in place for spills encountered during work activities. Turn off equipment when fuelling. Report all spills to the SSHO. Subcontractors to supply MSDSs for chemicals to be used.</p> <p><b>3.</b> Traffic in and out of the site must be maintained and orderly throughout the workday as needed. Traffic control required for any work where work is performed on/adjacent to an active street. Pedestrian traffic must be controlled. Flaggers/spotters assigned where necessary, by the Superintendent, to specifically control the flow of traffic in and out of the site. Traffic control flaggers must be courteous, professional, and alert at all times. Ground crew and flagger/spotters shall use safety reflective vest when working around active traffic and on site equipment. Drivers are to follow the direction of flaggers/spotters. Drivers are required to wear safety reflective vests whenever they are outside their vehicle. Drivers shall obey all safe-driving regulations, including wearing seat belts. Observe speed limit of 5 miles per hour onsite or other posted speeds limits. Site vehicles and trucks will be equipped with backup alarms. Signal personnel to use standard traffic control signals. NOTE: When driver is concerned about a location or condition that may cause an incident, injury, or property damage based on their knowledge as a driver and their</p>	<p><b>1. M</b></p> <p><b>2. M</b></p> <p><b>3. M</b></p>

	<p>4. Exposure to high noise</p> <p>5. Exposure to high/low ambient temperatures</p> <p>6. Falls from elevation</p> <p>7. Walking/Working surface</p> <p>8. Fire/Explosion</p> <p>9. Severe Weather</p>	<p>equipment, the driver is to stop and review the situation with the superintendent and safety officer.</p> <p><b>4.</b> Wear appropriate PPE (i.e., ear plugs/muffs). Instruct personnel on use of hearing protection. Employees on hearing conservation program.</p> <p><b>5.</b> Discuss signs/symptoms of heat/cold stress. Conduct periodic safety briefs about heat/cold stress. If work takes place in cold weather: Dress properly and protect exposed skin when performing work outdoors. Workers should have extra clothing to change into if they get wet. Watch for symptoms of exposure. Drink warm liquids as needed. Monitor core temperatures of workers periodically throughout the workday. If work takes place in hot weather: Plan activity early in the day (if possible). Dress properly and protect exposed skin when performing work outdoors. Drink plenty of fluids and review the signs and symptoms of heat related illness. Rest as needed. Wear sunscreen and tinted safety glasses. Drink cool liquids as appropriate. Monitor core temperatures of workers periodically throughout the workday.</p> <p><b>6.</b> Personnel/workers shall not ride on moving equipment unless a seat with seatbelt is provided. Maintain three points of contact when climbing on or off equipment. Fall protection required when working from heights greater than 6 feet. Workers shall use the proper sized ladders or stairs to climb to a different height.</p> <p><b>7.</b> Good housekeeping practices. Keep walkways and work areas clear of hoses, cords, and clutter. Restrict site to essential personnel. Wear steel toe/composite boots. During winter, maintain work areas clear of accumulating snow or ice.</p> <p><b>8.</b> Fire extinguisher inspected and in place. It may be necessary to wet down work area when combustible material cannot be moved. Fire watch during and 30 minutes after hot work procedures. Obtain Hot Work Permit (Open Flame Permit) from SSHO for any activity that involves welding radiation, flashes, sparks, molten metal, and slag. Follow hot work permit procedures. No such activity will be permitted in the presence of explosive atmospheres. Use good housekeeping practices. All ignition sources shall be eliminated or protected.</p> <p><b>9.</b> Monitor weather for severe conditions. Discuss severe conditions with USACE and Superintendents when it poses a hazard to workers (i.e. Thunderstorm, tornadoes, etc.). Work suspended when storm is within 20 minutes of site. Workers to seek appropriate shelter. May resume work 30 minutes after last lightning strike or storm no longer localized to site</p>	<p><b>4. L</b></p> <p><b>5. M</b></p> <p><b>6. M</b></p> <p><b>7. M</b></p> <p><b>8. M</b></p> <p><b>9. L</b></p>
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<p>4. Tarping of truck</p>	<p>1. Struck by/against heavy equipment</p> <p>2. Exposed to vehicle traffic</p> <p>3. Exposure to high noise</p> <p>4. Exposure to high/low ambient temperatures</p>	<p><b>1.</b> Approach equipment within the operators view. Only qualified employees will be authorized to operate heavy equipment. Equipment properly secured when not in use. Equipped with operable backup alarms and seat belts. ROPS are required on all heavy equipment. Inspect equipment regularly. Flaggers/spotters assigned where necessary. Use safety reflective vest when working around equipment. Hand signal by ONE (1) DESIGNATED worker. Keep heavy equipment at least 10 feet from power lines. Restrict pedestrian traffic. Do not walk, work, or stand near equipment being loaded or unloaded. Stay out of swing radius of equipment. For stationary equipment-rope off or guard swing radius.</p> <p><b>2.</b> Traffic in and out of the site must be maintained and orderly throughout the workday as needed. Traffic control required for any work where work is performed on/adjacent to an active street. Pedestrian traffic must be controlled. Flaggers/spotters assigned where necessary, by the Superintendent, to specifically control the flow of traffic in and out of the site. Traffic control flaggers must be courteous, professional, and alert at all times. Ground crew and flagger/spotters shall use safety reflective vest when working around active traffic and on site equipment. Drivers are to follow the direction of flaggers/spotters. Drivers are required to wear safety reflective vests whenever they are outside their vehicle. Drivers shall obey all safe-driving regulations, including wearing seat belts. Observe speed limit of 5 miles per hour onsite or other posted speeds limits. Site vehicles and trucks will be equipped with backup alarms. Signal personnel to use standard traffic control signals. NOTE: When driver is concerned about a location or condition that may cause an incident, injury, or property damage based on their knowledge as a driver and their equipment, the driver is to stop and review the situation with the superintendent and safety officer.</p> <p><b>3.</b> Wear appropriate PPE (i.e., ear plugs/muffs). Instruct personnel on use of hearing protection. Employees on hearing conservation program.</p> <p><b>4.</b> Discuss signs/symptoms of heat/cold stress. Conduct periodic safety briefs about heat/cold stress. If work takes place in cold weather: Dress properly and protect exposed skin when performing work outdoors. Workers should have extra clothing to change into if they get wet. Watch for symptoms of exposure. Drink warm liquids as needed. Monitor core temperatures of workers periodically throughout the workday. If work takes place in hot weather: Plan activity early</p>	<p><b>1. M</b></p> <p><b>2. M</b></p> <p><b>3. L</b></p> <p><b>4. M</b></p>
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	<p>5. Flying Debris</p> <p>6. Walking/Working surface</p> <p>7. Tarping</p> <p>8. Severe Weather</p> <p>9. Hand/Power tools</p> <p>10. Inhalation/contact with hazardous material</p>	<p>in the day (if possible). Dress properly and protect exposed skin when performing work outdoors. Drink plenty of fluids and review the signs and symptoms of heat related illness. Rest as needed. Wear sunscreen and tinted safety glasses. Drink cool liquids as appropriate. Monitor core temperatures of workers periodically throughout the workday.</p> <p><b>5.</b> Ensure guards are installed and working on tools/equipment. Initiate dust control measures. Wear appropriate PPE (i.e., Safety glasses/goggles/faceshield).</p> <p><b>6.</b> Good housekeeping practices. Keep walkways and work areas clear of hoses, cords, and clutter. Restrict site to essential personnel. Wear steel toe/composite boots. During winter, maintain work areas clear of accumulating snow or ice.</p> <p><b>7.</b> After the truck is loaded and manifested, the ground personnel will cover the truck bed. The tarp is unfurled by the truck driver. The tarp is secured by a workers standing on an elevated platform. Hold-down straps are reconnected. Once truck exits the loading area, the driver will stop, turn off truck, and inspect truck to assure that the tailgate is closed, the automatic lock is engaged, and hand load locks are dogged off properly. The driver will also check that the truck has the correct placards for the waste being hauled</p> <p><b>8.</b> Monitor weather for severe conditions. Discuss severe conditions with USACE and Superintendents when it poses a hazard to workers (i.e. Thunderstorm, tornadoes, etc.). Work suspended when storm is within 20 minutes of site. Workers to seek appropriate shelter. May resume work 30 minutes after last lightning strike or storm no longer localized to site.</p> <p><b>9.</b> Ensure personnel are trained on specific tools. Inspect tools before each use. Use correct tool for the job. Make use of all safety devices and ensure they are functioning.</p> <p><b>10.</b> Ensure site personnel have the appropriate HAZWOPER, medical clearance and Site Specific training. Follow decontamination procedures. Follow emergency contingency procedures. Implement site control areas. Perform real time air monitoring. Wear appropriate PPE for task/activity performed.</p>	<p><b>5. L</b></p> <p><b>6. M</b></p> <p><b>7. M</b></p> <p><b>8. M</b></p> <p><b>9. L</b></p> <p><b>10. M</b></p>
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Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
<p>Level D PPE (Gloves, Safety Glasses, Work boots, Hardhat, Hi visibility clothing (Class II reflective apparel required when exposed to public vehicle traffic)</p> <p>Modified Level D PPE to include: Hardhat, face shield, safety glasses (not store brand sunglasses), Hi visibility clothing (Class II reflective apparel required when exposed to public vehicle traffic), steel toe-work boots, (NO shorts, Tank Tops), Tyvek coveralls, and inner and outer nitrile gloves.</p> <p>Walkie Talkie Radios Tracked excavator Misc. Hand tools (shovels, rakes, etc.) Ladders Monitoring Instruments (dust monitor) Trucks Hoses</p> <p>Lightning detector</p>	<p>The SSHO shall be the Competent person for the following:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Fall Protection Program</li> <li><input type="checkbox"/> Respiratory Protection Program</li> <li><input type="checkbox"/> Hazardous Communication Program</li> <li><input type="checkbox"/> Confined Space Program</li> </ul> <p>The Superintendent shall be the competent or qualified person for the following:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Excavations</li> <li><input type="checkbox"/> General Operations</li> </ul> <p>Site Specific:</p> <ol style="list-style-type: none"> <li>1. OSHA HAZWOPER</li> <li>2. HTRW activity training</li> <li>3. Site specific</li> <li>4. Daily tailgate safety meetings at which the affected employees can voice their concerns and/or recommendations of the site-specific training requirements.</li> <li>5. Hazard communication</li> </ol> <p>Supervisory Personnel:</p> <ol style="list-style-type: none"> <li>1. OSHA supervisor's training</li> </ol> <p>Motor Vehicle:</p> <ol style="list-style-type: none"> <li>1. Operators shall hold a valid license for the type and class of vehicle they are operating.</li> </ol> <p>Heavy Equipment:</p> <ol style="list-style-type: none"> <li>1. Trained and qualified operators.</li> </ol> <p>Equipment General:</p> <ol style="list-style-type: none"> <li>1. Employees will be qualified and trained to operate or service mechanical equipment.</li> </ol>	<p>Site Inspection:</p> <ol style="list-style-type: none"> <li>1. Daily inspection by Health and Safety Officer</li> </ol> <p>Motor Vehicles:</p> <ol style="list-style-type: none"> <li>1. Before initial use vehicles will be inspected by a mechanic and found to be in a safe operating condition.</li> </ol> <p>Equipment:</p> <ol style="list-style-type: none"> <li>1. Before equipment is placed in use it will be inspected and tested by a competent person.</li> <li>2. Inspections and tests will be done in accordance with manufacturer's instructions.</li> <li>3. All equipment will be inspected daily when in use by the operator.</li> <li>4. Inspections and tests will be documented and records will be maintained at the site.</li> </ol> <p>Personal Protective Equipment (PPE):</p> <ol style="list-style-type: none"> <li>1. Disposal PPE shall be inspected before each use.</li> <li>2. Reusable PPE shall be inspected before use. Any defective PPE shall be repaired or replaced before use. All reusable PPE shall be decontaminated and stored properly before reuse.</li> </ol>

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Appendix B  
Health and Safety Forms

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Job No. \_\_\_\_\_  
 Job Address \_\_\_\_\_  
 \_\_\_\_\_



**Sevenson  
 Environmental  
 Services, Inc.**

## Report of Accident, Injury, or Illness

**Instructions:** Please print. Fill in all blanks. When completed, return this form to Sharon Lee at the main office.

Name \_\_\_\_\_ Sex: \_\_\_\_\_ Age: \_\_\_\_\_

Social Security Number \_\_\_\_\_ Birth Date: \_\_\_\_\_

Address \_\_\_\_\_ Phone Number \_\_\_\_\_

Marital Status:  Single;  Married;  Separated;  Divorced;  Widowed

# of Dependents \_\_\_\_\_ Date of Accident \_\_\_\_\_ Time \_\_\_\_\_ AM/PM

Date Employee notified employer: \_\_\_\_\_ Who was notified: \_\_\_\_\_

Employment Start Date:	Wage Rate:
Occupation:	Average Hours Worked:
Date Last Worked:	Average Days Per Week:
Time Shift Began:	Was worker paid for day of injury?
Name of Witness:	Did salary continue?
Describe how the accident happened:	
What was employee doing when injured?	
Describe the injury in detail and indicate part of body affected:	
Name of object or substance that directly injured the employee:	
Date & Time medical attention was sought:	

Name, address and phone number of hospital or doctor:
Was employee involved in any other incidents/accidents? If yes, describe:
Any history of work accidents, absenteeism, and/or disciplinary problems:
Substance abuse test administered: ___ Yes, ___ No – if no, why not?
Medical release obtained:
Corrective Action Taken:

Supervisor \_\_\_\_\_ Date \_\_\_\_\_

Safety Officer \_\_\_\_\_ Date \_\_\_\_\_

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Report of Accident, Injury, or Illness**







**Review checklist while completing front page of SPA. Check all that apply.**

A new SPA is required if the job scope or work conditions change.

Required Permits	Hazards	Safe Plan
<input type="checkbox"/> Confined Space	<input type="checkbox"/> Overhead Utilities	<input type="checkbox"/> Power de-energization required <input type="checkbox"/> Insulation blankets required <input type="checkbox"/> Wire watcher required
<input type="checkbox"/> Critical Lift		<input type="checkbox"/> Required clearance distance = _____ Ft. <input type="checkbox"/> Safe work zone marked
<input type="checkbox"/> Hot Work	<input type="checkbox"/> Crane or other Lifting Equipment	<input type="checkbox"/> Signalman assigned <input type="checkbox"/> Tag lines in use <input type="checkbox"/> Area around crane barricaded
<input type="checkbox"/> Lock Out/Tag Out		<input type="checkbox"/> Lifting equipment inspected <input type="checkbox"/> Personnel protected from overhead load
<input type="checkbox"/> Soil Disturbance (Over 12")	<input type="checkbox"/> Underground Utilities	<input type="checkbox"/> Reviewed as-builts <input type="checkbox"/> Subsurface surveys <input type="checkbox"/> Received dig permit
<input type="checkbox"/> Utility Clearance		<input type="checkbox"/> Required clearance distance = _____ Ft. <input type="checkbox"/> Safe work zone Marked
Required PPE		
<input type="checkbox"/> Hard Hat, Class C	<input type="checkbox"/> Electrical	<input type="checkbox"/> Lock Out/Tag Out/Try Out <input type="checkbox"/> Permit required? <input type="checkbox"/> Confirm that equipment is de-energized
<input type="checkbox"/> Hard Hat, Class E (Elect. Protect)		<input type="checkbox"/> Reviewed electrical safety procedures
<input type="checkbox"/> Ear Plugs/Ear Muffs	<input type="checkbox"/> Excavations	<input type="checkbox"/> Permits <input type="checkbox"/> Inspected prior to entering <input type="checkbox"/> Proper sloping/shoring
<b>Eye Protection:</b>		<input type="checkbox"/> Barricades provided <input type="checkbox"/> Access/egress provided <input type="checkbox"/> Protection from accumulated water
<input type="checkbox"/> Safety Glasses	<input type="checkbox"/> Fire Hazard	<input type="checkbox"/> Hot Work Permit <input type="checkbox"/> Fire Extinguishers <input type="checkbox"/> Fire watch
<input type="checkbox"/> Face Shield		<input type="checkbox"/> Adjacent area protected <input type="checkbox"/> Unnecessary flammable material removed
<input type="checkbox"/> Chemical Goggles	<input type="checkbox"/> Vehicular Traffic or Heavy Equipment	<input type="checkbox"/> Traffic Barricades <input type="checkbox"/> Cones <input type="checkbox"/> Signs <input type="checkbox"/> Flagmen <input type="checkbox"/> Lane closure
<input type="checkbox"/> Welding Hood	<input type="checkbox"/> Noise >85 dB	<input type="checkbox"/> Communication with equipment operator
<b>Hand Protection:</b>	<input type="checkbox"/> Hand & Power Tools:	Hearing protection is required: <input type="checkbox"/> Ear plugs <input type="checkbox"/> Ear Muffs <input type="checkbox"/> Both
<input type="checkbox"/> Cut Resistant Gloves		<input type="checkbox"/> Inspect general cond. <input type="checkbox"/> GFCI in use <input type="checkbox"/> Identified PPE required for each tool
<input type="checkbox"/> Welders Gloves	<input type="checkbox"/> Hand Hazards	<input type="checkbox"/> Reviewed safety requirements in operators manual(s) <input type="checkbox"/> Guarding OK
<input type="checkbox"/> Nitrile Gloves		List sharp tools, material, equipment: _____
<input type="checkbox"/> Surgical Gloves	<input type="checkbox"/> Manual Lifting	<input type="checkbox"/> PPE gloves, etc. <input type="checkbox"/> Protected sharp edges as necessary
<input type="checkbox"/> Rubber Gloves		<input type="checkbox"/> Reviewed proper lifting tech. <input type="checkbox"/> Identified material requiring lifting equipment
<input type="checkbox"/> Elect. Insulated Gloves	<input type="checkbox"/> Ladders	<input type="checkbox"/> Hand protection required <input type="checkbox"/> Back support belts
<input type="checkbox"/> Arm Sleeves		<input type="checkbox"/> Inspect general cond. before use <input type="checkbox"/> Ladder inspected with in last quarter
<b>Foot Protection:</b>	<input type="checkbox"/> Scaffolds	<input type="checkbox"/> Ladder tied off or held <input type="checkbox"/> Proper angle and placement <input type="checkbox"/> Reviewed ladder safety
<input type="checkbox"/> Sturdy Work Boots		<input type="checkbox"/> Inspect general condition before use <input type="checkbox"/> Tags in place <input type="checkbox"/> Properly secured
<input type="checkbox"/> Safety Toe Boots	<input type="checkbox"/> Slips, Trips Falls	<input type="checkbox"/> Toe boards used <input type="checkbox"/> Footings adequate <input type="checkbox"/> Materials properly stored on scaffold
<input type="checkbox"/> Rubber Boots		<input type="checkbox"/> Inspect for trip hazards <input type="checkbox"/> Hazards marked <input type="checkbox"/> Tools & material properly stored
<input type="checkbox"/> Rubber Boot Covers	<input type="checkbox"/> Pinch Points	<input type="checkbox"/> Extension cords properly secured <input type="checkbox"/> Work zone free of debris
<input type="checkbox"/> Dielectric Footwear		List potential pinch points: _____
<b>Respiratory Protection:</b>	<input type="checkbox"/> Working w/ Chemicals	<input type="checkbox"/> Working near operating equipment <input type="checkbox"/> Hand/Body positioning
<input type="checkbox"/> Dust Mask		<input type="checkbox"/> List specific chemicals involved and list hazards and precaution on front side.
<input type="checkbox"/> Air Purifying Respirator	<input type="checkbox"/> Asbestos or Lead Paint Potential	<input type="checkbox"/> Reviewed MSDS <input type="checkbox"/> Exposure Monitoring required <input type="checkbox"/> Have proper containers and labels.
<input type="checkbox"/> Supplied Air Respirator		<input type="checkbox"/> Identified proper PPE (respirators, clothing, gloves, etc.)
<input type="checkbox"/> SCBA	<input type="checkbox"/> Heat Stress Potential	<input type="checkbox"/> Areas to be worked may contain asbestos or lead paint <input type="checkbox"/> Asbestos controls incorporated
<input type="checkbox"/> Emergency Escape Respirator		<input type="checkbox"/> Lead based point controls in place <input type="checkbox"/> Exposure monitoring conducted.
<b>Special Clothing:</b>	<input type="checkbox"/> Cold Stress Potential	<input type="checkbox"/> Heat stress monitoring (>85°) <input type="checkbox"/> Liquids available <input type="checkbox"/> Cool down periods
<input type="checkbox"/> Tyvek ®		<input type="checkbox"/> Sun Screen <input type="checkbox"/> Reviewed Heat Stress symptoms
<input type="checkbox"/> Poly Coated Tyvek ®	<input type="checkbox"/> Environmental	<input type="checkbox"/> Proper clothing (i.e.. gloves, coat, coveralls) <input type="checkbox"/> Wind chill <32°
<input type="checkbox"/> Fire Resistant Coveralls		<input type="checkbox"/> Reviewed Cold Stress symptoms <input type="checkbox"/> Warm up periods
<input type="checkbox"/> Rain Suit	<input type="checkbox"/> Natural or Site Hazards	<input type="checkbox"/> Air emissions <input type="checkbox"/> Water discharge <input type="checkbox"/> Hazardous wastes <input type="checkbox"/> Other wastes
<input type="checkbox"/> Safety Vest		<input type="checkbox"/> Pollution prevention <input type="checkbox"/> Waste minimization
<b>Fall Protection:</b>	<input type="checkbox"/> Adjacent Work/Processes	<input type="checkbox"/> Weather <input type="checkbox"/> Terrain <input type="checkbox"/> Adjacent operations or processes <input type="checkbox"/> Biological hazards
<input type="checkbox"/> Harness		<input type="checkbox"/> Animals/reptiles/insects hazards
<input type="checkbox"/> Double Lanyard Required	<input type="checkbox"/> Barricades/covers	<input type="checkbox"/> Notified them of our presents <input type="checkbox"/> Other workers adjacent, above, or below.
<input type="checkbox"/> Anchorage Point Available		<input type="checkbox"/> Coordinated with adjacent supervisor/customer/operator <input type="checkbox"/> Need barriers between.
<input type="checkbox"/> Additional Anchorage Connector Needed e.g. Cross Arm Strap, etc.		<input type="checkbox"/> Caution barricade tape required <input type="checkbox"/> Danger barricade tape required <input type="checkbox"/> Rigid railing required
<input type="checkbox"/> Retractable Device Needed		<input type="checkbox"/> Covers over opening <input type="checkbox"/> Warning signs required
<input type="checkbox"/> Horizontal Life Line System Req'd.		<b>Additional Information:</b>
<input type="checkbox"/> Fall Clearance Distance Adequate		
<input type="checkbox"/> Fall Rescue/Retrieval Plan Set Up		



**TEST TO BE TAKEN**

	P.E.L.	Time		Time	Time	Time
		Tester		Tester	Tester	Tester
		Yes	N/A	Results	Results	Results
% of Oxygen	19.5% to 23%					
% of LEL	Any % over 10					
Carbon Monoxide	25 ppm					
Hydrogen Sulfide	10 ppm					
VOC						
Temperature	< 110°F/43°C					

**PREVENTION OF UNAUTHORIZED ENTRY**

- |  |                          |
|--|--------------------------|
|  | <b>YES</b>               |
| 1. Have Worker(s) to enter been trained for this specific entry? | <input type="checkbox"/> |
| 2. Have Attendants been trained for this specific space?         | <input type="checkbox"/> |
| 3. Post "WORKER IN CONFINED SPACE" Sign                          | <input type="checkbox"/> |
| 4. Set-up the following additional barriers:                     |                          |
| _____  |                          |
| _____  |                          |

**MANDATORY SAFETY EQUIPMENT REQUIRED**

- |                                    |                          |                          |
|------------------------------------|--------------------------|--------------------------|
|                                    | <b>YES</b>               | <b>N/A</b>               |
| 1. Fire Extinguisher               | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Retrieval Lines                 | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Respirator                      | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Goggles                         | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Hearing Protection              | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Protective Clothing             | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Special Boots or Shoes          | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Gloves                          | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. Other Safety Equipment Required | <input type="checkbox"/> | <input type="checkbox"/> |
| _____                              |                          | _____                    |
| _____                              |                          | _____                    |
| _____                              |                          | _____                    |
| _____                              |                          | _____                    |

**COMMUNICATION PROCEDURES AND EQUIPMENT TO BE USED FOR THIS ENTRY**

(Verify that chosen equipment is in place and operation.)

Verified by:

1. \_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**RESCUE EQUIPMENT TO BE PROVIDED ON-SITE**

	YES	N/A
a. Two chest harnesses or two wristlets	<input type="checkbox"/>	<input type="checkbox"/>
b. Two five minute supplied air escape respirators	<input type="checkbox"/>	<input type="checkbox"/>
c. One 30 minute S.C.B.A.	<input type="checkbox"/>	<input type="checkbox"/>
d. One emergency siren	<input type="checkbox"/>	<input type="checkbox"/>
e. Man basket	<input type="checkbox"/>	<input type="checkbox"/>
f. Retrieval wench	<input type="checkbox"/>	<input type="checkbox"/>
g. Other necessary Rescue Equipment	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>		
<hr/>		
<hr/>		

**IN CASE OF EMERGENCY**

Rescue Service	Phone Number or Ext.
1. <hr/>	<hr/>
2. <hr/>	<hr/>
3. <hr/>	<hr/>

**Confined Space Entry Supervisor or designee** must sign below AFTER all the above actions are fully understood and conditions necessary for SAFE entry have been met.

Authorization of Entry

\_\_\_\_\_  
Signature (if not CSE Supervisor, add title)

\_\_\_\_\_  
Date

\_\_\_\_\_  
Time

Termination of Entry

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Time



**Sevenson Environmental Services, Inc.**  
**DAILY SAFETY REPORT**

DATE:

WORK PERIOD COVERED:

WEATHER CONDITIONS:

SUMMARY OF DAY'S WORK ACTIVITY:

EQUIPMENT UTILIZED BY SAFETY MONITORS:

PROTECTIVE CLOTHING AND EQUIPMENT BEING USED BY TASK:

PHYSICAL CONDITION OF WORKERS (any heat or cold stress or other medical problems):

ACCIDENTS OR BREACH OF PROCEDURES:

DESCRIPTION OF MONITORING AND AIR SAMPLES TAKEN:

TYPE AND NUMBER OF PERMITS ISSUED:

SUMMARY OF TRAINING AND SAFETY MEETING:

NAME:

TITLE: Site Health and Safety Officer

SIGNATURE:



### DAILY EXCAVATION CHECKLIST

Location of Excavation: \_\_\_\_\_

Name of Qualified Person: \_\_\_\_\_

Date of Inspection: \_\_\_\_\_ Utility Locate No.: \_\_\_\_\_

Soil Type:             Stiff Clay             Firm Clay             Dry Granular  
                          Wet Granular         Saturated Granular     Running

Hydrostatic Conditions:  Dry                     Wet                     Saturated

Weather Conditions:  Sunny                     Overcast                     Rain

Angle of Repose: (width and height) \_\_\_\_\_

Unsupported Wall Height: (measurement required) \_\_\_\_\_

Protection Required:             Trench Box             Shoring             Sheeting  
    Benching             Sloping

Personal Protection Requirements: (list) \_\_\_\_\_

\_\_\_\_\_

Egress/Ingress: (identify) \_\_\_\_\_

Ladders/Ramps Location: \_\_\_\_\_

Location of Spoils: \_\_\_\_\_

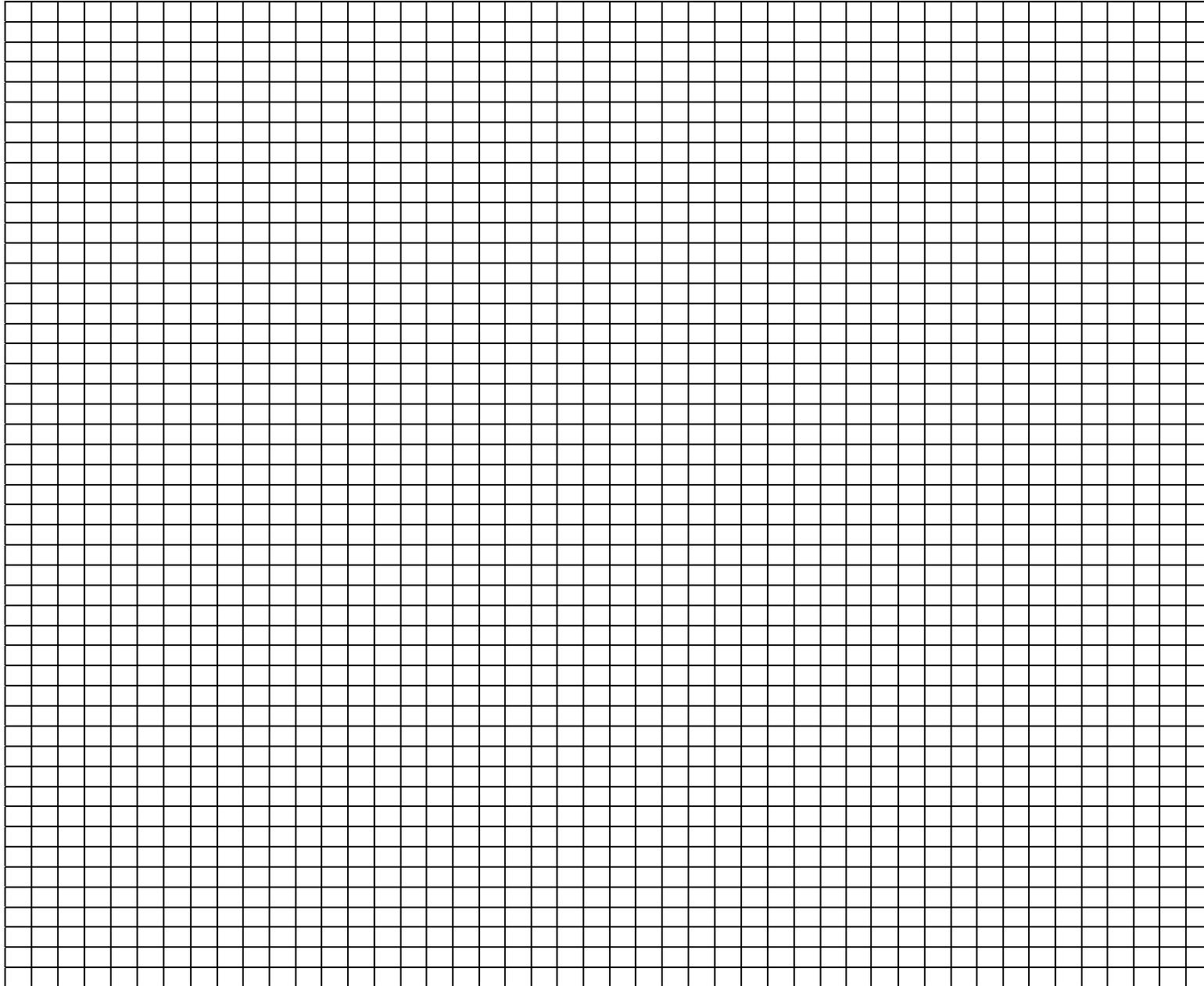
Location of Overhead Lines: \_\_\_\_\_

Name of Spotter for Overhead Lines: \_\_\_\_\_

Sketch excavation plan on reverse side and retain in file for 3 years.

# EXCAVATION SITE PLAN

# LOCATION



### ABOVE GROUND CONSIDERATIONS

- Building Overhangs
- Electrical Lines
- Canopies
- Tree Overhangs
- Traffic Lights
- Street Lights

### GROUND LEVEL CONSIDERATIONS

- Buildings
- Manholes
- Trees
- Hydrant
- PIVs
- Parking Lots
- D-Islands
- Curbs
- Ditches/  
Drains
- Towers
- Shrubs
- Fences
- Signs
- Lamp Posts
- Guard Posts
- Gate Arms
- TV Cameras
- Walls

### BELOW GROUND CONSIDERATIONS

#### Site Prints

- Site Lightings
- Comm. Duct Bank
- 13.2 kV Electricity
- Fire Line Water
- Natural Gas
- Lawn Irrigation
- Chilled Water
- Steam
- Sanitary

#### Building Prints

- Fuel Lines
- Electricity for Gate Arms
- Electricity for TV Cameras
- UST (Tanks)

# Sevenson Environmental Services, Inc.

## HOT WORK PERMIT

Job Description:  Welding;  Torch/oxy/acetylene;  Grinding/Cut saw;  Maintenance;  
 Heating Operation;  Other: \_\_\_\_\_

Permit Duration:  4 hrs;  8 hrs;  10 hrs;  12 hrs

Person(s) Performing Hot Work: \_\_\_\_\_

Fire Watch Required?  Yes;  No

If yes, Fire Watch Attendant: \_\_\_\_\_

Air Monitoring Required?  Yes;  No Respiratory Protection Required?  Yes;  No

### MONITORING (Acceptable Levels)

DATE	TIME	O <sub>2</sub> (19.5-22.0%)	LEL (0-10%)	ORGANIC VAPOR* (0-25ppm)

### FIRE PROTECTION

Fire extinguisher present: YES ; Area cleared of combustibles: YES ; Are operations in compliance with OSHA Regulations: YES ;

Activity Hazard Analysis attached and reviewed by affected personnel: YES

### Requirements for Performing Hot Work

- Flame retardant gloves, coat, and proper eye protection (glasses or shield with welding/cutting rated glass lens)
- Respirators will be required when welding/cutting/heating areas that cannot be decontaminated or when welding on stainless steel (Cr-VI) or galvanized metal (metal fume fever).
- Use fire blankets when necessary to protect material or areas where removing combustibles is not practical.
- Inspect welder, lead lines, and ensure unit is properly grounded.
- Maintain a 50 ft diameter clearance for flammables (i.e., fuel cans, vapors) an/or 25 ft diameter clearance for combustibles (i.e., wood, rags, debris)
- Oxygen & Acetylene bottles are secure with regulators removed and caps installed prior to moving or unattended during breaks
- Inspect all hoses, torch, tips and regulators for defects and ensure flash suppressors are installed
- Properly store all empty and full cylinders from vicinity and protect from hot work activities
- Barricade walkway under any overhead work
- If welding shields are not available, barricade and delineate all work areas when using a torch or welder with a minimum distance of 75 feet.
- When normal fire prevention precautions are not sufficient, a qualified fire watch is required. The fire watch shall be instructed in anticipated fire hazards and shall perform assigned duties to 30 minutes after hot work was stopped.
- At completion of work activity, disassemble all hoses and regulators and properly store
- Toxic surface coatings must be removed prior to welding, cutting or heating. A minimum of 4-inches must be cleared from each side of the weld, cut, or heated area.
- \*If working with fuel oil the PID for organic vapors will be used to determine the LEL due to the poor LEL sensor response to heavy hydrocarbons. Acceptable PID readings for ensuring vapors are less than 10% LEL will be less than 250 ppm VOCs.

Health and Safety Officer: \_\_\_\_\_

DATE: \_\_\_\_\_

# Job Safety Enhancement Program

## JSEP Form

“You can force compliance, you have to earn commitment”

Safety Observation       Task Improvement       Hazard Identification

Description: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Recommendations: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Submitted By: \_\_\_\_\_

Date: \_\_\_\_\_

\_\_\_\_\_

JESP Number: \_\_\_\_\_

Follow up or Corrective Action (if required): \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Person Responsible for Follow up or Corrective Action: \_\_\_\_\_

Estimated Completion Date: \_\_\_\_\_

Actual Completion Date: \_\_\_\_\_

Person responsible for verification: \_\_\_\_\_

Date: \_\_\_\_\_



<b>Load and Capacity Calculations (Page 2 of 3)</b>			
<b>C. Capacities of the (Main) Crane</b>			
Make & Model of Crane			
2. Counter Weight Size:		Type of Boom:	
3. Lifting Arrangement			
a. Max. Radius During Lift		Ft.	
b. Length of Boom		Ft.	
c. Angle of Boom at Pick		Deg.	
d. Angle of Boom at Set		Deg.	
Rated Capacity Under Most Severe Conditions			
1. Over Rear		Lbs.	
2. Over Front		Lbs.	
3. Over Side		Lbs.	
f. Rated Capacity for Lift Radius, Crane Configuration, and Orientation (over front, side or....)			Lbs.
4. Jib			
a. Is the Jib to be used	Yes	No	
b. Length of Jib		Ft.	
c. Jib Angle		Deg.	
d. Rated Jib Capacity for Lift Radius, Crane Configuration, and Orientation (over front, side, or...)			Lbs.
5. Load Line/Fall Cable			
a. Is Main Block to be used?	Yes	No	
b. Number of Parts of Cable			
c. Size of Cable		Ø inches	
d. Maximum Capacity for Lift Radius, Crane Configuration, and Orientation (over front, side, or ....)			Lbs.
<b>D. Percent of Cranes Capacity (&gt;85% requires High Hazard Lift Approvals)</b>			
		$\frac{\text{Total Lifted Weight} \times 100}{\text{Rated Capacity}} =$	%
<b>E. Size of Slings</b>			
1. Sling Selection			
a. Type of Arrangement		(Spreader, Vertical Slings, etc.	
b. Number of Slings to Hook	Ø	Capacity	Lbs.
c. Sling Size		Ø	
d. Sling Length		Ft.	
e. Sling Capacity (At angle used)		Lbs.	
f. Number of Slings to Load		#	
g. Total Rigging capacity (e x f)			Lbs.
Comments:			
Sketch of rigging arrangement available	Yes	No	See Page ( )
End of Standard Lift Plan Paperwork (			



## Figure 2: Pre-Lift Checklist

	Yes	No
1. Crane operator meets company qualification requirements?	<input type="checkbox"/>	<input type="checkbox"/>
2. Lift calculations and rigging plan completed?	<input type="checkbox"/>	<input type="checkbox"/>
3. Are lift equipment swing & travel requirements & clearances known?	<input type="checkbox"/>	<input type="checkbox"/>
4. Are all required approvals/permits signed?	<input type="checkbox"/>	<input type="checkbox"/>
5. Crane inspections up to date (Annual/Monthly/Daily)?	<input type="checkbox"/>	<input type="checkbox"/>
6. Weather conditions and wind speed acceptable?	<input type="checkbox"/>	<input type="checkbox"/>
7. Has the stability of the ground been assured by soil bearing analysis?	<input type="checkbox"/>	<input type="checkbox"/>
8. Location and size of underground facilities are known?	<input type="checkbox"/>	<input type="checkbox"/>
9. Matting and/or outrigger pads inspected and approved?	<input type="checkbox"/>	<input type="checkbox"/>
10. Electrical equipment and power lines at required distance?	<input type="checkbox"/>	<input type="checkbox"/>
11. Rigging Inspected for defects?	<input type="checkbox"/>	<input type="checkbox"/>
12. Engineered lifting lugs fabricated and installed correctly?	<input type="checkbox"/>	<input type="checkbox"/>
13. Connecting/disconnecting means been developed?	<input type="checkbox"/>	<input type="checkbox"/>
14. Have the safety precautions been reviewed?	<input type="checkbox"/>	<input type="checkbox"/>
15. Is survey equipment required?	<input type="checkbox"/>	<input type="checkbox"/>
16. Lift Hold Point of $\geq$ _____ lbs communicated to crew?	<input type="checkbox"/>	<input type="checkbox"/>
17. Signal person(s) assigned?	<input type="checkbox"/>	<input type="checkbox"/>
18. Safe Plan of Action (SPA) Completed?	<input type="checkbox"/>	<input type="checkbox"/>
19. Pre-Lift Meeting/Task Safety Awareness Meeting (TSA) held?	<input type="checkbox"/>	<input type="checkbox"/>
20. Hoist area & load path cleared of non-essential personnel?	<input type="checkbox"/>	<input type="checkbox"/>
21. Crane set up per the lift plan (radius, configuration, etc)?	<input type="checkbox"/>	<input type="checkbox"/>
22. Rigging equipment and tag line(s) installed per plan?	<input type="checkbox"/>	<input type="checkbox"/>
Completed By Signature: _____	Name Printed: _____	Date: _____

**Sevenson Environmental Services, Inc.  
RESPIRATOR FIT TEST RECORD**

<b>EMPLOYEE NAME:</b>		<b>DATE:</b>	
<b>RESPIRATOR MANUFACTURE:</b>			
<b>RESPIRATOR SIZE:</b>			
RESULTS			
	Isoamyl Acetate	Irritant Smoke	Other
FIT			
NO FIT			
COMFORT:	Very Comfortable ___	Comfortable ___	Tolerable ___
	Uncomfortable ___	Very Uncomfortable ___	
<b>COMMENTS:</b>			
<b>EMPLOYEE SIGNATURE:</b>			

**Sevenson Environmental Services, Inc.  
RESPIRATOR FIT TEST RECORD**

<b>EMPLOYEE NAME:</b>		<b>DATE:</b>	
<b>RESPIRATOR MANUFACTURE:</b>			
<b>RESPIRATOR SIZE:</b>			
RESULTS			
	Isoamyl Acetate	Irritant Smoke	Other
FIT			
NO FIT			
COMFORT:	Very Comfortable ___	Comfortable ___	Tolerable ___
	Uncomfortable ___	Very Uncomfortable ___	
<b>COMMENTS:</b>			
<b>EMPLOYEE SIGNATURE:</b>			

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Appendix C  
Chemical Information Sheets

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# Polychlorinated Biphenyls (PCBs)

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CAS Number: 1336-36-3

## What are PCBs?

Polychlorinated biphenyls (PCBs) were developed in the 1940's and were used extensively in the manufacture of transformers, capacitors, and other heat transfer devices through the late 1970's. PCBs are a group of chemicals that have extremely high boiling points and are practically nonflammable. Because of this, they were used extensively as heat transfer fluids in transformers and capacitors. In 1979 their manufacture and importation was banned in the United States, based on mounting evidence that they were toxic to humans and wildlife. Today they are classified as probable human carcinogens and are listed in the top 10% of EPA's most toxic chemicals. At older federal facilities today, there are still many PCB-containing transformers and capacitors. Many of these transformers are at or close to the end of their useful life and proper disposal of them is required to prevent the unnecessary (and unlawful) release of PCBs into the environment.

## How might I be exposed to PCBs?

Fish consumption appears to be the major pathway of exposure. PCBs do not easily break down, and can bioaccumulate in the fatty tissues of fish and mammals. A significant trend of increasing body burden is associated with increased fish consumption. People who

eat sport-caught fish consumed 2-3 times more fish than the overall U.S. population.

Concentrations of PCBs in subsurface soil at a Superfund site have been as high as 750 ppm. People who live near hazardous waste sites may be exposed to PCBs by consuming PCB-contaminated sportfish and game animals, by breathing PCBs in air, or by drinking PCB-contaminated well water.

Although PCBs are no longer made in the United States, people can still be exposed to them. Many older transformers and capacitors may still contain PCBs, and this equipment can be used for 30 years or more. Old fluorescent lighting fixtures and old electrical devices and appliances, such as television sets and refrigerators, may contain PCBs if they were made before PCB use was stopped. When these electric devices get hot during operation, small amounts of PCBs may get into the air and raise the level of PCBs in indoor air. Because devices that contain PCBs can leak with age, they could also be a source of skin exposure to PCBs.

Workplace exposure to PCBs can occur during the repair and maintenance of PCB transformers, accidents, fires, or spills involving PCB transformers and older computers and instruments, and disposal of PCB materials. In addition to older electrical instruments and fluorescent lights that contain

PCB-filled capacitors, caulking materials, elastic sealants, and heat insulation have also been known to contain PCBs. Contact with PCBs at hazardous waste sites can happen when workers breathe air and touch soil containing PCBs. Exposure in the contaminated workplace occurs mostly by breathing air containing PCBs and by touching substances that contain PCBs.

### **How can PCBs enter and leave my body?**

If you breathe air that contains PCBs, they can enter your body through your lungs and pass into the bloodstream. We do not know how fast or how much of the PCBs that are breathed will pass into the blood. A common way for PCBs to enter your body is by eating meat or fish products or other foods that contain PCBs. Exposure from drinking water is less than from food. It is also possible that PCBs can enter your body by breathing indoor air or by skin contact in buildings that have the kinds of old electrical devices that contain and can leak PCBs. For people living near waste sites or processing or storage facilities, and for people who work with or around PCBs, the most likely ways that PCBs will enter their bodies are from skin contact with contaminated soil and from breathing PCB vapors. Once PCBs are in your body, some may be changed by your body into other related chemicals called metabolites. Some metabolites of PCBs may have the potential to be as harmful as some unchanged PCBs. Some of the metabolites may leave your body in the feces in a few days, but others may remain in your body fat for months. Unchanged PCBs may also remain in your body and be stored for years mainly in the fat and liver, but smaller amounts can be found in other organs as well. PCBs collect in milk fat and can enter the bodies of infants through breast-feeding.

### **How can PCBs affect my health?**

Many studies have looked at how PCBs can affect human health. Some of these studies investigated people exposed in the workplace, and others have examined members of the general population. Skin conditions, such as acne and rashes, may occur in people exposed to high levels of PCBs. These effects on the skin are well documented, but are not likely to result from exposures in the general population. Most of the human studies have many shortcomings, which make it difficult for scientists to establish a clear association between PCB exposure levels and health effects. Some studies in workers suggest that exposure to PCBs may also cause irritation of the nose and lungs, gastrointestinal discomfort, changes in the blood and liver, and depression and fatigue. Workplace concentrations of PCBs, such as those in areas where PCB transformers are repaired and maintained, are higher than levels in other places, such as air in buildings that have electrical devices containing PCBs or in outdoor air, including air at hazardous waste sites. Most of the studies of health effects of PCBs in the general population examined children of mothers who were exposed to PCBs.

### **Is there a medical test to determine if I have been exposed to PCBs?**

Levels of PCBs in the environment were zero before PCBs were manufactured. Now, all people in industrial countries have some PCBs in their bodies. There are tests to determine whether PCBs are in the blood, body fat, and breast milk. These are not regular or routine clinical tests, such as the one for cholesterol, but could be ordered by a doctor to detect PCBs in people exposed to them in the environment and at work. If your PCB levels are higher than the background levels, this will show that you have been exposed to high

levels of PCBs. However, these measurements cannot determine the exact amount or type of PCBs that you have been exposed to, or how long you have been exposed. Although these tests can indicate whether you have been exposed to PCBs to a greater extent than the general population, they do not predict whether you will develop harmful health effects. Blood tests are the easiest, safest, and probably the best method for detecting recent exposures to large amounts of PCBs. Results of such tests should be reviewed and carefully interpreted by physicians with a background in environmental and occupational medicine. Nearly everyone has been exposed to PCBs because they are found throughout the environment, and people are likely to have detectable amounts of PCBs in their blood, fat, and breast milk. Recent studies have shown that PCB levels in tissues from United States population are now declining.

### **What levels of exposure have resulted in harmful health effects?**

Human health studies indicate that: 1) reproductive function may be disrupted by high levels of exposure to PCBs; 2) neurobehavioral and developmental deficits occur in newborns and continue through school-aged children who had in-utero exposure to PCBs; 3) other systemic effects (e.g., self-reported liver disease and diabetes, and effects on the thyroid and immune systems) are associated with elevated serum levels of PCBs; and 4) increased cancer risks, e.g., non-Hodgkin's lymphoma, are associated with PCB exposures.

### **What recommendations has the federal government made to protect human health?**

**The federal government has developed regulations, guidelines, and standards to protect people from the possible health effects of exposure to PCBs.**

The federal government develops regulations and recommendations to protect public health. Regulations can be enforced by law. Federal agencies that develop regulations for toxic substances include the Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), and the Food and Drug Administration (FDA). Recommendations provide valuable guidelines to protect public health but cannot be enforced by law. Federal organizations that develop recommendations for toxic substances include the Agency for Toxic Substances and Disease Registry (ATSDR) and the National Institute for Occupational Safety and Health (NIOSH).

Regulations and recommendations can be expressed in not-to-exceed levels in air, water, soil, or food that are usually based on levels that affect animals; then they are adjusted to help protect people. Sometimes these not-to-exceed levels differ among federal organizations because of different exposure times (an 8-hour workday or a 24-hour day), the use of different animal studies, or other factors.

Recommendations and regulations are periodically updated as more information becomes available. For the most current information, check with the federal agency or organization that provides it. Some regulations and recommendations for PCBs include the following:

The EPA standard for PCBs in drinking water is 0.5 parts of PCBs per billion parts (ppb) of water. For the protection of human health from the possible effects of drinking the water or eating the fish or shellfish from lakes and streams that are contaminated with PCBs, the EPA regulates that the level of PCBs in these waters be no greater than 0.17 parts of PCBs per trillion parts (ppt) of water.

The FDA has set residue limits for PCBs in

various foods to protect from harmful health effects. FDA required limits include 0.2 parts of PCBs per million parts (ppm) in infant and junior foods, 0.3 ppm in eggs, 1.5 ppm in milk and other dairy products (fat basis), 2 ppm in fish and shellfish (edible portions), and 3 ppm in poultry and red meat (fat basis).

OSHA regulates that workers not be exposed by inhalation over a period of 8 hours for 5 days per week to more than 1 milligram per cubic meter of air (mg/m<sup>3</sup>) for 42% chlorine PCBs, or to 0.5 mg/m<sup>3</sup> for 54% chlorine PCBs.

NIOSH recommends that workers not breathe air containing 42 or 54% chlorine PCB levels higher than 1 microgram per cubic meter of air (µg/m<sup>3</sup>) for a 10-hour workday, 40-hour workweek.

EPA requires that companies that transport, store, or dispose of PCBs follow the rules and regulations of the federal hazardous waste management program. EPA also limits the amount of PCBs put into publicly owned waste water treatment plants. To minimize exposure of people to PCBs, EPA requires that industry tell the National Response Center each time one pound or more of PCBs has been released to the environment.

### **Where can I get more information?**

If you have more questions or concerns, please contact your state health or environmental department or:

Agency for Toxic Substances and Disease  
Registry  
Division of Toxicology  
1600 Clifton Road, E-29  
Atlanta, Georgia 30333

### **References**

1. Agency for Toxic Substances and Disease Registry (ATSDR). *Public Health Statement for*

*PCBs.*

Atlanta, GA: U.S. Department of Health and Human Services, 1990.

2. Birmingham et al. 1989
3. Newhook 1988
4. Fitzgerald et al. 1996
5. Courval et al. 1996

Appendix D  
Respiratory Protection Program

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# Respiratory Protection Program



Sevenson Environmental Services, Inc.  
2749 Lockport Road  
Niagara Falls, NY 14305



This respiratory protection program has been written to comply with the applicable OSHA regulations and contract specifications, to provide the basis for the administration of the respirator program, and to serve as a training tool for the affected workers. Specifics of the program such as brands of respirators used, cartridges or filters, and type of monitoring equipment will be provided upon mobilization.

Since respiratory protection, in many instances, will be the primary method for protecting a worker's health, it is Severson's policy that all portions of this program be followed and that any deficiencies in the administration and enforcement of this program will be immediately corrected.

The overall responsibility for documenting and administering the respirator program rests with the Project Manager. This responsibility will be delegated to the Senior Site Safety Officer. The Site Safety Officer will be responsible for the purchasing, maintenance, and cleaning of respiratory protective equipment as well as providing "refresher" training for affected personnel. The Certified Industrial Hygienist (CIH) will be responsible for the preparation and evaluation of this program.

The type of respirators that will be used will be selected on the basis of either legally mandated requirements or on the professional judgment of the CIH. OSHA standard 1910.134 and the contract specifications are explicit in the types of respirators that are permitted to be worn when contaminants are handled. Those requirements are based on the airborne concentration of the various types of contaminants. Since monitoring is a requirement of the OSHA standard and contract specifications, sufficient data will be generated to determine the proper type of respiratory protection. The type of respirators to be worn will be chosen from the following types:

1. Half mask air purifying equipped with high efficiency particulate, organic vapor, and acid gas cartridges.
  - a. Limited to use in non-IDLH atmospheres where contaminants are effectively removed by purifying cartridges and have good indicator properties.
  - b. This style of respirator has an assigned protection factor of 10.
2. Full face air purifying equipped with high efficiency particulate, organic vapor, and acid gas cartridges.
  - a. Limited to use in non-IDLH atmospheres where contaminants are effectively removed by purifying cartridges and have good indicator properties.
  - b. This style of respirator has an assigned protection factor of 10 or 50. The assigned protection factor of 50 may only be assigned if a quantitative fit test was performed and the wearer achieves a fit factor greater than 500 for the fit test.
3. Powered air purifying air helmet equipped with high efficiency particulate, organic vapor, and acid gas cartridges.
  - a. Limited to use in non-IDLH atmospheres where contaminants are effectively removed by purifying cartridges and have good indicator properties.

- b. This style of respirator has an assigned protection factor of 25.
4. Powered air purifying respirator equipped with high efficiency particulate, organic vapor, and acid gas cartridges.
  - a. Limited to use in non-IDLH atmospheres where contaminants are effectively removed by purifying cartridges and have good indicator properties.
  - b. This style of respirator has an assigned protection factor of 1,000.
5. Full face piece supplied-air respirator operated in the pressure demand mode.
  - a. Limited to use in atmospheres from which the wearer can escape unharmed without the aid of the respirator. The wearer is restricted in movement by the hose and must return to a respirable atmosphere by retracing his route or entry. The hose is subject to being severed or pinched off.
  - b. This style of respirator has an assigned protection factor of 1,000.

It is important that a worker understands the proper use and limitations of the various respirators. Therefore, all workers who are required to wear respirators will undergo a training program that consists of:

1. Nature of the hazards
2. Explanation of why other control methods are not feasible
3. Explanation of the selection criteria for the respirators that are to be used
4. Limitations
5. Inspection
6. Proper donning and wearing
7. Positive and negative pressure fit tests
8. Maintenance
9. Emergency situations

In addition, all respirator users will be given a qualitative fit test.

All respirators will be cleaned and disinfected at the end of each day's use. The following procedure will be used:

1. Cartridges, filters, and canisters will be removed and discarded.
2. Wash respirator in warm water (approx. 120°F) and cleaner/disinfectant solution.
3. Rinse in clean, warm water and then in a 50% isopropyl alcohol solution.
4. Air dry or use a hair dryer.
5. Inspect all parts of respirator and replace any that are missing or defective.
6. Place face piece in plastic bag.

All respirators will be stored in a separate plastic bag and stored in the decontamination trailer.

It will be the responsibility of the site safety officer to assure that all respirators have been

properly inspected and maintained.

The inspection will consist of:

1. Tightness of connections.
2. Condition of face piece, straps, connecting tubes, and canisters.
3. Condition of exhalation and inhalation valves.
4. Pliability and flexibility of rubber parts.
5. Condition of lenses of full face piece respirators.
6. Charge of compressed air cylinder of self contained breathing apparatus.
7. Proper functioning of regulators and warning devices.

As outlined in the air monitoring section of the health and safety plan, personal air samples will be taken to determine the extent of worker exposure. The results of this sampling will be reviewed and evaluated and the proper type of respiratory protection will then be determined by the CIH.

As the work progresses, the type and extent of the health hazards will become more fully documented. Also there is the potential for the development of new hazards. Therefore, this respiratory protection program will be continually evaluated by the on-site safety and health personnel in consultation with the CIH.

All personnel who will be required to wear respirators must participate in the medical surveillance program outlined in the health and safety plan. A certificate stating that the employee is physically able to wear a respirator will be obtained and made available to the owner's representative.

All respiratory protective equipment used on this project will be approved by the National Institute for Occupational Safety and Health.

Air Supplied Breathing Apparatus Standards contains specific requirements for supplied air systems.

### **Respirator Fit**

An employee wearing a respirator can be protected against airborne contaminants only if there is successful sealing of the respirator on his or her face. All employees may not obtain a successful fit for a specific respirator, since facial dimensions vary considerably from person to person. A half face piece must contact a rather complex facial surface and the possibility of leakage is greater than in the case of the full face piece. Studies have shown that temples on glasses, absence of dentures, full beards, handlebar mustaches or wide sideburns can reduce respirator performance by as much as 25 percent.

The respirator face piece-to-face seal will be tested each time the employee enters a contaminated atmosphere. Most respirator manufacturers provide instructions for wearing and leak testing and these instructions will be followed. The training program will cover these procedures. Face piece-to-face fit tests include the following:

- A. Positive Pressure Test - close or "block off" the exhalation valve and exhale gently into the face piece. If a slight positive pressure is built up with no apparent outward leakage

around the seal, then the facepiece-to-face seal is satisfactory. Note that this test only applies to those respirators that have an exhalation valve that can be blocked (the exhalation valve cover may have to be removed for the test).

- B. Negative Pressure Test - Close the inlet opening or hose of the respirator facepiece with the hand(s), tape or other means, inhale gently so that the facepiece collapses slightly and hold the breath for ten seconds. If the facepiece remains slightly collapsed and no inward leakage occurs, then the facepiece-to-face seal is probably satisfactory.
- C. The respirator fit test will be performed according to the Qualitative Fit Test (QLFT) protocols as outlined in Appendix D of OSHA Standard 1910.1025, which are detailed below. Positive and negative pressure tests will be performed by the employee before each wearing of his respirator.

The isoamyl acetate protocol is as follows:

a. **Odor Threshold Screening**

1. Three 1-liter glass jars with metal lids (e.g. Mason or Bell jars) are required.
2. Odor-free water (e.g. distilled or spring water) at approximately 25°C will be used for the solutions.
3. The isoamyl acetate (IAA) (also known as isopentyl acetate) stock solution is prepared by adding 1 cc of pure IAA to 800 cc of odor-free water in a 1-liter jar and shaking for 30 seconds. This solution will be prepared new at least weekly.
4. The screening test will be conducted in a room separate from the room used for actual fit testing. The two rooms will be well ventilated but may not be connected to the same recirculating ventilation system.
5. The odor test solution is prepared in a second jar by placing 0.4 cc of the stock solution into 500 cc of odor-free water using a clean dropper or pipette. Shake for 30 seconds and allow to stand for two to three minutes so that the IAA concentration above the liquid may reach equilibrium. This solution may be used for only one day.
6. A test blank is prepared in a third jar by adding 500 cc of odor-free water.
7. The odor test and test blank jars will be labeled 1 and 2 for jar identification. If the labels are put on the lids they can be periodically dried off and switched to avoid people thinking the same jar always has the IAA.
8. The following instructions will be typed on a card and placed on the table in front of the two test jars (i.e. 1 and 2);

**"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, 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 will 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 correctly identify the jar containing the odor test solution, the IAA QLFT may not be used.
11. If the test subject correctly identifies the jar containing the odor test solution, he may proceed to respirator selection and fit testing.

**b. Respirator Selection**

1. The test subject will be allowed to select the most comfortable respirator from a large array of various sizes and manufacturers that include at least three sizes of elastomeric half face pieces and units of at least two manufacturers.
2. The selection process will be conducted in a room separate from where the fit test will take place.
3. The test subject should understand that he is being asked to select the respirator which provides the most comfortable fit for him. Each respirator represents a different size and shape and, if fit properly, will provide adequate protection.
4. The test subject holds each facepiece up to his face and eliminates those which are obviously not giving a comfortable fit. Normally, selection will begin with a half-facepiece and if a fit cannot be found here, the subject will be asked to go to the full face piece respirators. (A small percentage of users will no be able to wear any half-facepiece respirator).
5. The more comfortable face pieces are recorded; the most comfortable mask is donned and worn at least five minutes to assess comfort. Assistance in assessing comfort can be given by discussing the points in #6 below. If the test subject is not familiar with using a particular respirator, he will be directed to don the mask several times and to adjust the straps each time, so that he becomes adept at setting proper tension on the straps.
6. Assessment of comfort will include reviewing the following points with the test subject:
  - Chin properly placed
  - Positioning of mask on nose
  - Strap tension
  - Fit across nose bridge
  - Room for safety glasses

- Distance from nose to chin
  - Room to talk
  - Tendency to slip
  - Cheeks filled out
  - Self-observation in mirror
  - Adequate time for assessment
7. The test subject will conduct the conventional negative and positive pressure fit checks (e.g. see ANSI Z88.2-1980). Before conducting the negative or positive-pressure checks, the subject will be told to "seat" his mask by rapidly moving the head side-to-side and up and down, taking a few deep breaths.
  8. The test subject is now ready for fit testing.
  9. After passing the fit test, the test subject will be questioned again regarding the comfort of the respirator. If it has become uncomfortable, another model of respirator will be tried.
  10. The employee will be given the opportunity to select a different facepiece and be retested if during the first two weeks of on-the-job wear the chosen facepiece becomes unacceptably uncomfortable.

c. **Fit Test**

1. The fit test chamber will be substantially similar to a clear 55 gallon drum liner suspended inverted over a two foot diameter frame, so that the top of chamber is about six inches above the test subject's head. The inside top center of the chamber will have a small hook attached.
2. Each respirator used for the fitting and fit testing will be equipped with organic vapor cartridges to offer protection against organic vapors. The cartridges or masks will be changed at least weekly.
3. After selecting, donning, and properly adjusting a respirator himself, the test subject will wear it to the fit testing room. This room will be separate from the room used for odor threshold screening and respirator selection, and will be well ventilated, as by an exhaust fan or lab hook, to prevent general room contamination.
4. A copy of the following test exercises and rainbow (or equally effective) passage will be taped to the inside of the test chamber:

**Test Exercises**

- i. Normal breathing.
- ii. Deep breathing. Be certain breaths are deep and regular.
- iii. Turning head from side-to-side. Be certain movement is complete. Alert the test subject not to bump the respirator on the shoulders.

Have the test subject inhale when his head is at either side.

- iv. Nodding head up and down. Be certain motions are complete and made about every second. Alert the test subject not to bump the respirator on the chest. Have the test subject inhale when his head is in the fully up position.
- v. Talking. Talk aloud and slowly for several minutes. The following paragraph is called the Rainbow Passage. Reading it will result in a wide range of facial movements, and thus be useful to satisfy this requirement.

### **Rainbow Passage**

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.

- vi. Normal breathing.
5. Each test subject will wear his respirator for at least ten minutes before starting the fit test.
  6. Upon entering the test chamber, the test subject will be given a six inch by five inch piece of paper towel or other porous absorbent single ply material, folded in half and wetted with three-quarters of one cc of pure IAA. The test subject will hang the wet towel on the hook at the top of the chamber.
  7. Allow two minutes for the IAA test concentration to be reached 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 cooperation, the purpose for the head exercises, or to demonstrate some of the exercises.
  8. Each exercise described in No. 4 above will be performed for at least one minute.
  9. If at any time during the test, the subject detects the banana-like odor of IAA, he will quickly exit from the test chamber and leave the test area to avoid olfactory fatigue.
  10. Upon returning to the selection room, the subject will remove the respirator, repeat the odor sensitivity test, select and put on another respirator, return to the test chamber, etc. The process continues until a respirator that fits well has been found. Should the odor sensitivity test be failed, the subject will wait about five minutes before retesting. Odor sensitivity will usually have returned by this time.

11. If a person cannot be fitted with the selection of half-facepiece respirators, include full facepiece models in the selection process.
12. When the test subject leaves the chamber he will remove the saturated towel, returning it to the conductor. To keep the area from becoming contaminated, the used towels will be kept in a self-sealing bag. There should be no significant IAA concentration buildup in the test chamber from subsequent tests.
13. Persons who have successfully passed this fit test may be assigned the use of the tested respirator in atmospheres with up to ten times the PEL of airborne lead. In other works this IAA protocol may be used to assign a protection factor no higher than ten.

Appendix E  
Hazardous Communications Program

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# Hazard Communication Program



Sevenson Environmental Services, Inc.  
2749 Lockport Road  
Niagara Falls, NY 14305

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# Hazard Communication Program

## 1. INTRODUCTION

It's as true as ever! The bottom line for progress in health and safety problems is awareness. That means employers and employees must be aware of potential hazards before they can work safely.

A new standard, the Hazard Communication Standard, has been introduced into the workplace as a means to further communicate information about potential hazards. Specifically, this standard promotes awareness about chemical hazards. So if you work with or around hazardous substances this important standard affects **YOU**.

The following guidelines are intended as a training tool to explain the Hazard Communication Standard - What it is and how it is implemented in the workplace. These guidelines can be used as an introduction to the standard and also as an ongoing reference to be used as necessary.

Included are:

- a self-quiz to test your knowledge of the Hazard Communication Standard;
- a section-by-section breakdown of a Material Safety Data Sheet (MSDS);
- an example of a substance warning label;
- a glossary of common technical terms; and
- an explanation of the responsibilities of the chemical manufacturer, the employer, and the employee.

## 2. POLICY STATEMENT

In order to conduct our business, Severson must use certain chemicals that require specific precautions to be taken to protect our employee's health. It is the policy of Severson, in compliance with the OSHA Hazard Communication Standard, Title 29 Code of Federal Regulations 1910.1200, to communicate any relevant information regarding hazardous chemicals to potentially exposed employees, as well as to implement appropriate measures to safeguard employee safety and health. The goal of the program shall be to minimize the possibility of employee illness or injury arising from the exposure to hazardous chemicals.

It will be the responsibility of management and supervisors to ensure that adequate information is obtained and disseminated to the appropriate employees. It will be the employees responsibility to follow the recommended practices outlined in product labels, Material Safety Sheets (MSDS), company operating procedures, and company-provided training.

This Hazard Communication Program is intended to supplement our existing safety and health program. Current safety and health policies remain in effect.

The effectiveness of this program, as with all of our programs, depends upon the active support and involvement of all personnel.



---

Paul Jung, CIH, CSP  
Director of Health and Safety

### 3. EMPLOYEE NOTIFICATION

All employees who are or may be exposed to hazardous materials will be trained according to the requirements of the Hazard Communication Standard, HCS. The training will include the following elements:

a. Employee Information

Employees shall be informed about the hazardous chemicals and suspected hazards of substances to which they are exposed in the normal course of their work including:

1. Information on the operations in their work area where hazardous chemicals are present.
2. The location and availability of the Written Hazard Communication Program, including a list of hazardous chemicals and MSDS's.

b. Employee Training

All employees exposed to hazardous chemicals, including production employees, supervisors, and lab personnel, will be trained according to the following program:

1. Initial training for all employees will be conducted.
2. After the initial training, any necessary training required by the introduction of new hazardous chemicals and training for new employees will be conducted by the supervisor of the applicable department.
3. Subjects to be included in the Employee Training Program will include the following:
  - a) Methods and observations that may be used to detect the release of hazardous chemicals, such as employee monitoring, visual sightings, or odors of hazardous chemicals when released.
  - b) The measures which employees can take to protect themselves from exposure to hazardous chemicals (such as personal protective

equipment and emergency procedures).

- c) The physical and health hazards of the chemicals in the work area.
- d) An explanation of the labeling system, Material Safety Data Sheets, and how employees can obtain and use information on hazardous chemicals.
- e) The methods used to inform employees of the hazards of non-routine tasks.

All new employees will be trained before being exposed to any hazardous chemicals or situations. Retraining will occur as needed when new hazards become recognized, or when employees become exposed to new hazards as a result of transfer, process changes, or new chemical introductions. In the event non-English speaking or reading employees are utilized at the site accommodations will be made to either obtain a MSDS in their native language or have someone who can communicate effectively with the individual(s) participate in the training.

#### **4. MULTI-EMPLOYEE JOBSITES**

It is the policy of Severson to adequately apprise other contractors regarding the hazardous substance which their employees may be exposed to during the course of day to day activities. Contractors, whose employees may be exposed to hazardous substances used by Severson employees, will be given access to this Hazard Communication Program. This will provide all relevant chemical information necessary to protect their employees.

Contractors should be informed of conditions existing on-site which necessitate special precautionary measures through scheduled meetings.

Other on-site employers working among Severson employees are also required to adhere to the provisions of the Hazard Communication Standard. They shall make available copies of MSDS's for all hazardous materials used by their employees which can be reviewed by Severson employees. MSDS will be provided within a reasonable time period after such a request.

## 5. SELF-QUIZ

Test your knowledge of the Hazard Communication Standard and the NYS Right to Know Law by taking the following quiz. And when you've finished reading this booklet, re-test yourself. If you still have any questions, ask your supervisor.

- |    | YES   | NO    |  |
|----|-------|-------|--|
| 1. | _____ | _____ | Do you know the basic purpose of OSHA's Hazard Communication Standard, The Right to Know?                              |
| 2. | _____ | _____ | Do you know what your organization's responsibilities are concerning the disclosure of hazardous material information? |
| 3. | _____ | _____ | Do you know who is responsible for determining potential substance hazards?  |
| 4. | _____ | _____ | Do you know what information must be contained on the substance warning label?   |
| 5. | _____ | _____ | Do you know what MSDS is and what information it contains?   |
| 6. | _____ | _____ | Do you know the difference between a physical hazard and a health hazard?  |

## 6. HAZARD COMMUNICATION PROGRAM

### I. INVENTORY

- a. This section applies to any Hazardous Substance which is known to be present in the workplace in such a manner that employees may be exposed under normal conditions of use or in a foreseeable emergency.
- b. A written inventory of all the hazardous chemicals used or stored by Severson is kept at our main office.
- c. **What is a Hazardous Chemical?**

---

Virtually all chemical hazards fall into one or more of the four categories. There are

not strict boundaries between these four categories and most chemicals will fit into more than just one category. For example, flammable paint thinners can also be toxic.

**Flammable:** Includes materials that will burn. Usually, they are liquids that give off vapors that can ignite, but could also be gases, dusts and solid materials.

**Corrosive:** These materials can damage or burn your eyes or skin on contact and damage your lungs if inhaled. These are the acids, caustics, and some cleaners you may use.

**Toxic:** These include materials which are poisonous to the body. They can be any form; solid, liquid or gas.

**Reactive:** Includes materials that can react sometimes violently, when mixed with certain other materials. The reaction can release toxic vapors and gases. They can also produce heat or oxygen which can create a serious fire problem or explosion.

## ***II. WARNING LABELS***

Sevenson will ensure that each container of hazardous chemical in the workplace will be labeled with the following information:

- a. Identity of the hazard.
- b. Appropriate hazard warning or physical hazard.
- c. Health hazard.
- d. Manufacturers name and address.
- e. C.A.S. No. (Chemical Abstract Service)

The employer is not required to label portable containers into which hazardous chemicals are transferred from labeled containers and are intended only for immediate use.

Sevenson adheres to the policy that all manufacturer's and/or shipping labels will be left on the containers and that all containers will be labeled.

### ***III. MATERIAL SAFETY DATA SHEET (MSDS)***

It's up to Sevenson to obtain or develop a MSDS for all hazardous chemicals used in the workplace. The MSDS is a form that provides more detailed information about a chemical than the label. It is accessible upon request to employees through the employer. The MSDS file exists both on a computerized data system and in hard copies. The MSDS file is maintained by the Site Safety and Health Officer and is available for review at any time from the Safety Office. All material received on-site must have a MSDS prior to the use of this material.

**Sevenson's procedures** - If a MSDS is not received with the material, then the procedures for obtaining a MSDS are as follows:

- Step 1** - A letter will be sent at any time an item is received and a MSDS does not accompany it.
  
- Step 2** - If after 30 days, a MSDS has not been received, a follow up request will be sent.
  
- Step 3** - If after an additional 30 days from the follow up letter a MSDS has not been received, the company will report to OSHA in an attempt to receive the proper information.

Below is a sample letter requesting a MSDS:

Sevenson Environmental Services, Inc.  
2749 Lockport Road  
Niagara Falls, New York 14305

Dear Sir:

The Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (29 CFR 1910.1200) requires that employers be provided Material Safety Data Sheets (MSDS) for all hazardous substances used in their facility, and to make these sheets available to employees potentially exposed to these hazardous substances.

In an effort to comply with these regulations, we ask your cooperation in providing us with a Material Safety Data Sheet on (product name) no later than (date). Delays in receiving the MSDS information may prevent use of your product.

Please consider this letter as a standing request to your company for any information concerning the safety and health aspects of using this product that may become known in the future.

Your cooperation is greatly appreciated. Thank you for your timely response to this request. If you have any questions concerning this matter, please contact myself at the above address.

Sincerely,

**SEVENSON ENVIRONMENTAL SERVICES, INC.**

Paul Jung, CIH, CSP  
Director of Health and Safety

The Safety Director will review all incoming MSDS for completeness and accuracy and make the information directly available to employees. Employees will be advised of precautionary measures in using the product.

The following is a complete outline of the guidelines used to check for MSDS completeness:

1. Do we have MSDS for the hazardous chemicals used?
2. Is the MSDS in English?
3. Does the MSDS contain at least the following information?
  - a) The identity on the label?
  - b) The chemical and common name for single substance hazardous chemicals?
  - c) For mixtures tested as a whole:  
  
The chemical and common names of the ingredients which contribute to the hazards?
  - d) For mixtures tested as a whole:  
  
The chemical and common names of all ingredients which are health hazards or carcinogens?
  - e) The chemical and common names of all ingredients which have been determined to present a physical hazard when present in a mixture?
4. Does the MSDS contain the physical and chemical characteristics of the hazardous chemical (vapor pressure, flash point, etc.)?
5. Does the MSDS contain the physical hazards of the hazardous chemical, including the potential for fire, explosion, and reactivity?
6. Does the MSDS contain the health hazards of the hazardous chemical (including signs and symptoms, medical conditions aggravated)?
7. Does the MSDS contain the primary routes of entry?
8. Does the MSDS contain the OSHA PEL, the ACGIH TLV, and other exposure limits (including ceiling and other short-term limits)?
9. Does the MSDS contain the information on carcinogen listings (i.e. OSHA regulated

carcinogens, those indicated in the national Toxicology (NTP) annual report, and those listed by the International Agency for Research on Carcinogens (IARC)?

10. Does the MSDS contain generally applicable procedures and precautions for safe handling and use of the chemical (hygienic practices, or personal protective equipment)?
11. Does the MSDS contain generally applicable control (engineering controls, work practices, or personal protective equipment)?
12. Does the MSDS contain date of preparation or last change? Is this the current MSDS?
13. Does the MSDS contain the name, address, and telephone number of a responsible party?
14. Are all sections of the MSDS completed?

An example of an MSDS in its entirety is shown in the following pages.

### **Explanation:**

#### **PRODUCT NAME & IDENTIFICATION**

**Chemical Manufacturer's Name** - this may list one or more alternate manufacturers or importers, the address and emergency telephone number.

**Name of Product** - generally the trade name, which is an adopted name that is given by a manufacturer to distinguish it as produced by him and that it may be protected as a trademark.

**Chemical Name** - lists the name of the chemical. (In some cases this may be listed as a "Trade Secret" but the remainder of the MSDS should be filled out).

Make a special note that you may come across an MSDS or a label that does not list the chemical name. Sometimes that's allowed.

A manufacturer, importer, or employer may withhold the chemical identity if it is a trade secret. However, it must be stated clearly that the chemical is a trade secret and the hazardous nature of the chemical **MUST** still be listed, both on the label and the MSDS.

#### ***IV. EMPLOYEE TRAINING PROGRAM***

##### **A. Health Hazards & Emergency First Aid**

a. **Health Hazard**

This section is a quick summary of the possible health hazards associated with exposure to the chemicals.

b. **Emergency First Aid**

This section explains which type of first aid is to be applied in case of inhalation-absorption-ingestion.

**B. Fire, Explosion & Reactivity**

a. **Extinguishing Agent**

This explains what type extinguisher is to be used in case of fire. ABC-WATER-FOAM-etc.

b. **Flash Point**

Minimum temperature at which a liquid gives off sufficient vapor to form, with air, an ignitable mixture.

c. **Reactivity**

Reactives are materials which can change violently when combined with certain other materials or conditions. There are very few reactives in use by the construction trades. But knowing the hazard will help you when you do come in contact with them.

Oxidizers add oxygen to any situation where burning is occurring, and make the fire more intense and more difficult to put out. Some reactives explode or give off gas and heat in air or on contact with water.

Many substances can act like reactives when mixed with incompatible materials. Acids and bases react strongly with each other, giving off heat, often enough to cause boiling and splattering of the mixture. The Material Safety Data Sheet should tell you what materials may be incompatible with the chemical you are working with and what other materials to avoid.

**EXAMPLES**

The most common reactive mixture in construction is found in gas welding or brazing. Acetylene gas mixes with oxygen gas to provide an extremely powerful reaction in the form of a very intense flame.

Oxidizers, though, are the most commonly found reactive class. Most oxidizers are also corrosive, so keeping them away from the skin and eyes is necessary.

## **C. Protection Equipment**

### **a. Personal Protection**

This section explains what type of personal protection is required when working with various chemicals.

#### **Example:**

- vapor canister respirator
- supplied - air hose & mask
- rubber gloves
- rubber apron

Degree of exposure is always a consideration in the determination of exactly which of the personal protective equipment items shown is necessary for each particular operation. Consult Safety Director for further guidance on this.

This section also lists requirements for ventilation and names the specific types of ventilation needed.

## **D. Handling and Storage**

This section describes proper handling and storage procedure for the chemical.

#### **Example:**

#### **Safe Handling and Use of Flammables**

The important points for using flammables safely and reducing the amount of flammable vapor in the air and limiting sources of ignition are:

- Don't Smoke - Eliminate all sources of flames or ignition.
- Keep work containers of flammable materials as small as possible.
- Reduce surface area of all containers.
- Clean up spill promptly.
- Store flammable soaked rags in covered protective containers.
- Bond and ground all containers when dispensing.
- Use explosion proof wiring and equipment.

Safe handling of flammables may require personal protective equipment. Repeated contact with flammables on skin can remove the fatty protective layer and lead to irritation. Some flammables are also toxic and may require the use of a respirator. Also, avoid splashes onto the skin and into the eyes.

### **Safe Storage of Flammables**

Flammables, especially solvents, should be stored in the right container, unbreakable and specially designed for flammable liquids. It should have flame arresters and have a spring loaded cover. If storage is inside, small amounts can be kept in special flammable cabinets. Larger amounts should be stored in specially designed storage rooms which have devices and controls to minimize the risk of fire or explosion.

Care should be taken to provide storage of flammables away from oxidizers and corrosives. Oxidizers may ignite an otherwise non-flammable mixture. Corrosives may destroy the atmosphere. Concentrated vapors of flammables may sink to the floor and travel some distance to a source of ignition, with the flashback traveling back to the source containers.

### **Emergencies: Spills and Leaks**

Small leaks should be cleaned up quickly. If it is possible to limit the leak by closing a valve, shutting down the equipment, or moving the container, it should be done. Turn off electrical equipment which may provide a source of ignition.

If the leak is large, or your skin, eyes or clothes are contaminated, leave the area immediately. Wash eyes, skin and clothes with lots of water to remove the material. Get to fresh air. Notify your foreman or contractor as soon as it is safe to do so. Unless you have special training and the proper protective equipment, do not try to clean up a large leak.

### **Storage and Handling**

Reactivities should be stored away from other types of materials. Many, such as lithium, require conditions for storage, which necessitates separate rooms or facilities for storage.

Read the MSDS carefully when you see the word oxidizer or reactive. Note what chemicals are incompatible with the materials that you are using and avoid situations where they might become mixed.

Be sure to use any protective clothing or respiratory protection required by the MSDS or the process documentation. Many reactives are toxic, corrosive, or both. Protect yourself against the health hazards as well as the physical hazards of reactives.

## **Emergencies**

If it is practical, shut down any electrical equipment. If possible, stop the spill or leak from continuing, but if there is doubt, leave the area and notify your foreman or contractor.

Do not try to neutralize the material or clean up the spill unless you have appropriate protective equipment and have been properly trained in how to do so safely.

## **E. Exposure Limits**

### **Toxic**

Any material can be hazardous under the wrong conditions. The degree of the hazard depends on the dose. Even a substance as necessary to life as salt can cause problems when too much is present; drinking saltwater is eventually fatal. Small amounts of most materials may cause mild symptoms which disappear once the person is removed from the exposure. Larger doses can cause more severe illness, and extremely large doses can cause irreversible illness and even death.

Each person responds differently to hazardous material. In the United States, OSHA Permissible Exposure Limits are intended to protect the average person from the harmful effects of chemical exposures over a working lifetime. OSHA's definition of Toxic or Highly Toxic materials applies to only a very few potent poisons seldom used by construction trades. We will use the more common definition of toxic: any material which can cause illness or injury.

### **Acute and Chronic Effects**

Toxic materials can poison the body and cause harmful effects. There is a difference between the acute effect and chronic effect of exposure to toxic chemical hazards. Acute effects are usually due to a sudden overexposure to large quantities or concentrations of a material. The acute effects, for example, a firefighter overcome by smoke, will usually disappear after the exposure ends. Sometimes, supportive medical treatment is needed, but the body usually returns to normal.

Chronic toxic effects aren't easy to recognize. They are often the result of low levels of exposure over a long period of time. Typically, they effect one or more of the body's organ systems. If the problem is identified, the effect can often be reduced. If the exposure to a toxic material is stopped, healing of the organ or organ system can return the body to normal. Because of the slow and subtle nature of some diseases caused by exposure, irreversible damage can be caused by a long-term exposure to a chemical hazard. Asbestosis is a disease common to older insulation workers, and is an example of a debilitating chronic disease resulting from a long-term exposure to asbestos fibers in the air.

## **Routes of Entry**

Remember earlier we said that if a material couldn't get in or on your body, it probably wouldn't hurt you. To better understand what this really means, let's cover the three common ways that chemicals can enter your body.

1. **Inhalation** - Whenever you are doing a job that uses a toxic material, you need to be careful not to breathe too much of that material. This is the most common way that chemicals get into the bloodstream. As we breathe the material, which is probably a vapor, gas or fume mixed with the air, it enters our lungs. It is then easily transferred into our blood and taken throughout the body. To prevent this from happening, good ventilation is very important. Open doors and windows, or set up a fan that directs the air away from you. Respirators may also be necessary to protect you. Be sure you choose the correct one and know how to use it. Air filtration respirators take the toxic material out of the air you breathe, while air supplied respirators provide you with clean air from a tank or other source. If you think you need a respirator, check with your foreman or contractor and read the label or MSDS.
2. **Ingestion** - Some chemicals can hurt you if you accidentally eat or swallow them. Good personal habits often stop this route of entry. Washing hands before you eat and keeping your clothes clean are good practices. Check the MSDS or label for emergency and first aid procedures, and see a doctor if necessary.
3. **Skin Absorption** - This is a hazard with some materials. They have the ability to pass through unprotected skin into the bloodstream. Wearing proper gloves and other skin and face protection will reduce the chance for this route of entry to cause you harm. The label and MSDS both will tell you if gloves or other equipment is recommended. Remember that not all gloves are alike, nor will they protect you from all materials. Use the right ones.

## **Examples of Toxic Materials**

**Solvents** - Solvents are among the most common toxic materials in the workplace. Many processes, mixing and cleaning, use or give off solvent vapors. They are also used as thinners in paints and adhesives. Solvents vary in their toxicity from practically non-toxic materials such as the alcohols, ketones, halogenated solvents, to the very toxic such as dimethyl acetamide, methyl acrylate and other materials. Some solvents are also flammable or reactive.

The government and health professionals evaluate the hazards of materials, and decide upon exposure limits. These levels are called Threshold Limit Values (TLV). TLV's are usually stated in parts per million or milligrams per cubic meter, and represent a mixture of the

material with the air we breathe over a period of time. The TLV is expressed as a time weighted average (TWA) and indicates the limit of exposure that you should have over a period of time (eight hour work day, 40 hour work week). The TLV should not be exceeded. The TLV can be found for each material on the MSDS.

The following table provides a "Rough Guide" to the toxicity of solvents or other toxic materials you may work with. Check the glues, solvents or cleaners you use against this table. So you don't get confused, the more hazardous chemicals have the **lowest** TLV's, while the safer ones usually have **high** values listed:

Mildly Toxic	500 - 1000 ppm
Moderately Toxic	50 - 500 ppm
Toxic	1 - 50 ppm
Highly toxic	less than 1 ppm

Solvents can all cause irritations to eyes and skin in high concentrations. Most will dissolve the protective layer of oils on the skin and leave it looking white in the small cracks. They should never be used to clean the skin; if there is a problem with contamination, some form of glove or barrier cream should be used to protect the skin. The early signs of overexposure often include headaches, dizziness, and nausea, but there are many other causes of these symptoms.

**Metals and other particulate solids** - can be toxic and are usually given off when welding or grinding. Some, like gypsum dust are only nuisance dusts. Others, like zinc fume, can cause flu-like symptoms. Others, like asbestos have been linked to cancer or other chronic diseases. Dusts can irritate the skin and be ingested along with food, drinks, or smoking materials if they aren't washed off the hands and removed from clothing. They may even be carried home to the family and cause problems there.

**Lubricants, coolants and machine oils** - are not that common in construction, but are used when cutting, turning or milling metals. There are three types: petroleum based (straight oils), water based, and synthetic fluids which contain no oils. Many cutting oils contain additives to inhibit corrosion, prevent bacterial growth and permit high temperature operation. The fumes and mist from cutting operations can be irritating to the eyes and lungs. Skin exposure can result in acne-like conditions and can cause other problems. Avoid breathing mist and fumes and use gloves and aprons to minimize contact with the materials.

**Gases** - present a range of problems. Some, like nitrogen, are simple asphyxiants - they prevent the body from getting enough oxygen by displacing it from the airstream. Some are chemically hazardous, like carbon monoxide, or nitrous oxide, which cause poisoning of the body systems. Some are very toxic, like many of the gases used in the semiconductor

industry. These gases, which include silane, chlorosilane, arsine, phosphine, and others are very toxic - a few concentrated breaths can be fatal. Some are also very reactive, silane burns when exposed to air, and these hazards must be dealt with using carefully designed engineering controls. Other gases, like hydrogen, and natural gas are explosive and must be treated with great care. All compressed gas cylinders should be secured by chains or stands at all times, and only the proper fittings should be used.

**Plastics, epoxies and polymers** are a growing group of industrial chemicals. Materials such as polystyrene, polypropylene, acrylates, polyacrylates, vinyls, and polyurethanes are used for making a wide variety of products. Although most of these materials are not toxic in their final form, where they are being molded, extruded, vacuum formed, or laid up, there can be significant hazards. Isocyanates used in polyurethane production are strong lung sensitizers. Where the material is cut or molded at high temperature, the monomer materials, which can be quite toxic can be released. The products of partial thermal decomposition, or burning, can be very hazardous.

**Sensitizers** are a special class of materials that present a unique hazard. These are materials, such as epoxy systems and isocyanates, that react with the body's immune system. On the first exposure, which may be rather high, some mild irritation may be experienced. But, in future small exposures, severe immune reactions, hives, asthma-like symptoms and others, can be disabling and even fatal.

**Carcinogens, mutagens, and teratogens:** A mutagen is a material which causes a change in the genetic makeup of a cell. Substances which cause cancer are called carcinogens. Those which change the reproductive cells and can cause changes in the offspring are called teratogens. Although the body may be able to deactivate or remove some of these materials, a control strategy which minimizes worker exposure is essential when working with these materials.

**Reproductive hazards:** Some materials can cause problems in reproduction, either by interfering in the capability for reproduction, such as DBCP, or through being toxic to fetuses in the womb. Dimethyl acetamide is a material which is more toxic to developing fetuses than to the mother. Fortunately, few materials in construction fit this hazard category.

## **Safe Handling**

In general, minimizing contact with toxic materials will minimize the toxic effect. For hundreds of years, scientists noted that "The dose makes the poison." Use controls, such as ventilation, to draw contaminants away from the workplace air. Use respiratory protection to minimize the inhaled dose. Use goggles, gloves, aprons and other protective gear to keep the material off the skin, out of the eyes and away from the body. Although the body can get rid of a certain amount of most toxic chemicals, and the standards are there to maintain the level below that point, you can minimize your exposure by proper understanding of the routes of entry and methods of control.

## V. TRAINING AND LEARNING

### A. TRAINING COURSE OUTLINE

#### I. Course Introduction

- A. Chemical Hazard Recognition
- B. Sources of Information on Chemical Hazards
- C. Control of Chemical Hazards

#### II. Chemical Hazard Recognition

Employees shall be instructed of the health hazards of each hazardous chemical in their workplace.

##### A. Types of Hazards

1. Physical Hazards - employees shall be instructed on the fire hazard of hazardous chemicals in their workplace.
  - a. Combustible liquid
  - b. Compressed Gas
  - c. Explosive
  - d. Flammable
  - e. Oxidizer
  - f. Pyrophoric
  - g. Unstable or Reactive
2. Health Hazards
  - a. Acute Hazards
    - i. corrosive
    - ii. highly toxic
    - iii. toxic
    - iv. irritant
    - v. sensitizer
  - b. Chronic Hazards
    - i. carcinogens
    - ii. mutagens
    - iii. teratogens and reproductive toxins
    - iv. hepatotoxins
    - v. nephrotoxins

- vi. neurotoxins
- vii. other toxic effects

Employees shall be instructed on how to protect themselves when exposed to hazardous chemicals. They will also be instructed on the type and use of personal protective equipment required when using a particular hazardous chemical.

B. Routes of Entry

- 1. Ingestion
- 2. Inhalation
- 3. Skin absorption

C. Symptoms of Exposure to Hazardous substances

- 1. Acute exposure
  - a. Short term exposure period
  - b. Usually high concentrations
  - c. Immediate health effect
- 2. Chronic exposure
  - a. Long term exposure period
  - b. Usually low concentrations
  - c. Long term health effects
- 3. Types of reaction to acute and chronic exposures
  - a. Chronic lung disease-silica, cotton dust
  - b. Anesthetics-solvent vapors
  - c. Irritants-formaldehyde, acids
  - d. Chronic liver damage-carbon tetrachloride
  - e. Sensitizers-reactive dyes
  - f. Cutaneous Hazards-ketones, chlorinated compound
  - g. Eye hazards-methanol, acids

D. Relationship of Dose to Risk

- 1. Toxicity of chemical
- 2. Concentration of chemical
- 3. Mode of exposure and exposure time

4. The greatest risk is posed by toxic substances that are:
  - a. highly toxic
  - b. present in high concentrations and
  - c. to which employees are exposed to several hours per day/day after day

E. Exposure standard

1. OSHA Permissible exposure limits
  - a. 8-hour time weighted averages
  - b. 15 minute ceiling
  - c. legally binding
2. ACGIH Threshold Limit Values
  - a. 8-hour time weighted averages
  - b. instantaneous ceiling
  - c. not legally binding
3. Other Relevant Standards or Criteria
  - a. NIOSH Criteria Documents
  - b. ANSI Standards
  - c. EPA Health Assessment Documents
4. Common Features of Exposure Limits
  - a. units-very small amounts
    - i. ppm, ppb, ppt
    - ii. mg/m<sup>3</sup>, ug/m<sup>3</sup>
  - b. Not "safe" limits but exposure to concentration below levels is generally low risk

III. Sources of Information on Chemical Hazards

A. Summary of HCS

1. Hazard determination-performed by manufacturer
2. MSDS
3. Labeling
4. Training Requirements
5. Written Hazard Communication Program
6. List of Hazardous substances in workplace

B. Contents of a MSDS

1. Manufacturer's address and phone number
2. Hazardous ingredients/identity
3. OSHA, PEL, ACGIH, TLV, other recommended limits

4. Physical/Chemical characteristics
  - a. boiling point
  - b. vapor pressure
  - c. vapor density
  - d. solubility in water
  - e. specific gravity
  - f. melting point
  - g. evaporation rate
  - h. appearance and odor
  
5. Fire and explosion hazard data
  - a. flash point
  - b. flammable limits
  - c. explosive levels
  - d. extinguishing media
  - e. special fire fighting procedures
  - f. unusual fire and explosion hazards
  
6. Reactivity Data
  - a. stability
  
  - b. conditions to avoid
  
7. Health Hazard Data
  - a. routes of entry
  - b. acute and chronic hazards, including carcinogen
  - c. signs and symptoms of exposure
  - d. medical conditions aggravated by exposure
  - e. emergency first aid procedures
  
8. Precautions for Safe Handling and Use
  - a. steps to be taken in handling and storage
  - b. waste disposal method
  - c. precautions to be taken in handling and storing
  - d. other precautions
  
9. Control measures
  - a. ventilation
    - i. local exhaust, special
    - ii. mechanical other
  - b. sealed systems
  - c. other engineering controls
  - d. respiratory protection
  - e. protective gloves
  - f. other protective clothing or equipment

- g. eye protection
- h. workplace practices, industrial hygiene procedures

C. Labeling

- 1. Labels tell you
  - a. what the principal hazards are
  - b. what precautions you should take
  - c. emergency first aid procedures
- 2. Labels provide this information by
  - a. words
  - b. symbols
  - c. numbers
  - d. colors
  - e. combinations

D. Recognizing Hazardous Chemicals are present

- 1. Appearance or odor of hazardous chemicals
- 2. Physical or health effects
- 3. Monitoring
- 4. Inventory Control

IV. Control of Chemical Hazards

A. Chemical Hazards are Controlled by Various Methods

- 1. Engineering control, e.g. ventilation
- 2. Workplace practices e.g. grounding containers of flammable substances
- 3. Personal protective devices
  - a. gloves, shoes
  - b. safety glasses
  - c. protective clothing
  - d. dust masks
  - e. respirators
- 4. Isolation of chemical

B. Safe Handling of Hazardous Chemicals

- 1. Storage practices

2.     Reactivity considerations
3.     Proper containers
4.     Spill prevention
5.     Spill cleanup procedures
6.     Personal protective equipment

## **B.     LEARNING**

Knowing that we have an inventory of hazardous materials, MSDS's on file, warning labels on the containers can improve our safety. But learning to recognize the hazards on the job and how to protect ourselves is really what this training section is really all about.

We share the responsibility for safety and health with our employees, and we also share the training responsibility.

But we can have all the training in the world and if we don't learn anything or practice what we've learned, the entire system can be a failure. Take this program as an example. It contains most of the important points you need to know. But if you don't take the time to learn it, how will you know when you face a material that is hazardous or what to do to protect yourself when you use it?

Learning, not training, is really what this part of the system is all about. Be concerned and ask questions. **THE SYSTEM DOES WORK!**

If there are any questions pertaining to this program call Paul Jung, Director of Health and Safety.

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Appendix F  
Fall Protection Program

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**Sevenson Environmental Services, Inc.**

**FALL PROTECTION PROGRAM**

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## Attachments

Attachment 1 – Fall Protection Plan

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## 1.0 Introduction

The objective of this Fall Protection Program is to identify and evaluate fall hazards to which employees will be exposed and to provide specific training as required by the Occupational Safety and Health Administration (OSHA) Fall Protection Standard, 29 CFR 1926, Subpart M and the USACE Health and Safety Manual EM 385-1-1, Section 21.

## 2.0 Policy

It is the policy of Severson Environmental Services, Inc. (Severson) to protect its employees and sub contractors from occupational injuries by implementing and enforcing safe work practices and appointing a competent person(s) to manage the Fall Protection Program. This Fall Protection Program shall comply with OSHA and USACE requirements. A copy of the EM 385-1-1 and OSHA Fall Protection Standards shall be made available to all employees, and may be obtained from the Site Safety and Health Officer(s) (SSHO).

This Fall Protection Program covers the use of Personal Fall Arrest Systems at a number of areas at the Site. These areas are:

1. Working at heights greater than 6 feet or leading edge work
2. Working in aerial/man lifts
3. Securing of ladders

## 3.0 Definitions

**Anchorage** – means a secure point of attachment for lifelines, lanyards or deceleration devices.

**Basic rescue** – means providing rescue services for a fallen employee(s) who does not require immediate emergency medical services and can be performed with a ladder or aerial lift man basket.

**Body harness** – means straps which may be secured about the employee in a manner that will distribute the fall arrest forces over at least the thighs, pelvis, waist, chest and shoulders with means for attaching it to other components of a personal fall arrest system.

**Deceleration device** – means any mechanism, such as a rope grab, rip-stitch lanyard, specially-woven lanyard, tearing or deforming lanyards, automatic self-retracting lifelines/lanyards, etc., which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on an employee during fall arrest.

**Deceleration distance** – means the additional vertical distance a falling employee travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which the deceleration device begins to operate. It is measured as the distance between the location of an employee's body harness attachment point at the moment of activation (at the onset of fall arrest forces)

of the deceleration device during a fall, and the location of the attachment point after the employee comes to a full stop.

**Guardrail system** – means a barrier erected to prevent employees from falling to lower levels.

**Infeasible** – means that it is impossible to perform the construction work using conventional fall protection systems (i.e., guardrail system, safety net system, or personal fall arrest system) or that it is technologically impossible to use any one of these systems to provide fall protection.

**Lanyard** – means a flexible line of rope, wire rope, or strap which generally has a connector at each end for connecting the body harness to a deceleration device, lifeline, or anchorage.

**Personal Fall Arrest System** – means a system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, a body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these.

**Positioning device system** – means a body harness system rigged to allow an employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning.

**Self-retracting lifeline/lanyard** – means a deceleration device contained in a drum-wound line which can be slowly extracted from, or retracted onto, the drum under slight tension during normal employee movement, and which, after onset of a fall, automatically locks the drum and arrests the fall.

**Unprotected sides and edges** – means any side or edge (except entrances to point of access) of a walking/working surface, e.g., floor, roof, ramp, or runway where there is no wall or guardrail system at least 39 inches high.

#### 4.0 Duties and Responsibilities

##### 1. Severson

It is the responsibility of Severson to provide fall protection to affected employees, and to ensure that all employees understand and adhere to the procedures of this plan and follow the instructions of Site Safety and Health Officer (SSHO) or Competent Person.

##### 2. Program Manager – Mr. Eric Tschudi

It is the responsibility of SSHO as the Fall Protection Program Manager to implement this program by:

1. Performing routine safety checks of work operations;
2. Enforcing Site safety policy and procedures;
3. Correcting any unsafe practices or conditions immediately;
4. Training employees and supervisors in recognizing fall hazards and the use of fall protection systems;

5. Maintaining records of employee training, equipment issue, and fall protection systems used at the Site; and
  6. Investigating and documenting all incidents that result in employee injury.
3. Competent Person

Is it the responsibility of the Competent Person to:

1. Understand the hazards posed by falls.
  2. Calculate fall forces.
  3. Understand the methods of fall protection.
  4. Assist in the implementation of the Fall Protection Program.
  5. Select, inspect and maintain the fall arrest equipment.
  6. Ensure Site personnel are properly trained in the use and limitation of fall protection.
4. Employees

It is the responsibility of all employees to:

1. Understand and adhere to the procedures outlined in this Fall Protection Program;
2. Follow the instructions of the SSHO or Competent Person;
3. Bring to management's attention any unsafe or hazardous conditions or practices that may cause injury to either themselves or any other employees; and
4. Report any incident that causes injury to an employee, regardless of the nature of the injury.

## **5.0 Description of Tasks**

(Examples – Specific tasks to be entered once identified)

1. Working at heights greater than 6 feet for construction activities or leading edge work  

Workers may be exposed to falling greater than six feet from either working at heights or working near the edge of a drop off.
2. Working in aerial/man lifts  

Workers may utilize aerial lifts at the Site to perform maintenance on equipment or systems. Any time a person is in the basket of an aerial lift they will utilize a restraining system.
3. Securing ladders  

Workers may have to utilize ladders at the Site to perform assigned job tasks. Any time a person utilizes a straight ladder that must be secured a Fall

Protection Plan will be completed to ensure a safe plan has been developed to protect workers.

## **6.0 Training Requirements**

All employees who may be exposed to fall hazards are required to receive training on how to recognize such hazards, and how to minimize their exposure to them. Employees shall receive training as soon after employment as possible, and before they are required to work in areas where fall hazards exist.

A record of employees who have received training and training dates shall be maintained by the SSHO. Training of employees shall include:

1. Nature of the fall hazards employees may be exposed to.
2. Correct procedures for erecting, maintaining, disassembling, and inspecting fall protection systems.
3. Use and operation of controlled access zones, guardrails, personal fall arrest systems, safety nets, warning lines, and safety monitoring systems.
4. Limitations of the use of mechanical equipment during roofing work on low-slope roofs (if applicable).
5. Correct procedures for equipment and materials handling, and storage and erection of overhead protection.
6. Requirements of the OSHA Fall Protection Standard, 29 CFR 1926, Subpart M and the USACE EM 385-1-1 Section 21, "Fall Protection".
7. Severson and USACE requirements for reporting incidents that cause injury to an employee.
8. Documented training for personnel utilizing an aerial lift.

Additional training shall be provided on an annual basis, or as needed when changes are made to this Fall Protection Program, the EM 385-1-1 (pertaining to fall protection), or the OSHA Fall Protection Standard.

## **7.0 Anticipated Hazards**

Prior to the use of a personal fall arrest system a Fall Protection Plan, a Fall Hazard Analysis (FHA), and an Activity Hazard Analysis (AHA) will be completed for the associated task. The Fall Protection Plan (Attachment 1) will be completed by the SSHO or his designee. The Fall Protection Plan, FHA, and AHA will identify the anticipated hazards and the controls to be implemented to reduce or eliminate these hazards.

Some of the anticipated hazards at the Site include leading edge work at the Reservoir, the use or aerial lifts, erection of the sediment treatment equipment, and work from ladders.

## **8.0 Fall Hazard Prevention and Control**

### Engineering Controls

This should always be the first option for selection whenever possible (i.e., light bulb changing, telescoping arm, changing valve, relocate at ground level).

## Guardrails

For all work areas, only guardrails made from steel, wood, and wire rope will be acceptable. All guardrail systems will comply with the current OSHA and EM 385-1-1 standards (i.e., withstand 200 pounds of force, 42-inch high hand rail, midrail, and toeboard). These guardrails will be placed in the following areas if necessary or feasible based on job location or requirements:

1. On all open sided floors.
2. Around all open excavations or pits.
3. On leading edges of roofs or decking.

## Personal Fall Protection Systems

All employees that will be required to wear a personal fall arrest or restraint system will follow these guidelines:

1. A full body harness will be used at **all** times.
2. **All personal fall arrest systems will be inspected before each use by the employee.** Any deteriorated, bent, damaged, impacted and/or harness showing excessive wear will be removed from service.
3. Connectors will be inspected to ensure they are drop forged, pressed, or formed steel or are made of equivalent materials **and** that they have a corrosion resistant finish as well as that all surfaces and edges are smooth to prevent damage to interfacing parts of the system.
4. Verify that D rings and snap hooks have a minimum tensile strength of 5,000 lbs and that the D rings and snap hooks are proof tested to a minimum tensile load of 3,600 lbs without cracking, breaking, or taking permanent deformation.
5. Only shock absorbing lanyards or retractable lanyards are to be used so as to keep impact forces at a minimum on the body (fall arrest systems).
6. Only nylon rope or nylon straps with locking snaphooks are to be used for restraints.
7. All lanyards will have self-locking snaphooks.
8. Snap hooks are not engaged in the following manners:
  - a. To a tie off adapter D ring to which another snap hook or other connector is attached;
  - b. In a manner that would result in a load on the gate;
  - c. In a false engagement, where features that protrude from the snap hook or carabiner catch on the anchor and without visual confirmation seems to be fully engaged to the anchor point;
  - d. To each other;

- e. Directly to webbing or rope lanyard or tie-back unless the manufacturer's instructions for both the lanyard and the connector specifically allow such a connection;
  - f. To any object which is shaped or dimensioned such that the snap hook or carabiner will not close and lock, or that rollout could occur.
9. The maximum free fall distance is not to exceed **6 feet**. Consideration must be given to the total fall distance. The following factors can affect total fall distance:
- a. Length of connecting means (i.e., lanyard length, use of carabiners, snaphooks, etc.).
  - b. Position and height of anchorage relative to work platform/area (always keep above head whenever possible).
  - c. Position of attachment and D-ring slide on the full body harness.
  - d. Deployment of shock absorber (max 42-inches).
  - e. Movement in lifeline.
  - f. Initial position of worker before free fall occurs (i.e., sitting, standing, etc.).

### **Calculating Total Fall Distance**

Knowing how to calculate Total Fall Distance is as important as picking the proper harness, lanyard, and anchorage system. Total Fall Distance (TFD) is defined as the sum of the Free Fall Distance (FFD), Deceleration Distance (DD), Harness Effect (HEFF), Vertical Elongation (VEL), and Safety Factor (SF) of at least one foot. The TFD can be calculated by:

$$\text{TFD} = \text{FFD} + \text{DD} + \text{HEFF} + \text{VEL} + \text{SF}$$

Where:

- TFD Total Fall Distance or the vertical distance a worker travels between the onset of a fall till the fall event is completed.
- FFD Free Fall Distance or the vertical distance a worker travels between the onset of a fall until just prior to the point where the Fall Arrest System begins to arrest the fall.
- DD Deceleration Distance or the vertical distance a worker travels between the activation of the Fall Arrest System and the final fall arrest. (Federal OSHA limits this distance to 3.5-feet or less. This distance is determined by the manufacturer and can be found on the product label.)
- HEFF Harness Effect Distance or the stretch of a harness during a fall arrest. (This is typically one foot or less for a properly fitted harness. However, some harnesses use elastic-type webbing that

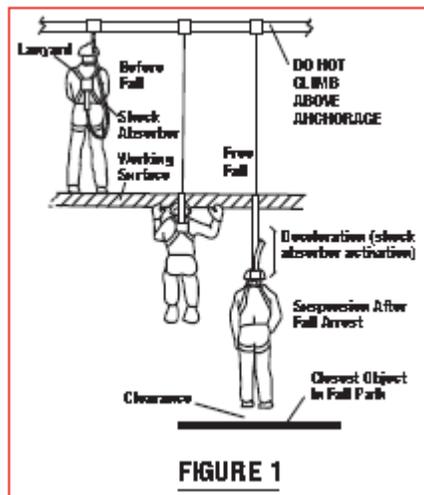
can increase the harness effect to two feet or more. Check manufacturer's information to determine this distance.)

- VEL Vertical Elongation Distance or the stretch in the lifeline of the Personal Fall Arrest System. Vertical Elongation is measured on the part of the lifeline that is under tension during deceleration and final fall arrest. This variable will change drastically depending upon the type of Fall Arrest System. For example, most shock-absorbing lanyards are designed to have a maximum deceleration distance of 3.5 feet, which includes the vertical elongation of the lanyard. However, if you are using a rope grab system or a horizontal lifeline, vertical elongation must be calculated based on the stretch of the vertical or horizontal lifelines in those systems. You will need to check the specific manufacturers' product information for exact stretch percentages.
- SF Safety Factor Distance is an additional factor of safety to ensure that you have the required clearance below your working surface. This should be at least one foot but can reflect any number with which you feel comfortable.

Example:

- Full body harness
- 6-foot shock absorbing lanyard
- Fixed, ridged anchor point (such as a D-plate bolted to a structural I-beam)
- Figure , provides visual for example

**Figure 1- Example for Calculating Fall Distance**



In Figure 1 we see a worker with a 6-foot shock absorbing lanyard on an elevated platform. In this example, let's assume the anchor point is 2-feet about the back D-ring of the harness. For every 1-foot the lanyard attachment point is above the harness back D-ring, 1-foot is deducted from the FFD. For every 1-foot the

lanyard attachment point is below the harness back D-ring, 1-foot is added to the FFD. In this example, if the worker falls, the FFD will equal 4-feet since the lanyard attachment point is 2-feet above the back D-ring of the harness. So the formula looks like this:

- $TFD = 4 \text{ feet} + DD + HEFF + VEL + SF$

The next value to consider is Deceleration Distance or the DD. Federal OSHA requires that this distance not exceed 3.5-feet. Since all manufacturers' products are slightly different, you will have to read the label or product specification sheet to determine the maximum DD that a product will permit and use that value for your calculation. In this example, the maximum deceleration distance will be 3.5-feet.

- $TFD = 4 \text{ feet} + 3.5 \text{ feet} + HEFF + VEL + SF$

The Harness Effect or HEFF variable is relatively constant at less than 1-foot. This will vary slightly due to the adjustment of the harness, so we generally use 1-foot to account for these slight differences. However, elastic type harnesses can have more than 1-foot of stretch, possibly 2-feet or more, and that additional distance must be accounted for in your calculation. In this example, we are using a non-elastic harness.

- $TFD = 4 \text{ feet} + 3.5 \text{ feet} + 1 \text{ foot} + VEL + SF$

Most manufacturers design their shock absorbing lanyards so that the vertical elongation of the lanyard is included in the OSHA mandated 3.5-foot maximum DD. However, if we were using a rope grab or vertical life line, or if you were attaching to a non-ridged anchorage connector, the VEL would need to be based on the specifications of those components in the Fall Arrest System. Since this example uses a ridged anchor point and a 6-foot shock absorbing lanyard and the VEL is already considered in the lanyard design the VEL for our equation will be zero (0).

- $TFD = 4 \text{ feet} + 3.5 \text{ feet} + 1 \text{ foot} + 0 \text{ feet} + SF$

The final variable of the formula is the safety factor or SF. It is always a good idea to include at least 1-foot, however, that safety factor could reflect any number that makes you comfortable with your calculation. If you are using a non-ridged system it would not be uncommon to see a SF of 3-feet or more.

- $TFD = 4 \text{ feet} + 3.5 \text{ feet} + 1 \text{ foot} + 0 \text{ feet} + 1\text{-foot}$

We can now solve for Total Fall Distance or TFD. The TFD for this example would be 9.5-feet. So, you will need a minimum of 9.5-feet clearance from the workers feet to the next level or object below.

NOTE: Some people calculate the TFD from the anchor point, to modify this equation to reflect the distance from the anchor point you would add the distance from the working surface to the workers D-ring and add it to the equation.

Example: Let's use the same example from above. The distance from the working level (the level the worker is standing on) to the distance the harness D-ring is from

that surface is 5-feet. You would add 5-feet to 9.5 feet for a total distance of 14.5-feet from the anchor point to the lower level or object.

### Engineered Lifeline

Lifeline systems must be designed and approved by an engineer or qualified person.

Lifeline systems must be engineered to have appropriate anchorages, strength of line designed to hold X number of individuals connected to it, line strength to aid in the arrest of a fall, and durability to hold a fallen employee(s) suspended until rescue can occur.

### Warning Line System

All flat roofs greater than 50 feet wide (i.e., roof with less than 4/12 slope) where work is performed 6 feet or further back from the edge of the roof can be completed by installing a Warning Line and using a safety monitor. Warning Lines will consist of the following:

1. Will be erected 6 feet from the edge of the roof.
2. Be constructed of stationary stanchions capable of resisting without tipping over a force of at least 16 pounds applied horizontally against the stanchion.
3. Wire, chain, or rope shall be rigged and supported in such a way that at its lowest point (including sag) is no less than 34 inches from the walking/working surface and its highest point is no more than 39 inches for the walking/working surface.
4. Wire, chain, or rope will be flagged at no more than 6-foot intervals with high visibility material. The rope, wire or chain shall have a minimal tensile strength of 500 pounds.
5. The warning line will guard the entire perimeter of the roof where work is being performed.

If an employee must access an area within 6 feet of the roof edge for reasons *other than* exiting the roof via a ladder or fixed industrial ladder, another employee must monitor that individual and warn him/her of any dangers. If another employee is not available to act as a safety monitor, then the employee must don a full body harness and attach a fall restraint lanyard to an anchor point to prevent reaching the edge of the roof.

## **9.0 Rescue Plan and Procedure**

The height of the work to be performed at the Site requiring the use of personal fall arrest systems is less than 20 feet.

An employee who falls must be rescued within 15 minutes to avoid permanent physical harm. Site personnel will be responsible for performing basic rescue for persons involved in a fall arrest situation when no life threatening injuries are present. If a situation occurs where the fallen person receives injuries that require immediate emergency medical attention, local emergency services will be summons via 911.

The following basic rescue equipment will be made available at the Site where personal fall arrest systems are employed:

- A straight or folding ladder tall and strong enough to reach the maximum height an individual may be suspended from.
- In the absence of a suitable ladder, an aerial lift with a man basket may be used.

Basic rescue equipment shall be located and inspected prior to work being performed. During the rescue, ladders will be properly positioned and either held in place or secured in place to prevent the ladder from sliding or falling. If a fallen worker cannot access the ladder under their own power, 911 will be immediately called for rescue assistance. At no time will the ladder weight restriction be compromised to perform a basic rescue.

If injuries are involved where the worker cannot be moved or should not be moved, 911 will be immediately called for rescue assistance.

A medical professional must evaluate and clear any worker involved in a fall arrest stop for suspension trauma before being allowed to resume work duties.

### **10.0 Designs of Personal Fall Arrest Systems**

Personal fall arrest systems will be designed by a professional engineer and installed as directed by the manufacturer. All equipment used in a personal fall arrest system shall meet the requirements set forth in ANSI/ASSE Z359.1-2007. Full body harnesses labeled to meet the requirements of ANSI A10.14 shall not be used. The SSHO shall ensure all personal fall arrest system equipment meets these standards by showing proof from the manufacturer. The proof can be presented by the manufacturer in either as built drawings/specifications or affixed tags to the system parts.

### **11.0 Inspection, Maintenance, and Storage of Fall Protection Equipment**

The following criteria will be utilized to maintain all equipment in good working condition.

#### Full Body Harnesses

1. Inspect before each use.
  - Closely examine all of the nylon webbing to ensure there are no burn marks, which could weaken the material.
  - Verify there are no torn, frayed, broken fibers, pulled stitches, or frayed edges anywhere on the harness.
  - Examine D-ring for excessive wear, pits, deterioration, or cracks.
  - Verify that buckles are not deformed, cracked, and will operate correctly.
  - Check to see that all grommets (if present) are secure and not deformed from abuse or a fall.
  - Harness should never have additional punched holes
  - All rivets should be tight, not deformed.
  - Check tongue/straps for excessive wear from repeated buckling.

2. Semi-annual inspection of all harnesses will be completed by the SSHO; documentation will be maintained on file.
3. Storage will consist of hanging in an enclosed cabinet, to protect from damage.
4. All harnesses that are involved in a fall will be destroyed.

#### Lanyards/Shock Absorbing Lanyards

1. Inspect before each use.
  - Check lanyard material for cuts, burns, abrasions, kinks, knots, broken stitches and excessive wear.
  - Inspect the snaphooks for hook, locks, and eye distortion.
  - Check carabiner for excessive wear, distortion, and lock operation.
  - Ensure that all locking mechanisms seat and lock properly.
  - Once locked, locking mechanism should prevent hook from opening.
  - Visually inspect shock absorber for any signs of damage, paying close attention to where the shock absorber attaches to the lanyard.
  - Verify that points where the lanyard attaches to the snaphooks are free of defects.
2. Semi-annual inspection of all harnesses will be completed by the SSHO; documentation will be maintained on file.
3. Storage will consist of hanging in an enclosed cabinet, to protect from damage.
4. All lanyards that are involved in a fall will be destroyed.

#### Snaphooks

1. Inspect before each use.
  - Inspect snaphooks for any hook and eye distortions.
  - Verify there are no cracks, pitted surfaces, and eye distortions.
  - The keeper latch should not be bent, distorted, or obstructed.
  - Verify that the keeper latch seats into the nose without binding.
  - Verify that the keeper spring securely closes the keeper latch.
  - Test the locking mechanism to verify that the keeper latch locks properly.
2. Semi-annual inspection of all harnesses will be completed by the SSHO; documentation will be maintained on file.
3. All snaphooks involved in a fall will be destroyed.

#### Self-Retracting Lanyards

1. Inspect before each use.
  - Visually inspect the body to ensure there is no physical damage to the body.
  - Make sure all back nuts or rivets are tight.
  - Make sure the entire length of the nylon strap is free of any cuts, burns, abrasions, kinks, knots, broken stitches, and excessive wear and retracts freely.
  - Test the unit by pulling sharply on the lanyard to verify that the locking mechanism is operating correctly.
  - If manufacturer requires, make certain the retractable lanyard is returned to the manufacturer for scheduled annual inspections.
2. Semi-annual inspection of all harnesses will be completed by the SSHO; documentation will be maintained on file.
3. Service per manufacturer specifications.
4. Inspect for proper function after every fall.

#### Tie-off Adaptors/Anchorages

1. Inspect for integrity and attachment to solid surface.
2. Semi-annual inspection of all harnesses will be completed by the SSHO; documentation will be maintained on file.
3. All tie-offs adaptors will be destroyed and replaced after a fall.

#### Articulating Man Lift

1. Inspect before each use.
2. Inspect/service per manufacturer guidelines. Forklift, scissors lifts, and safety nets will be inspected at the beginning of each shift in use. Structural integrity or forklift basket will be checked per same schedule.
3. Semi-annual inspection of all harnesses will be completed by the SSHO; documentation will be maintained on file.

Maintenance will be performed as specified by the manufacturer.

Personal fall arrest equipment will be stored as follows:

1. Never store the personal fall arrest equipment in the bottom of a tool box, on the ground, or outside exposed to the elements (i.e., sun, rain, snow, etc.).
2. Hang equipment in a cool dry location in a manner that retains its shape.
3. Always follow manufacturer recommendations for inspection.
4. Clean with a mild, nonabrasive soap, and hang to dry.
5. Never force dry or use strong detergents in cleaning.
6. Never store equipment near excessive heat, chemicals, moisture, or sunlight.

7. Never store in an area with exposures to fumes or corrosives elements.
8. Avoid dirt and build-up on equipment.
9. Never use this equipment for any purpose other than personal fall arrest.
10. Once exposed to a fall, remove equipment from service immediately.

A designated storage area will be established for personal fall arrest equipment. An inspection sheet will be posted at the storage area to allow site personal to document their inspection prior to use. The inspection sheet will also provide direction and requirements for ensuring the equipment is in satisfactory condition.

### **12.0 Incident Investigation Procedures**

All incidents that result in injury to workers, as well as near misses, regardless of their nature, shall be reported and investigated. The SSHO and Site Superintendent shall conduct investigations as soon after an incident as possible to identify the cause and means of prevention to eliminate the risk of reoccurrence.

In the event of such an incident, the Fall Protection Program shall be reevaluated by the SSHO and Safety and Health Manager to determine if additional practices, procedures, or training are necessary to prevent similar future incidents.

### **13.0 Evaluation of Program Effectiveness**

This fall protection program will be evaluated periodically to determine effectiveness. The following criteria will be used to evaluate its performance:

1. Accident reports, number of accidents.
2. Management/staff compliance with program components.
3. Periodic on-site audits.
4. Safety Observation Reports
5. Staff feedback, interviews.

### **14.0 Inspection and Oversight Methods Employed**

The SSHO, Site Superintendent, and the Construction Quality Control Systems Manager will be responsible for performing Safety Observation Reports for personnel performing tasks that involve the use of personal fall arrest systems. These observations will be done on a random basis and will be used in to aid in the evaluation of the Fall Protection Programs effectiveness. The Fall Protection Program will also be audited on a quarterly basis by the Safety and Health Manager or a member Severson's corporate health and safety staff.

# Fall Protection Plan

## Project Information

Project Location:		Plan Effective Dates
Specific Equipment Involved		Start:
Project Description		End:
Fall Protection Plan Author (Print)		Office or Cell Phone Number
Fall Protection Plan Author (Sign)		
Competent Person (Print)		Office or Cell Phone Number
Competent Person (Sign)		
Site Superintendent (Print)		Office or Cell Phone Number
Site Superintendent (Sign)		

# Fall Protection Plan

## Elevated Surface Work Plan

Questions to Consider	Answers or Solutions
Has an Activity Hazard Analysis (AHA) and a Fall Hazard Analysis (FHA) been performed to identify the hazards and controls to be used to eliminate hazards for work at unprotected elevations?	
What is the job to be performed?	
What is the location and the height of the work?	
What is the working or walking surface like (flat steel, textured steel, wood planking, dirt, etc.)?	
Are there any environmental factors to consider (i.e., heat, cold, slippery, wet, wind, glare, etc.)?	
Are there any hazards nearby or underneath that are exposed or could become exposed in an impact (i.e., plumbing lines, electrical exposures, protruding or impalement hazards, etc.)?	
Will the work require special PPE (besides fall protection)?	
Will workers be utilizing the buddy system or will someone be monitoring the worker?	
How will the tools and equipment get to the work location (bucket with rope, tool belt, manlift, etc.)?	

# Fall Protection Plan

Questions to Consider	Answers or Solutions
Does the lower level work area need to be barricaded to keep non-essential personnel away from the work area?	
Can the work be performed from the ground with extendable tools?	
Can the work be performed from a secured ladder?	
Can an aerial lift or scissor lift be used? Is the operator qualified to use this equipment?	
If not, can portable guardrails be installed?	
If not, can a fall arrest system be used?	
If yes, has a Fall Hazard Analysis and Rescue Plan been developed?	
Other?	

# Fall Protection Plan

## Fall Hazard Analysis for Fall Arrest

Are there any existing approved anchorage points that can be used? Where?	
Is the anchorage point labeled or obviously capable of holding 5000 pounds or more as determined by a qualified person?	
If not, can approved pre-engineered or manufactured anchorages be installed?	
Is the right equipment (full body harness, minimum length lanyard, shock absorber, connecting hardware, I-beam strap, self-retracting life line, etc.) available to affected employees?	
What is the distance a person may fall?	
Is there at least 6 feet of clear space from anchorage point before the next level down? (Calculate fall distance.)	
Will the worker hit anything on the way down during a fall?	
Has a Fall Rescue Plan been developed to determine how a fallen person will be rescued if suspended in the harness?	

# Fall Protection Plan

## Rescue Plan

A rescue plan must be developed whenever fall arrest systems are in use and when personnel may not be able to self-rescue if a fall occurs.

What is the emergency rescue service contact information (Emergency phone number and name of agency)?	
Are there any special instructions to give to the emergency rescue service when requesting assistance?	
Is basic (non-emergency) rescue equipment (i.e., ladders, aerial lifts, additional harnesses) immediately available at the work area for this task?	
Are there any obstructions in the way of reaching the suspended worker? If so, what.	
How will the rescue be assured within 15 minutes of the occurrence of the fall to minimize the risk of further injury or death due to suspension trauma?	
How will the safety of the rescuers be assured as well as that of the suspended worker?	
What communication systems will be used between the suspended worker and the rescue team?	

Appendix G  
Control of Hazardous Energy Program

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# Beech Creek Superfund Site

Control of Hazardous Energy (Lockout/Tagout) Program



Sevenson Environmental Services, Inc.  
2749 Lockport Road  
Niagara Falls, NY 14305

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## 1.0 Purpose

It is this company's policy that before any work or maintenance is performed on any machine, equipment, tool, or electrical system, that they are made totally safe before work starts by removing any source of energy or power to them. The Lockout/Tagout Program provides for a safe method of working on, near, or in machinery or equipment that can cause serious injury.

This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It will be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

NOTE: This program will be available to all employees for review and a copy will be located in the following area(s):

1. Health and Safety Office
4. Main Office Trailer

## 2.0 Authority and Reference

Occupational Safety and Health Administration (OSHA) 29 CFR 1910.147.

This standard covers the servicing and maintenance of machines and equipment in which the unexpected energizing or start up of the machines or equipment, or release of stored energy could cause injury to employees.

## 3.0 Application

This program applies to the control of energy during servicing and/or normal maintenance of machines and equipment if:

1. An employee is required to remove or bypass a guard or other safety device.
2. An employee is required to place any part of his or her body into an area on a machine or piece of equipment where work is being performed at or upon the point of operation, or when an associated danger zone exists during a machine operating cycle.

EXCEPTION: Minor tool changes and adjustments which take place during normal production operations are not covered by the OSHA Standard if they are routine, repetitive, and integral to the use of the equipment for production, provided that the work is performed using alternative measures which provide effective protection.

NOTE: The OSHA Lockout/Tagout Standard (See 29 CFR 1910.147) does not apply to work on cord-and-plug-connected electrical equipment when the employee performing the service or maintenance controls energizing by unplugging the equipment from the energy source. The standard also does not apply to hot tap operations involving transmission systems from substances such as gas, steam, water, or petroleum, when they are performed on pressurized pipelines. However, it must be demonstrated that the continuity of service is essential, shut off of the system is impractical, and special equipment is used which provides effective protection.

### 3.1 Affected Employees

Job Classification(s) required following Lockout/Tagout procedures include:

1. Mechanics

2. Watertreatment Personnel
3. Equipment Operators
4. Laborers
5. Electricians

### 3.2 Authorized Employees

Job classifications that have the authority and responsibility to perform lockout operations:

1. Mechanics
2. Watertreatment Personnel
3. Equipment Operators
4. Electricians
5. Laborers

### 3.3 Other Employees

Job classifications whose work operations are or may be in an area where energy control procedures may be utilized:

1. Health and Safety personnel
2. Site Superintendent
3. Project Manager

### 3.4 Sources of Energy and Stored Energy Requiring Lockout

1. Electrical: service panels, outlets, transformers, motors, and capacitors
2. Mechanical: spring-loaded equipment, tensioning devices
3. Hydraulic: rams, oil-powered equipment
4. Pneumatic: compressed-air equipment
5. Kinetic/Gravity: counterweights, flywheels
6. Fluids/Steam: heating pipes, steam lines

## **4.0 Compliance with this Program**

### 4.1 All Employees

All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout procedures. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment, which is locked out to perform servicing, or maintenance will not attempt to start, energize, or use that machine or equipment. Any employee who does not follow this lockout/tagout program will be subject to disciplinary action including written warning, suspension, or dismissal from the company. In the event that a particular assignment makes it impractical to follow all the provisions of this program, the supervisor directing the work activities will be notified immediately and before work starts.

### 4.2 Health and Safety Officer

The Site Safety and Health Officer or approved alternate will be responsible for the following:

1. Development of a facility-specific energy control policy.
2. Definition and procurement of authorized lockout and tagout devices.
3. Training of supervisors and employees on facility policy and procedures for hazardous energy control.
4. Implementation of the Energy Control Policy and review of supervisory/employee performance.
5. Assurance that newly acquired equipment or overload equipment can accommodate locks.
6. Master file maintenance of specific policies, lockout procedures review and training records.

The Site Safety and Health Officer or approved alternate shall:

1. Identify specific hazards and develop hazard isolation procedures within the facility.
2. Assure that the facility's hazardous energy control policy and procedures are communicated to employees in the work unit.
3. Monitor hazard isolation procedures for effectiveness.
4. Enforce hazard isolation procedures within his/her work unit and between work units or employers in the case of outside contractors.
5. Maintain work unit files documenting employee training.
6. Specify controls capable of being locked out when replacing or updating equipment controls.

### **5.0 Transfer of Lock/Tagout Responsibility**

No employee shall remove a lockout or tagout device affixed by another employee unless authorized. Responsibility for lockout or tagout remains that of the authorized employee who affixes the lockout or tagout device subject to the following exception.

When an incoming authorized employee is to assume lock/tagout responsibilities on a piece of equipment from a departing employee due to shift or personnel changes, the incoming employee shall affix his/her properly labeled locks and/or tag devices to the equipment. If it is intended that the equipment remain securely locked out until the departing employee returns, responsibility does not need to be passed on to the incoming employee.

### **6.0 Definitions**

#### Affected Employee:

An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which servicing or maintenance is being performed.

#### Authorized Person:

A person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties include performing servicing or maintenance covered under this section.

### Energy Isolating Device:

A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: a manually operated electrical circuit breaker, a disconnect switch, a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors and, in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches and other control circuit type devices are not energy isolating devices.

### Energy Source:

Any electrical, mechanical, hydraulic, pneumatic, chemical, nuclear, thermal or other potential energy source that could have potential to endanger personnel.

### Entry Point of Power:

The point at which energy enters the system, machine or unit, such as the main electrical disconnect. Changes in power routing at the entry point should be shown on the circuit diagrams for the machines.

### Lockout:

The placement of a lockout device on an energy-isolating device, in accordance with an established procedure, ensuring that the energy-isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

### Other Employees:

All other employees whose work operations are or may be in an area where control procedures may be utilized.

### Power:

Any type of energy that can operate equipment, cause movement, or cause injury directly from the energy source. Common types of power are electricity, air or gas under pressure, gravity, springs, oil or water under pressure and steam.

### Residual Electrical Power:

Electrical energy, which is retained in a system, machine or unit when the supply line disconnect, is placed on the "OFF" position. Power capacitors and electric or magnetic fields are examples that may have residual power if not properly dissipated.

### Residual Pressure:

The differential pressure remaining within a component after the pressure source is closed off.

### Tagout:

The placement of a tagout device on an energy-isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

## **6.0 Energy Control Procedures**

Procedures will be developed and documented when employees are engaged in activities that potentially could be hazardous, due to exposure from an energy source. The following exceptions to required documentation include:

1. The machine or equipment has no potential for stored or residual energy or re-accumulation of stored energy after shut down which could endanger employees.

2. The machine or equipment has a single energy source, which can be readily identified and isolated.
3. The isolation and locking out of that energy source will completely de-energize and deactivate the machine or equipment.
4. The machine or equipment is isolated from that energy source and locked during servicing or maintenance.
5. A single lockout device will achieve a locked-out condition
6. The lockout device is under the exclusive control of the authorized employee performing the servicing or maintenance.
7. The servicing or maintenance does not create hazards for other employees.
8. The employer, in utilizing this exception, has had no accidents involving the unexpected activation or re-energization of the machine or equipment during servicing or maintenance.

Energy control procedures shall clearly and specifically outline the purpose, rules and techniques to be utilized for the control of hazardous energy. (See Form #1) These procedures must include the following:

1. A specific statement of the intended use of the procedures.
2. Specific procedural steps for shutting down, isolating, blocking and securing machines or equipment to control hazardous energy.
3. Specific procedural steps for the placement, removal and transfer of lockout or tagout devices and the responsibility for them.
4. Specific requirements for testing a machine or equipment to determine and verify the effectiveness of lockout devices, tagout devices, and other energy control measures.

## **7.0 Equipment for Lockout/Tagout**

For the purpose of achieving lockout/tagout, employees will be provided with appropriate lockout equipment. Equipment shall include, but not be limited to:

### **7.1 Padlocks**

One or more padlocks will be issued to each authorized employee. Each employee will have an individual key. Only one key per lock shall be issued. These locks may be used only for lockout purposes. Locks will be identified by a number assigned to each employee and/or by the use of a nametag. Only the authorized person may apply and remove the lock, and the key may never be given to another person.

Note: A second or master key for each lock will be issued to designated supervisors to enable them to open and remove a padlock after taking the required precautions.

### **7.2 Lockout Tags**

Authorized employees will be issued warning tags, which must be used whenever a padlock cannot be applied. The tag must be affixed as closely as possible to the energy disconnect with a single purpose 50-pound strength plastic tie. Extra caution must be exercised since there is no physical restraint when only a tag is used and energy can be restored without removing a padlock. In addition, where possible, energy source components should be altered, removed, or obstructions should be placed to restrict access to energy disconnects. Electricians may remove

fuses but must attach a tag to the panel involved and remove it when the machine is ready for service and the fuse is replaced.

Tag legends may include, but are not limited to:

DANGER Do Not Start	DANGER Do Not Energize
DANGER Do Not Open	DANGER Do Not Operate
DANGER Do Not Close	

Warning tags shall bear the name of the authorized person and the date of application. Tags must be durable, weather proof and not easily damaged

### 7.3 Lockout hasps

These devices are designed to accommodate more than one lockout padlock when more than one person is working on de-activated equipment. Each person, to assure his or her safety, will apply a lock and warning tag and remove it when the task is completed

### 7.4 Circuit Breaker Lockout Devices

These devices are designed to attach to circuit breakers inside a panel box. Once attached a lock and tag may be applied to the device to prevent the breaker from being energized.

## 8.0 Sequence of Lockout

1. The authorized employee shall notify all affected employees that servicing or maintenance is required on a machine or equipment and that the machine or equipment must be shut down and locked out to perform the servicing or maintenance. It is the responsibility of the equipment operator to notify all affected supervision and employees when a piece of equipment is to be repaired.
2. The authorized employee will refer to the company procedure to identify the type and magnitude of the energy that the machine or equipment utilizes, will understand the hazards of the energy, and will know the methods to control the energy.
3. If the machine or equipment is operating, shut it down by the normal stopping procedure (depress the stop button, open switch, close valve, etc.).
4. De-activate the energy isolating device(s) so that the machine or equipment is isolated from the energy source. (Examples: main switch, circuit breaker, flow/control valve, etc).
5. Lock out the energy isolating device(s) with assigned individual lock(s). If more than one person is exposed to the hazard or is working on the machine or equipment, each person must attach his or her individual lock. Only the person who attaches the lock is authorized to remove their lock.
6. Dissipate or restrain any stored or residual energy (such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam or water pressure, etc.) by such actions as grounding, repositioning, blocking, bleeding down, etc.
7. Ensure that the machine or equipment is disconnected from the energy source(s) by first checking that no persons are exposed, then verify the machine or equipment is isolated by operating the push/on button or other normal operating control(s) or by testing to make certain the machine or equipment will not operate. Cautions: Return operating control(s) to neutral or "off" position after verifying the isolation of the machine or equipment. For

any electrical work, voltage checks will be made of any circuit elements and electrical parts on which work is to be performed and any exposed adjacent parts.

8. The machine or equipment is now locked out, and servicing or maintenance may proceed.

### **9.0 Procedures Involving More Than One Person (Group Lockout)**

In the preceding steps, if more than one individual is required to lock the energy-isolating device(s), they shall utilize a procedure which affords the employees a level of protection equivalent to that provided by the implementation of a personal lockout or tagout device. When an energy-isolating device cannot accept multiple locks, a multiple lockout or tagout device (hasp) may be used.

### **10.0 Restoring Equipment to Service**

When the servicing or maintenance is completed and the machine or equipment is ready to return to normal operating condition, the following steps will be taken.

1. Check the machine or equipment and the immediate area around the machine to ensure that nonessential items have been removed and that the machine or equipment components are operationally intact, and all guards are installed.
2. Check the work area to ensure that all employees have been safely positioned or removed from the area. Notify all affected employees that the lockout/tagout is going to be removed.
3. Verify that the controls are in the neutral position.
4. Remove the lockout/tagout device and reenergize the equipment. Except in emergencies, only the person who attached the lockout device may remove it!

Note: The removal of some forms of blocking may require reenergization of the machine before safe removal.

5. Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready for use.

### **11.0 Abandoned Lock Removal Procedures**

If an employee who has departed the building has left a safety lock in place, it shall be removed only by adherence to the following procedure:

Before the lock is removed:

1. A thorough inspection of the equipment is to be made by the supervisor responsible for the area.
2. The supervisor must confirm that the authorized employee who applied the lockout device is not at the facility.
3. The supervisor shall make all reasonable efforts to contact the authorized employee to inform him/her that his/her lockout or tagout device has been removed.
4. The supervisor shall remove the lock providing he/she has determined starting up the equipment will not endanger other personnel.
5. Each time it is necessary to remove/cut a safety lock, the person authorized to remove the lock shall prepare a written report and a copy will be sent to the H&S Officer (Position designated).

6. The supervisor shall ensure that the authorized employee has knowledge of this release before he/she resumes work at the facility.

## **12.0 Training**

Lockout/Tagout training will be conducted for all employees who are required to perform work on any equipment as referenced in this program. The training will address all components and procedures of this program. It will include methods to ensure employees understand the purpose and function of the program, that they can recognize applicable lockout/tagout situations, and that they have acquired the knowledge and skills required for applying, using, and removing the locks and tags.

1. Each authorized employee will receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control. The training will be documented on Form #2.
2. Each affected employee will be instructed in the purpose and use of the energy control procedure. The training/instruction will be documented on Form #3.
3. All other employees whose work operations are or may be in an area where energy control procedures may be utilized, will be instructed about the procedure and about the prohibition relating to attempts to restart or re-energize machines or equipment which are locked out. The instruction will be documented on Form #4.
4. When employees are assigned to work in or on equipment that could potentially endanger personnel should it be activated, the supervisor assigning employees to this work is responsible for ensuring that these workers are provided with specific equipment and instructions to comply with this power lockout procedure.
5. Authorized and affected employees will be retrained whenever there is a change in their job assignments that could affect their lockout responsibilities, a change in the machines that presents a hazard or when there is a change in energy control procedures.
6. Additional retraining will be conducted whenever the periodic inspection reveals that there are deviations from or inadequacies in the employee's knowledge or use of energy control procedures.
7. The employer shall certify that employee training has been accomplished and is being kept up to date. The certification shall contain each employee's name and dates of training.

## **13.0 Periodic Inspection/ Assessment**

The SSHO or approved alternate will be conduct a comprehensive inspection/audit of the energy control procedures at least annually to ensure that the facility is in compliance with the OSHA Power Lockout/Tagout Standard 29 CFR 1910.147 and the procedures outlined in this policy. The results of the annual inspection will be recorded on the Annual Power Lockout/Tagout Certified Inspection Worksheet. (See Form #5) Each machine/equipment-specific lockout procedure must be assessed at least annually to ensure that the procedure remains valid or if any changes are warranted. This assessment must be machine-procedure specific and be documented.

## **14.0 Outside Personnel (Contractors, etc.)**

Whenever outside servicing personnel are to be engaged in activities covered by the scope and application of this standard, the on-site employer and the outside employer shall inform each other of their respective lockout or tagout procedures. The on-site employer shall ensure that

his/her employees understand and comply with the restrictions and prohibitions of the outside employer's energy control program. The exchange of this information shall be documented on Form #6.

# LIST OF SAMPLE FORMS

Form 1: Specific Energy Control Procedures

Form 2: Authorized Employee Training Certification

Form 3: Affected Employee Training Certification

Form 4: Other Employee Training Certification

Form 5: Annual Power Lockout/Tagout Certified Inspection Worksheet

Form 6: Documentation of Information Given to Contractors Pertaining to  
Lockout/Tagout Procedures

Form 7: Lockout/Tagout Inventory Form

Form 8: Lockout/Tagout Inspection Form

# Lockout/Tagout Form #1

## SPECIFIC ENERGY CONTROL PROCEDURES FOR EACH PIECE OR TYPE OF MACHINE OR EQUIPMENT

Procedure Number/ Name: \_\_\_\_\_ Date: \_\_\_\_\_

Completed By: \_\_\_\_\_

Machine(s) or Equipment utilizing this procedure: \_\_\_\_\_

Number of Locks required: \_\_\_\_\_

Other Lockout Devices required: \_\_\_\_\_

### PROCEDURES FOR CONTROLLING HAZARDOUS ENERGY

#### 1. Sources of Hazardous Energy (examples)

- Electrical Natural Gas Springs
- Hydraulic Gravity Steam
- Chemical Pneumatic Thermal
- Other: \_\_\_\_\_

#### 2. Notify affected employees that the machine is about to be shut down and locked out. Specific Instructions

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#### 3. Shut down the machine using normal stopping procedures. Specific Instructions:

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4. Isolate all energy sources listed above.

Specific Instructions:

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5. A) Apply locks to all isolate devices operated in Step Four.

Specific Instructions:

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B) If a tag is used in lieu of a lock when the energy-isolating device is incapable of lockout, the following additional safety precaution will be taken:

Specific Instructions:

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6. Block or dissipate all stored energy in rams, flywheels, springs, pneumatic or hydraulic systems, etc.

Specific Instructions:

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7. Verify that the machine is locked out by testing the machine operating controls.

**RETURN ALL CONTROLS TO THE "NEUTRAL" OR "OFF" POSITION AFTER TESTING.**

Specific Instructions:

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**PROCEDURE FOR REMOVING LOCKS/TAGS**

1. Check the machine to be sure it is operationally intact, tools have been removed, and guards have been replaced.

Specific Instructions:

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2. Check to be sure all employees are safely positioned.

Specific Instructions:

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3. Notify all affected employees that locks/tags are going to be removed and the machine is ready for operation.

Specific Instructions:

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4. Remove all locks, blocks, or other energy restraints.

Specific Instructions:

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5. Restore all energy to the machine/equipment.

Specific Instructions:

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Other Comments/Special Precautions:

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Lockout/Tagout Form #2

**"AUTHORIZED" EMPLOYEE TRAINING CERTIFICATION**

Date of Training: \_\_\_\_\_

Instructor's Name: \_\_\_\_\_

Instructor's Signature: \_\_\_\_\_

The following employees have received "AUTHORIZED" employee training on lockout/tagout procedures:

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Employee Name (Please Print): \_\_\_\_\_

Employee Signature: \_\_\_\_\_

Lockout/Tagout Form #3

**"AFFECTED" EMPLOYEE TRAINING CERTIFICATION**

Date of Training: \_\_\_\_\_

Instructor's Name: \_\_\_\_\_

Instructor's Signature: \_\_\_\_\_

The following employee have received "AFFECTED" employee training on lockout/tagout procedures:

Employee Name (Please Print): \_\_\_\_\_

Employee Signature: \_\_\_\_\_

Lockout/Tagout Form #4

**"OTHER" EMPLOYEE TRAINING CERTIFICATION**

Date of Training: \_\_\_\_\_

Instructor's Name: \_\_\_\_\_

Instructor's Signature: \_\_\_\_\_

The following employees have received "OTHER" employee training on lockout/tagout procedures:

Employee Name (Please Print): \_\_\_\_\_

Employee Signature: \_\_\_\_\_

Lockout/Tagout Form #5

# ANNUAL POWER LOCKOUT/TAGOUT CERTIFIED INSPECTION WORKSHEET

DATE: \_\_\_\_\_ DEPT.: \_\_\_\_\_

MACHINE/EQUIPMENT NAME: \_\_\_\_\_

REVIEW WITH EMPLOYEE (S) PERFORMING SERVICE OR MAINTENANCE ON THE  
FOLLOWING:

- HAVE YOU HAD LOCKOUT TRAINING?  YES,  NO
- DO YOU HAVE A SAFETY LOCK?  YES,  NO
- ARE LOCKOUT PROCEDURES FOR ABOVE MACHINE/ EQUIPMENT AVAILABLE  
AND/OR POSTED?  YES,  NO
- DOES EMPLOYEE (S) UNDERSTAND HIS/HER LOCKOUT RESPONSIBILITIES?  
 YES,  NO

OBSERVATION:

WERE LOCKOUT PROCEDURES FOLLOWED?  YES,  NO

NONE REQUIRED:

LIST DEVIATION (S) OR INADEQUACIES OBSERVED: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

CORRECTIONS/CHANGES/COMMENTS:

EMPLOYEE (S) INSPECTED:

NAME: \_\_\_\_\_ DEPT.: \_\_\_\_\_

NAME: \_\_\_\_\_ DEPT.: \_\_\_\_\_

NAME: \_\_\_\_\_ DEPT.: \_\_\_\_\_

NAME: \_\_\_\_\_ DEPT.: \_\_\_\_\_

INSPECTED BY:

NAME: \_\_\_\_\_ POSITION: \_\_\_\_\_

Lockout/Tagout Form #6

**DOCUMENTATION OF INFORMATION GIVEN TO  
CONTRACTORS PERTAINING TO LOCKOUT/TAGOUT  
PROCEDURES**

<u>Date</u>	<u>Contractor</u>	<u>Information Given</u>

Contractor's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Authorized Employee Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Authorized Supervisor's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Lockout/Tagout Form #7

LOCKOUT - TAGOUT INVENTORY FORM

Location: \_\_\_\_\_

1. Machine/Equipment: \_\_\_\_\_

2. Maintenance or service performed on this machine/equipment in this work area?

YES,  NO

3. Type of Power/Energy Source(s)

Electrical \_\_\_\_\_

Hydraulic \_\_\_\_\_

Gas \_\_\_\_\_

Pneumatic \_\_\_\_\_

Water \_\_\_\_\_

Gravity \_\_\_\_\_

Other \_\_\_\_\_

4. Energy Source Type

Main Source/Location \_\_\_\_\_

Source on Machine/Equipment \_\_\_\_\_

5. What type of lockout processes can be used on this equipment?

(Check all available)

Keyed locks with tags \_\_\_\_\_ Blocks \_\_\_\_\_

Tags only \_\_\_\_\_ Wedges \_\_\_\_\_

Chains \_\_\_\_\_

Other (list) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

6. What steps should be taken to secure this machine/equipment from accidental start-up?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Lockout/Tagout Form #8

**LOCKOUT - TAGOUT INSPECTION FORM**

Agency/Institution: \_\_\_\_\_

Department: \_\_\_\_\_

Type of Machine Locked Out: \_\_\_\_\_

Employee: \_\_\_\_\_ Job Title: \_\_\_\_\_

Employee Observed by: \_\_\_\_\_ Job Title: \_\_\_\_\_

Date and Time of Inspection: \_\_\_\_\_

Employee obeying safe procedures for locking and tagging:  
\_\_\_\_\_  
\_\_\_\_\_

Unsafe procedures or practices observed:  
\_\_\_\_\_  
\_\_\_\_\_

Recommendations:  
\_\_\_\_\_  
\_\_\_\_\_

Corrective actions taken:  
\_\_\_\_\_  
\_\_\_\_\_

Inspection reviewed with employee observed: \_\_\_\_\_

Date/Time: \_\_\_\_\_

Observed Employee's signature: \_\_\_\_\_ Date: \_\_\_\_\_

Inspection Performed by: \_\_\_\_\_ Date: \_\_\_\_\_

Appendix H  
Confined Space Program

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**Sevenson Environmental Services, Inc.**

**CONFINED SPACE PROGRAM**

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## 1.0 Purpose

The purpose of Confined Space Entry Program is to protect the health and safety of employees who enter confined spaces and/or are assigned to serve as attendants or rescue personnel. This program is also intended to ensure compliance with 29 CFR 1910.146 and EM 385-1-1 Section 34.

## 2.0 Application

This program applies to:

- 2.1. All employees, who are authorized to enter a confined space
- 2.2. All employees assigned to serve as attendants
- 2.3. Provide assistance during a confined space emergency rescue
- 2.4. Employees who serve as Confined Space Entry Supervisors or Confined Space Entry Program Administrators.

## 3.0 Definitions

- 3.1. ACCEPTABLE ENTRY CONDITIONS - conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit-required confined space can safely enter and perform work.
- 3.2. ATTENDANT - an individual stationed outside the permit-required confined space who had specific training and monitors the authorized entrants inside the space.
- 3.3. AUTHORIZED ENTRANT - employee who is authorized to enter a permit-required space.
- 3.4. BLANKING OR BLINDING - absolute closure of a pipe, line, or duct by fastening across its bore a solid plate that completely covers the bore and can withstand the maximum upstream pressure.
- 3.5. CONFINED SPACE - a space that meets all the following criteria:
  - 1) is large enough and so configured that an employee can bodily enter and perform assigned work;
  - 2) has limited means of entry and egress; and
  - 3) is not designed for continuous employee occupancy.Examples may include tanks, silos, boilers, pits, bins, manholes electrical vaults, degreasers, and hoppers.
- 3.6. ENGULFMENT - surrounding and effective capture of a person by a liquid or finely divided solid substance (i.e sand, corn. grain, sawdust etc).
- 3.7. ENTRY - a person's intentional passing through an opening into a permit-required confined space.
- 3.8. ENTRY PERMITS - a written or printed document that allows and controls entry into a permit space.
- 3.9. ENTRY SUPERVISOR - person responsible for:
  - 1) determining if acceptable conditions are present before entering a permit space;

- 2) for authorizing entry;
  - 3) coordinating and supervising all entry operations; and
  - 4) terminating entry.
- 3.10. HAZARDOUS ATMOSPHERE - an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue, injury, or acute illness from one or more of the following causes
- 1) Flammable gas, vapor or mist in excess of 10% of its Lower Explosive Limit (LEL).
  - 2) Airborne combustible dust at a concentration that meets or exceeds its LEL.
  - 3) Atmospheric oxygen concentration below 19.5 percent or above 23.0 percent (22% for USACE sites)
  - 4) Atmosphere concentration of any substance for which a dose or a permissible exposure limit is published in Subpart G, Occupational Health and Environment Control, or in Subpart Z, Toxic and Hazardous Substances, of 29 CFR 1910 and which could result in employee exposure in excess of its dose or PEL
  - 5) Any other atmospheric condition that is immediately dangerous to life or health.
- 3.11. HOT WORK PERMIT – employer’s written authorization to perform operations (for riveting, welding, cutting, burning, and heating) capable of providing a source of ignition.
- 3.12. IMMEDIATELY DANGEROUS TO LIFE OR HEALTH (IDLH) - any condition that poses an immediate threat to life, or a delayed threat to life, or that would cause irreversible adverse health effects, or interfere with an individual's ability to escape unaided from a permit space.
- 3.13. ISOLATION - process by which a permit space is removed from service and completely protects against the release of hazardous energy or material into the space.
- 3.14. LOWER EXPLOSIVE LIMIT (LEL) - the lowest concentration of gas or vapor, expressed in percent by volume in air, that burns or explodes if an ignition source is present at room temperature.
- 3.15. LINE BREAKING - intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas or any fluid at a volume, pressure, or temperature capable of causing death or serious physical harm.
- 3.16. NON PERMIT CONFINED SPACE- A confined space that does not contain or have the potential to contain an atmospheric hazard or any other serious safety or health hazard.
- 3.17. OXYGEN DEFICIENT ATMOSPHERE - an atmosphere containing less than 19.5% oxygen.
- 3.18. OXYGEN ENRICHED ATMOSPHERE - an atmosphere containing more than 23.0% oxygen (22% for USACE sites).
- 3.19. PERMISSIBLE EXPOSURE LIMIT (PEL) - the airborne concentration of a hazardous material that must not be exceeded over a specified time. This value is established by the Occupational Safety and Health Administration (OSHA).

3.20. PERMIT-REQUIRED CONFINED SPACE - a confined space that has one or more of the following characteristics:

- 1) Contains or has a reasonable potential for hazardous atmospheres.
- 2) Contains a material that has the potential for engulfment.
- 3) Is internally configured so an employee could become trapped or asphyxiated by inwardly converging walls or a floor that slopes downward into a smaller cross-section.
- 4) Contains any other recognized serious safety or health hazard.

3.21. PROHIBITED CONDITION - any condition in a permit space that is not allowed by the permit during the period when entry is authorized.

3.22. RESCUE SERVICE - personnel designated to rescue employees from permit spaces.

3.23. RETRIEVAL SYSTEM - equipment used for a non-entry rescue of persons from permit spaces (i.e., tripod).

3.24. TESTING - process by which hazards that may affect entrants of a permit space are identified and evaluated.

3.25. THRESHOLD LIMIT VALUE (TLV) - the airborne concentration of a hazardous material that should not be exceeded over a specified time. This value is established by the American Conference of Governmental Industrial Hygienists (ACGIH).

3.26. WELDING/CUTTING PERMIT - written authorization to perform operations that can provide a source of ignition (e.g., welding, cutting, burning, or heating) or a hazardous atmosphere.

#### **4.0 Responsible for Compliance**

4.1. The Confined Space Entry Program Administrator is the SSHO, or Superintendent if a SSHO is not assigned to the project.

The responsibilities of this individual shall include:

- 1) Conducting/coordinating hazard assessments.
- 2) Determining the classification (permit required/non permit space and location of each confined space).
- 3) Coordinating the posting of appropriate danger/caution signs by each confined space.
- 4) Supervising the selection and use of respirators in conjunction with the Respiratory Protection Program Administrator.
- 5) Coordinating the medical screening of respirator users.
- 6) Conducting/coordinating supervisory and employee training (including attendants) and maintaining all training records.
- 7) Conducting an annual evaluation of the overall program to determine its continued effectiveness.
- 8) Consulting employees and their authorized union representatives on the development and implementation of the Confined Space Entry Program.

#### 4.2. Managers and Supervisors

The responsibilities for these people shall include:

- 1) Actively supporting the Confined Space Entry Program and providing funding to purchase equipment when needed.
- 2) Ensuring all assigned personnel are knowledgeable of all aspects of the Confined Space Entry Program.
- 3) Ensuring their employees comply with all elements of Confined Space Entry Program.
- 4) Ensuring appropriate PPE and equipment is properly utilized and maintained.

#### 4.3. Confined Space Entry Supervisor is the Superintendent.

The responsibilities of this individual shall include:

- 1) Providing confined space entry personnel with a copy of the most current Confined Space Entry Program and any future changes.
- 2) Knowing the hazards that may be encountered during entry and informing the entrants about the hazards, including information on the mode, signs, or symptoms and consequences of exposure.
- 3) Verifying that the proper atmospheric tests have been conducted and that all procedures and equipment, mentioned in the permit, are in place before signing the Confined Space Entry Permit.
- 4) Assuring that the Confined Space Entry Permit is completed prior to each entry.
- 5) Terminating the entry and canceling the permit when needed.
- 6) Verifying that rescue or other emergency personnel are available and that the means for summoning them are operable in the event that an emergency occurs.
- 7) Removing unauthorized individuals who have entered or who attempt to enter the confined space.
- 8) Determining whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space, and that entry operations remain consistent with terms of the entry permit.
- 9) Maintaining completed entry permits and equipment calibration records.
- 10) Providing employees and their authorized union representative(s) an opportunity to observe the atmospheric testing of the confined space.

**NOTE:** The Confined Space Entry Supervisor may also serve as an attendant or as an authorized entrant providing that person is properly trained and equipped. The duties of the Confined Space Entry Supervisor may also be passed from one individual to another during the course of an entry operation as long as the alternate is qualified.

#### 4.4. Authorized Entrants

All authorized entrants shall be responsible for:

- 1) Knowing and recognizing the hazards that may be faced during entry including

information on the mode, signs, or symptoms and consequences of exposure.

- 2) Using and maintaining the proper PPE and other equipment.
- 3) Communicating with the attendant as necessary.
- 4) Alerting the attendant when hazardous conditions are detected, identified, or suspected.
- 5) Exiting the confined space immediately whenever:
  - a. Ordered to do so by other entrants, the attendant or the Confined Space Entry Supervisor.
  - b. Warning signs/symptoms are identified,
  - c. Prohibited conditions are identified,
  - d. An evacuation alarm is activated.
- 6) Complying with all other aspects of the Confined Space Entry Program

#### 4.5. Attendants (Standby persons)

All authorized attendants shall be responsible for:

- 1) Knowing the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
- 2) Knowing the possible behavioral effects of the hazard exposure in the authorized entrants.
- 3) Maintaining an accurate count of authorized entrants in the confined space and ensures that the means used to identify the authorized entrants accurately identifies who is in the space.
- 4) Remaining outside the confined space during entry operations until relieved by another attendant.

**Note:** Attendants may enter a confined space to attempt a rescue if they have been trained and equipped for rescue operations and if they have been properly relieved.

- 5) Communicating with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the confined space.
- 6) Monitoring activities inside and outside the confined space to determine if it is safe for authorized entrants to remain in the space and order the authorized entrants to evacuate the space immediately under any of the following conditions:
  - a. If the attendant detects a prohibited condition.
  - b. If the attendant detects a behavioral effect of the hazard exposure in an authorized entrant.
  - c. If the attendant detects a situation outside the confined space that could endanger the authorized entrants; or
  - d. If the attendant cannot effectively and safely perform all the duties required.

- 7) Summoning rescue and other emergency services as soon as the attendant determines that entrants need assistance to escape from the confined space hazards.
- 8) Taking the following actions when an unauthorized person(s) approach or enter a confined space while entry is underway:
  - a. Warn the unauthorized person(s) that they must stay away from the confined space.
  - b. Advise the unauthorized person(s) that they must exit immediately if they have entered the confined space.
  - c. Inform the authorized entrants and the entry supervisor if an unauthorized person(s) have entered the confined space.
  - d. Performing non-entry rescues as specified in Section 6.8.2.
- 9) Performing no duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.

## **5.0 Permit System**

### **5.1. Permit**

Before entry is authorized, an entry permit shall be prepared in order to document the completion of safety measures required (as discussed in section 6.0 of this Program). The completed permit shall be made available to all authorized entrants or their authorized representatives, at the time of entry, by posting it at the entry portal or by any other equally effective means.

- 1) The Confined Space Entry Supervisor shall sign a completed Confined Space Entry Permit or in his absence another member of the health and safety staff (if properly trained) to authorize entry into a permit-required confined space.
- 2) The Confined Space Entry Supervisor shall ensure that the permit specifies the location, type of work, personal protective measures, authorized entrants, monitoring equipment, hazards of the permit space, hazard control measures and any required rescue equipment. The procedure for contacting rescue services will also be included on the permit.
- 3) The permit shall be dated and carry an expiration time limiting the work to one shift.
- 4) The duration of the permit may not exceed the time required to complete the assigned task or job.
- 5) The Confined Space Entry Supervisor shall terminate the permit if a potential hazardous situation occurs which exceeds the conditions authorized on the permit or the entry operations, documented on the permit have been completed.
- 6) Cancelled entry permits shall be retained for at least 1 year.
- 7) The permit must be available at the work area outside the confined space entry point.
- 8) All confined space entry permits must be given to the Confined Space Entry Supervisor after the work is completed.

- 9) Hot work (potential ignition sources) must be authorized on a separate hot work permit that is attached and noted on the confined space entry permit.
- 10) Individuals authorizing entry into a permit required confined space may serve as entrants or attendants if they have received the proper training.

## 5.2. Entry Procedure

Supervisors, attendants and authorized employees must complete the general requirements, discussed in the next section. Entry procedure to permit required confined space are as follows:

- 1) The Confined Space Entry Supervisor shall be notified prior to the time that an entrant enters a permit-required confined space.
- 2) A Confined Space Entry Permit shall be properly completed and signed by the Confined Space Entry Supervisor or in their absence another member of the health and safety staff (if properly trained) prior to entry into the permit-required confined space.
- 3) Only properly trained and authorized individuals will be allowed to enter a permit required confined space. Authorized entrants will maintain contact with the attendant either visually or verbally.
- 4) Each individual entering a permit-required confined space will, whenever practical, have a safety or retrieval line attached to a body harness or wristlets. The other end of the line must be secured to a secure anchor point or lifting device (i.e., tripod) outside the entry portal. **Note: The anchor point shall not be secured to a motor vehicle in a manner that would pull the line out of the space if the vehicle moved unless proper Lockout/Tagout controls are in place.** A retrieval line is not required if:
  - a. A permit space has obstructions or turns that would prevent pull on the retrieval line from being transmitted to the entrant, or
  - b. A permit space from which an employee being rescued with the retrieval system has projections which would injure the employee if forcefully removed,
  - c. A permit space when entered by an entrant using an air supplied respirator and retrieval lines could pose an entanglement hazard, or
  - d. A permit required excavation other than a trench.
- 5) A properly trained individual shall test the atmosphere for oxygen content, flammable gases, and potential toxic air contaminants prior and during entry. Each entrant shall be required to wear an air-monitoring instrument if the confined space is large enough and/or has a potentially hazardous atmosphere, excavations are exempt from this requirement unless working with unknown drums or containers.
- 6) During any confined space entry, all safety rules and procedures shall be followed.
- 7) At least one attendant should be provided outside the permit space into which entry is authorized for the duration of entry operations.

- 8) Personal protective equipment, including respirators, shall be provided to entrants as necessary for safe entry into the confined space and used properly.
  - a. All PPE must be approved by the Confined Space Entry Supervisor.
  - b. An atmosphere supplied breathing apparatus shall be used for entry into an unknown atmosphere. The Rescue Team, with self-contained breathing apparatus (SCBA) must be present on-site and immediately available if entry is into an atmosphere that is actually or potentially immediately dangerous to life or health.
- 9) Electrical equipment used in the confined space shall be appropriate for the hazard and meet the requirements of the National Electric Code if a hazardous atmosphere is present.
- 10) Any condition making removal of an entrance cover unsafe (i.e. pressured differential, physical obstacles, etc.) shall be eliminated before the cover is removed.
  - a. When the cover has been removed, the opening(s) shall be promptly guarded to prevent accidental fall into the opening and prevent objects from falling into the opening.
  - b. Appropriate vehicle and pedestrian barriers shall be used to protect workers.
- 11) Metal ladders shall not be used when working around electrical equipment.
- 12) Any use of chemicals or welding, soldering, or cutting operations must be approved by the Confined Space Entry Supervisor.

## **6.0 General Requirements**

### **6.1. Workplace Evaluation**

The Confined Space Program Administrator will coordinate/conduct an evaluation of the workplace to determine if confined spaces are present. A detailed assessment will be made of each space in order to determine type and location of each space, its dimensions and number of exits, the reason(s) for entry, actual or potential health and safety hazards, and its classification (permit or non-permit). The assessment will also specify the equipment and personal protective equipment (PPE) required for entry and any special precautions that must be followed for safe entry and work in the confined space. The results of the assessment will be recorded on a Confined Space Hazard Assessment Form (See Form I - Part 1 and 2). It is required that all affected employees be trained for their respective duties, prior to their entry

### **6.2. Identification of Confined Spaces**

Effective means of identifying confined spaces (i.e. training, etc.) may be used to prevent unauthorized entry.

#### **1) Warning Signs and Posting**

- a. When using warning signs or placards for the identification of Confined Spaces, all types shall be printed both in English and (if applicable) in the predominant language of any non-English reading employees.

- b. Where confined space entry symbols are established, they shall also be used in conjunction with a warning sign.
- c. Signs shall include, but not necessarily be limited to, the following information:
  - i. **DANGER: PERMIT REQUIRED CONFINED SPACE - DO NOT ENTER UNLESS AUTHORIZED**
- d. The following statements shall be added in large letters to the warning sign when a specific work practice must be performed or when specific safety equipment is necessary:
  - i. Respirator Required For Entry
  - ii. Lifeline Required For Entry
  - iii. Hot Work Permit-Required
- e. Signs are not required at manholes, or any other entry, located in public traffic areas.

### 6.3. Atmospheric Requirements Prior to Entry:

The atmosphere in the confined space within the entrant's immediate area may be continuously monitored for oxygen and combustible gas and any other hazardous substance which the employer has reason to believe may be present in the confined space. Excluding excavations greater than 4 feet in depth which will be checked initially and then periodically thereafter unless determined otherwise by the Confined Space Entry Supervisor.

Before entering a confined space, the following atmospheric conditions must be met:

- 1) The oxygen level is between 19.5% and 23.0% (22% for USACE sites).
- 2) The concentrations of flammable gas, vapors, or mists are below 10% of their Lower Explosive Limits (LEL).
- 3) The level of airborne hydrogen sulfide (H<sub>2</sub>S) is below 10 parts per million (ppm).
- 4) Toxic air contaminants are less than the OSHA Permissible Exposure Limit (PEL). **Note:** If the substance does not have a PEL, use the Threshold Limit Value (TLV) established by the American Conference of Governmental Industrial Hygienists (ACGIH).
- 5) Atmospheric concentrations of toxic substances are below what is considered as the IDLH.
- 6) The level of carbon monoxide (CO) is less than 35 ppm.

Entry into a confined space is **not** allowed if monitoring indicates deficiency in any of these categories. Respirators or a self-contained breathing apparatus (SCBA) shall not be used to allow entry into deficient atmospheres unless specifically approved in writing by Severson's Safety and Health Manager (and the USACE Contracting Officer's Representative on USACE sites).

In order to achieve and maintain a safe atmosphere, one or more actions may have to be

taken to render the space safe for human occupancy. This could include:

- 1) Isolation - precautions taken to prevent release of material and/or energy into the space. This can be achieved through blinding, blanking, disconnecting, lockout/tagout, or removal of incoming pipes or related energy sources.
- 2) Ventilation - purging, inserting, flushing, or otherwise ventilating the space with fresh air. The replacement air will displace the contaminated air allowing for safe entry. This can be accomplished by removing ports and openings or by mechanically ventilating the vessel.
- 3) Separation - where there is a possibility of external hazards, the space may require barricades to protect the entrants from falling objects or from unauthorized entry.

#### 6.4. Ventilation

If a confined space being entered is found to contain a hazardous atmosphere, forced ventilation may be provided for a period of time in order to bring the air quality within the acceptable limits. Once the determined ventilation period expires, employees shall monitor the confined space according to subsection entitled "Air Monitoring". If the sampling shows that a hazard still exists, then additional ventilation and sampling may be required.

**Note:** Control of atmospheric hazards through forced ventilation does not constitute elimination of hazards.

If the hazard still exists after repeated ventilation steps, the confined space shall then be considered a permit-required confined space and the Confined Space Entry Team (entrant, attendant, and Confined Space Entry Supervisor) must follow the proper procedures for permit-required confined space entry.

**Note:** Forced ventilation may not be used in lieu of monitoring. Consideration must also be given to the possibility of static discharge that could be a source of ignition.

Forced air ventilation should be so directed as to ventilate the immediate areas where an employee is or will be present within the space and shall continue until all employees leave.

Whenever ventilation is used, employees shall:

- 1) Keep the blower controls at least 10 feet from the confined space, and out of the wind or downwind from the entrance to the confined space.
- 2) Use a ventilation blower that is designed to be intrinsically safe if the possibility of an explosive atmosphere could exist.
- 3) Ensure that the exhaust systems are designed and placed so that they protect employees in the surrounding area from being contaminated.
- 4) Ensure that the ventilation system is fully operational and air is supplied from a clean source.
- 5) Ensure that contaminated air is not recirculated into the confined space.
- 6) Purge the ventilation hose outlet for at least one-minute (at street or blower level if possible) before inserting the hose into the confined space.

- 7) Maintain continuous local ventilation when toxic atmospheres are being produced as part of a work procedure (i.e., welding, painting or cleaning operations).

#### 6.5. Lockout/Isolation

Each confined space (if applicable) shall have its own specific written lockout/isolation procedures. These procedures will be posted above and/or next to the entrance of the confined space, where feasible.

- 1) **Electrical Isolation:** In order to prevent employees from being exposed to activation of moving parts, or from being exposed to energized objects, authorized entrants shall lockout circuit breakers and/or the disconnect in the open (off) position with a key-type lock. If more than one authorized entrant is to be inside the confined space, each employee must place his/her own lock on the circuit breaker or disconnect.
- 2) **Mechanical Isolation:** All equipment with moving mechanical parts that could unexpectedly rotate or move will be blocked in such a way that there can be no accidental rotation or movement. Isolation of mechanical parts can be performed by disconnecting linkages or removing drive belts and/or chains.
- 3) **Blanking:** A solid plate or cup capable of withstanding the maximum pressure of the gas or liquid inside the pipe may be placed across a pipe or duct to prevent unexpected release of the contents.
- 4) **Line Isolation:** Lines can be isolated by 1) double blocking and bleeding the line or 2) by blocking two closed in-line valves or 3) blocking or bleeding open to the outside atmosphere the drawn or the bleed-in line between the two closed valves.

#### 6.6. Air Monitoring

Before any permit required confined space may be entered by any employee, the entry supervisor (or designee if qualified) must monitor the atmosphere of the confined space to determine that the characteristics of the air for all levels and all areas within the confined space are safe. The atmosphere within the authorized entrant's immediate area should be continuously monitored for oxygen, combustible gases and any other hazardous substance.

**When testing for atmospheric hazards, test first for oxygen, then for combustible gases and vapors, and then for toxic gases and vapors.**

**Note:** Authorized entrants and/or their authorized representatives shall be provided an opportunity to observe the atmospheric testing of the confined space that is conducted prior to entry and subsequent testing. Reevaluation of the permit space shall be done in presence of the authorized entrant or employee's authorized representative who requests the reevaluation.

#### **Sampling Devices**

- 1) A direct readout sampling device which can simultaneously test for oxygen, hydrogen sulfide and/or carbon monoxide and combustible gas without manual switching shall be used to sample the atmosphere of the confined space.

- 2) The sampling device shall be equipped with an audible and visible warning device that warns the entrant and/or attendant of the hazardous atmosphere in the permit space.
- 3) Sampling devices shall be calibrated relative to the oxygen content of the ambient air at the time of sampling. Calibration of the sampling device relative to the oxygen content shall be performed where the 20.9% natural content of oxygen in the air is most likely to occur.

**Note:** Oxygen calibration should not be performed near a confined space opening.

- 4) A sampling device, which has a zero set, shall be zeroed in a clean atmosphere before each sampling. Calibration of a sampling device shall be conducted daily before each use.
- 5) Non-sparking Equipment: When sampling the atmosphere of a confined space, the sampling device shall have an attached non-sparking probe.
- 6) Manhole Sampling: When a confined space entry is by means of a manhole, a probe shall be inserted through the pick hole of the manhole cover, or the manhole cover shall be preyed open on the downwind side to allow just enough room for insertion of the probe or other sampling device.
- 7) Intrinsically Safe: When the confined space to be entered is expected to have combustible vapors present, employees shall be required to use an approved explosion-proof or intrinsically safe sampling device.

#### 6.7. Assessment of Additional Hazards

Before entering a confined space, the Confined Space Entry Supervisor or in his absence another member of the health and safety staff, shall conduct an assessment of any additional hazards which the entrant may encounter during the confined space entry. This assessment shall include, but is not limited to, a review of the following additional hazards:

- 1) Thermal hazards due to extremes in hot and cold temperatures.
- 2) Engulfment Hazards due to loose, granular materials, such as sand, coal, or ash, stored in bins or hoppers.
- 3) Noise hazards, which can affect hearing and emergency communications.
- 4) Slick/wet surfaces, which can increase the risk to slips and falls. Wet surfaces also increase the risk and effects of shocks from electrical tools, machinery, and circuitry.
- 5) Falling Objects from work being performed above an employee or by objects falling through open confined space entrances.
- 6) Mechanical equipment that is required to be operating during the entry.
- 7) Electrical Hazards from exposed wires, power lines, etc.
- 8) Fall Hazards.
- 9) Biological Hazards.

## 6.8. Emergency Rescue

**Note:** The OSHA Confined Space Standard allows two options for rescue operations. The Confined Space Administrator and Confined Space Entry Supervisor must select one of the following types of rescue for each permit required confined space identified at the Site.

### 6.8.1. Emergency Service Confined Space Rescue

Prior to utilizing a rescue service/contractor, the Confined Space Program Administrator shall:

- 1) Evaluate the prospective rescuer's ability to respond to a rescue summons in a timely manner, considering the hazard(s) identified.

**Note:** What is considered "timely" will vary according to the specific hazards involved in each entry;

- 2) Evaluate the prospective rescue service's ability, in terms of proficiency with rescue-related tasks and equipment, to function appropriately while rescuing entrants from the particular permit space or types of permit spaces identified;
- 3) Select a rescue team or service that has the capability to reach the victim(s) within a time frame that is appropriate for the permit space hazard(s) identified, and is equipped for and proficient in performing the needed rescue services;
- 4) Inform each rescue team or service of the hazards they may confront when called on to perform rescue at the site; and
- 5) Provide the rescue team or service selected with access to all permit spaces from which rescue may be necessary so that the rescue service can develop appropriate rescue plans and practice rescue operations.

**Note:** OSHA 29 CFR 1910.146 Appendix F contains examples of criteria that employers can use in evaluating prospective rescuers.

### 6.8.2. On-site Confined Space Rescue

In the event that a confined space related emergency is expected, all employees involved in the rescue shall be provided with the proper emergency rescue training, PPE, and rescue equipment needed in order to make a safe rescue attempt, at no cost to the employees.

- 1) Before a confined space rescue attempt is made, the following equipment must be available near the entrance of the confined space:
  - a. Personal Protective Equipment
    1. Fully charged SCBA with at least a 30-minute air supply or a Type C airline respirator with an emergency escape air tank.
    2. Protective clothing/gloves, if needed
    3. Head protection, if needed
    4. Hearing protection, if needed

5. Eye protection
6. Communication devices

b. Retrieval equipment

1. Full body harness and lifeline

**Note:** Wristlets may be used in lieu of the full body harness if the employer can demonstrate that the use of a full body harness is infeasible or creates a greater hazard and that the use of wristlets is the safest way and most effective alternative.

2. Winch/hoist fully capable of retrieving personnel from a vertical type confined space more than five feet deep.

Retrieval line shall be attached at the center of the entrants back near shoulder level, above the entrants head, or at another point which presents a profile small enough for the successful removal of the entrant. The other end of the retrieval line shall be attached to a mechanical device or fixed point outside the permit space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary.

3. Ladders.

c. Emergency equipment:

1. First aid kit
2. Fire extinguisher(s) appropriate for the situation

2) Duties of Rescuing Attendants - (Non-Fire Emergency)

In the event that either a non-permit or permit-required confined space non-fire related emergency rescue occurs, rescuing attendants shall follow the following procedures:

- a. Alert the employees in the confined space to immediately vacate the space and verify that the employees understood these instructions.
- b. Notify the following personnel via a two-way radio or telephone with detailed information about the emergency.
  1. Rescue Service
  2. Confined Space Entry Supervisor and SSHO

**Note:** The Confined Space Entry Supervisor or area supervisor will then request assistance from the Local Fire Department if medical attention is needed.

c. Begin emergency extraction from outside of the confined space:

1. Verify that all employees are exiting the confined space. If not, then perform the following:
2. Notify the Confined Space Entry Supervisor that the employee(s) are disabled.

3. Begin winching/hoisting employee(s) from the confined space.
  4. Do **not** enter the confined space until help arrives.
- 3) Duties of Rescuing Attendants - Fire Emergency
- a. **No attempt should be made to enter a burning confined space.**
  - b. Standby personnel shall immediately call 911 and will indicate that a fire emergency is involved and the location of the confined space.
  - c. The attendant(s) shall attempt to remove the employee or employees via the hoist/winch from outside the confined space.
- 4) Rescue Attempt. Upon arriving at the confined space, the rescue service shall;
- a. Sample the air in the confined space.  
**Note:** Entry is **not** permitted if the air quality in the confined space is outside the acceptable limit for combustible gas. If the combustible gas content is more than 10% of the LEL, the confined space must be ventilated and/or the source of the combustible gas shut off or removed before entry is permitted.
  - b. Assess the potential hazards that rescue personnel could encounter by entering the space.
  - c. If entry conditions are determined safe, enter the confined space with the proper retrieval equipment, personal protective equipment, and a fully charged SCBA or a supplied airline respirator equipped with an emergency air tank.
  - d. Search for the disabled employee(s).
  - e. Assess the type of accident/injuries.
  - f. Administer proper first aid/CPR, if needed.
  - g. Begin extraction procedures, taking care not to cause further injury.
- 5) Substance Information. If an injured entrant is exposed to a substance for which a Material Safety Data Sheet (MSDS) or other written information is required to be kept at the work site, that MSDS or written information shall be made available to the medical facility treating the exposed entrant.

## 7.0 Employee Training

All employees who are required to enter a Permit Required Confined Space or serve as an attendant shall be trained and properly equipped to recognize, understand, and control hazards that may be encountered in the confined space. Training records (certification) shall be available for inspection by employees and their authorized representative.

7.1. Training shall be provided to each affected employee:

- 1) Before the employee is first assigned duties under this section.
- 2) Before there is a change in assigned duties.
- 3) When there is a change in the permit space operations that present a hazard

about which an affected employee has not previously been trained.

- 4) Whenever the employer has reason to believe either that there are deviations from the permit space entry procedures or that there are inadequacies in the employee's knowledge or use of these procedures.

## 7.2. Confined Space Entry

All employees who are required to either enter a confined space or serve, as attendants shall receive training in the following areas:

- 1) Associated safety and health hazards of the confined space entry
- 2) Duties of entrants and attendants
- 3) Air monitoring and attendants
- 4) Respiratory protection
- 5) Emergency rescue procedures
- 6) Lockout isolation procedures

Training shall be provided to each affected employee:

- 1) Before the employee is first assigned confined space entry duties.
- 2) Before there is a change in assigned duties.
- 3) Whenever there is change in confined space operations that presents a hazard about which the employee has been previously trained.

## 7.3. Personal Protective Equipment (PPE)

All employees who are required to either enter a confined space and/or serve as attendants, shall receive training on the proper use of any PPE needed to perform the job safely, such as, protective clothing and suits, gloves, respiratory protection; confined space rescue equipment, body harnesses, hearing protection, and eye/face, hand, foot and head protection.

## 7.4. Emergency Rescue Training

An emergency rescue employee(s) who is designated to provide permit space rescue and emergency services shall be trained in the following measures with an adequate level of proficiency shown in:

- 1) The use of personal protective equipment (PPE) needed to conduct permit space rescues safely.
- 2) The assigned rescue duties (same as entrants).
- 3) Basic first aid and CPR - At least one member of the rescue team or emergency service shall hold a current certification in first aid and CPR.

Emergency rescue personnel shall perform a permit space rescue at least once every 12 months by means of simulated rescue operations in which dummies, manikins, or actual persons are removed from the actual permit spaces or from representative permit spaces.

Representative permit spaces shall, with respect to opening size, configuration, and

accessibility, simulate the types of permit spaces from which rescue is to be performed.

## **8.0 Work Involving Subcontractors**

8.1. When the Site Superintendent arranges to have employees of a subcontractor perform work that involves confined space entry, the Confined Space Entry Program Administrator or the Confined Space Entry Supervisor shall:

- 1) Inform the contractor that the workplace contains permit spaces and the permitted space entry is allowed only through compliance with a permit space program that complies with CFR 1910.146.
- 2) Inform the contractor of the hazards identified and Severson's experience with the confined space that made the space in question a confined space.
- 3) Coordinate entry operations with the subcontractor when personnel from both employers will be working in or near the confined space.
- 4) Verify that the subcontractor has an appropriate Confined Space Entry program.

8.2. Debrief the contractor at the conclusion of the confined space entry operation(s) regarding the permit space entry procedures that were followed (if applicable) and the hazards that were confronted or created during entry operations.

## **9.0 Non- Permit Required Confined Space Entry**

9.1. No employee shall enter or work in a non-permit confined space unless the following steps have been performed:

- 1) Obtains permission to enter the confined space from the Confined Space Entry Supervisor, or in their absence another member of the health and safety staff.
- 2) Obtains and uses the proper PPE, tools and other equipment.
- 3) Complies with all other applicable confined space entry procedures

**Note:** Atmospheric testing of a non-permit confined space is not required by the OSHA Confined Space standard. However, testing the atmosphere for toxic gases and oxygen deficiency prior to entering the confined space is recommended if a suitable, and properly calibrated, sampling device is available. The OSHA Standard also does not require an attendant for entry into a non-permit required confined space, however having an attendant present (if practical) is again strongly recommended. Other OSHA standards (i.e. Personal Protective Equipment, Respiratory Protection, etc.) still apply to entry into all confined spaces.

## **10.0 Reclassification of a Permit Required Confined Space to Non-Permit Confined Space**

10.1. A permit required confined space may be entered as a non-permit confined space if the permit space contains no actual or potential atmospheric hazard, and all other hazards within the space can be eliminated without entry into the space. Hazards may be eliminated, for example, by:

- 1) Following all designated lockout/tagout procedures for the space in question;
- 2) Emptying a vessel to remove an engulfment or other content hazard;
- 3) Draining chemical tanks of their contents, purging any residual chemicals with

water, and ventilating the space after purging is complete;

- 4) Shutting boilers down, opening all access ports to allow for temperature reduction and natural ventilation, and by taking all appropriate safety measures (i.e. locking out machines, etc.) to render the space safe for entry.

**If the hazards arise within a permit space that has been declassified to a non-permit space, each employee in the space shall exit the space as soon as possible. The employer shall then reevaluate the space and determine whether it must be reclassified as a permit space, in accordance with other applicable provisions.**

## **11.0 Reclassification of a Non-Permit confined Space to a Permit Required Confined Space**

11.1. When there are changes in the use of a non-permit confined space that may increase the hazards, the space shall be reevaluated and classified as a permit-required space if necessary. Reclassification would be required, for situations such as:

- 1) During application of solvents, paints chemicals or other materials that could potentially create a hazardous atmosphere in a confined space.
- 2) During welding, cutting, brazing, or soldering in some confined spaces with limited ventilation.

11.2. The Confined Space Entry Supervisor shall reevaluate and reclassify confined spaces as necessary depending upon the work activities to be performed in these spaces.

## **12.0 Other Safety Rules and Work Practices**

12.1. In order to protect the safety and health of all employees associated with the confined space entry, employees (and supervisors) shall comply with the following safety rules and work practices:

### 1) General Safety Rules

- a. All employees within the confined space and those employees assigned to serve, as attendants shall be in constant two-way communication.
- b. All employees required to wear respiratory protection must properly use and maintain properly the respirator in accordance with 29 CFR 1910.134 and the specific instructions provided to them by their supervisor and during training.
- c. Smoking is not permitted within the confined space or within a 10 feet radius of the entrance of a confined space.
- d. All employees shall comply with the requirements and limitations on the confined space entry permit, including the maximum number of employees permitted to work in the confined space.

### 2) Underground and Aboveground Storage Tanks

Before any employee enters a boiler or any other vessel type confined space, the following safety precautions shall be implemented:

- a. Ensure there is only residual material left in the bottom of the underground storage tank (UST) before an entry.

- b. Ensure that all lines leading into and away from the tank(s) are blanked, blinded, and/or double blocked and bled before an entry is allowed.
- c. Ensure that all employees entering a tank are secured by a lifeline to a winch or other retrieval device outside the confined space.
- d. Treat all boilers and other vessel-type confined space in a manner consistent with that of other confined spaces.

**Note: If a confined space entry is required for fuel oil (diesel fuel) tank the LEL must be determined with a Photoionization Detector (PID). This is due to LEL sensor<sup>1</sup> technology and its response to heavy hydrocarbon fuels is unreliable. The PID reading must be less than 250 ppm for entry into the tank in Level C PPE with OVA cartridges.**

### 3) Traffic Safety

- a. Entrances to confined spaces that are located in streets shall be guarded in accordance with the following requirements:
  - 1. Employees shall activate the following warning lights
    - a. Vehicle's beacon light
    - b. Four-way hazard flashers
- b. Employees shall park the vehicle used to transport their confined space equipment in such a way that the vehicle does not obstruct the normal traffic flow and shall, when possible, use the vehicle to provide protection for the employees.
- c. Employees shall park the vehicle in such a manner that the vehicles exhaust fumes cannot accumulate in the confined space. If this is not possible, the vehicle's exhaust pipe shall be extended away from the confined space.
- d. Employees shall properly place traffic safety cones around the manhole and any vehicle in accordance with state and federal traffic ordinances to adequately warn oncoming traffic.
- e. Traffic safety cones shall be visible to traffic in all directions and in such a manner as to protect the employees from the traffic flow. Traffic cones should also be placed far enough from the confined space to give drivers adequate notice.

When working on the street or an easement surface, all standby and flag person employees shall at all times wear a traffic safety vest or the equivalent. A flag person(s) shall be added to the Confined Space Entry Team when the need arises. The flag person(s) shall not be considered as the required attendant for a permit required confined space.

### 4) Cleaning purposes

When a confined space entry is required for cleaning purposes, the Confined Space Entry Supervisor or in their absence another member of the health and

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<sup>1</sup> Application Note AP-219, "Using PID for 10% of LEL Decisions" Revision 1, RAE Systems, Inc., San Jose, CA, Severson Environmental Services, Inc.  
Confined Space Entry Program

safety staff, shall review and authorize the procedures and processes to be used while cleaning the confined space before entry can take place.

The following specific cleaning methods shall be used depending upon the product or products in the space:

- a. Flammable/Combustible Atmosphere: The atmosphere within the confined space shall be purged with an inert gas if the atmosphere is above the upper flammable limit to remove the flammable and/or combustible substance before forced ventilation of the space. Initial cleaning shall be done, if possible, from outside the tank.
- b. Cleaning Process Hazards: When additional hazards are created by the cleaning process, the Confined Space Entry Supervisor shall develop additional safety procedures to address the newly created hazards. These special procedures shall be developed before a confined space cleaning process takes place.

5) Use of equipment and tools inside the confined space

When the confined space entry requires the use of equipment and tools inside the space, this equipment shall be inspected and must meet the following requirements:

- a. Hand tools must be in good repair and be kept clean.
- b. Portable electrical tools, equipment, and lighting shall be listed Class I, Division I, Group D. All grounds must be checked before electrical equipment is used in a confined space. **Note:** Ground Fault Protectors should be used whenever possible to protect employees from electrical shock when working in damp or wet locations.
- c. All electrical cords, tools, and equipment must be constructed of a heavy-duty, double-insulated cord and equipped with a 3-prong plug. Note: double insulated tools with a 2-prong pug may be appropriate in some cases.
- d. All electrical cords, tools, and equipment must be visually inspected for defects before being used in a confined space. If found defective, they will be replaced, repaired, or destroyed before any employee enters the confined space.
- e. Cylinders of compressed gases must never be taken into a confined space and will be turned off at the cylinder valve when not in use. Exempt from this rule are cylinders that are part of SCBA or resuscitation equipment.
- f. Ladders must be adequately secured or of a permanent type which provides the same degree of safety. Note: Permanent ladders must be inspected for rust or corrosion and repaired or replaced if necessary.

All equipment that may be used in a flammable atmosphere shall be approved as either explosion proof or intrinsically safe for the atmosphere and shall be approved by a recognized testing laboratory (i.e., UL, FM).

### **13.0 Recordkeeping**

13.1. The following records will be maintained on file for at least one year:

- 1) Employee Training Records - including dates and the names of attendees.
- 2) Confined Space Entry Equipment Inspections - including dates, results, and corrective action.
- 3) Monitoring Equipment Calibration/Service Reports - indicating calibration dates and any service conducted by the manufacturer.
- 4) Confined Space Permits - for all Permit Required confined space entries.

### **14.0 Annual Review**

14.1. The Confined Space Entry Program Administrator shall review the Confined Space Program at least annually using cancelled Confined Space Permits and other available information and records in order to determine if:

- 1) Changes should be made to improve the program's overall effectiveness;
- 2) Additional hazards have been identified within a given space;
- 3) Additional measures should be taken to protect the entrants;
- 4) Additional confined spaces should be included within the program; and
- 5) Some locations can be removed from the program.

# CONFINED SPACE HAZARD ASSESSMENT FORM

## PART I

**Hazard Codes:**

1. Atmosphere is within acceptable limits.
2. Contains or has a potential to contain a hazardous atmosphere.
3. Contains a material that has the potential for engulfing an entrant (i.e. soil, sand)
4. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section.
5. Contains moving parts or machinery.
6. Contains any other recognized health or safety hazard.

Confined Space (Tank, Manhole, etc)	Location	Reason(s) for Entry	Classification (Permit Required/Non Permit)
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

# CONFINED SPACE HAZARD ASSESSMENT FORM

## PART II

Confined Space (Part I)	Tools/Equipment Required for Entry	PPE Required for Entry	Special Precautions Required for Entry
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

\_\_\_\_\_

Assessment Performed By

\_\_\_\_\_

Title

\_\_\_\_\_

Date

# Sevenson Environmental Services, Inc.

## CONFINED SPACE PERMIT

Date \_\_\_\_\_ Time of Issue \_\_\_\_\_ Length of Permit \_\_\_\_\_  
 Location \_\_\_\_\_ Equipment ID \_\_\_\_\_  
 Purpose of Entry & Description of Work \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Authorized Entrant(s) \_\_\_\_\_  
 Will "HOT" Work be authorized for this Entry?     No;  Yes (describe) \_\_\_\_\_  
 \_\_\_\_\_

### HAZARDOUS IDENTIFICATION

Indicate ALL potential Hazards of this Permit Space: YES    N/A

a.    Contains or may contain a hazardous atmosphere    

b.    Contains a material for potential engulfment    

c.    Has an internal configuration for potential entrapment       
       If "Yes", describe \_\_\_\_\_  
       \_\_\_\_\_

d.    Contains the following serious safety or health Hazards: \_\_\_\_\_  
       \_\_\_\_\_

### PRE-ENTRY PREPARATION

	YES	N/A	Done			Removed		
			Date	Time	By	Date	Time	By
1. Lines broken and/or blanked:								
Line Contents      Location								
a.								
b.								
c.								
2. Drain or at a workable level								
3. Purge - flush and vent								
4. Force air to bottom & vent								
5. Lock out power feeds:								
Equip/Location of Lock out								
a.								
b.								

c.								
6. Shut-off heating systems								
7. Other:								

**TEST TO BE TAKEN**

	P.E.L.	Time		Time	Time	Time
		Tester		Tester	Tester	Tester
		Yes	N/A	Results	Results	Results
% of Oxygen	19.5% to 23%					
% of LEL	Any % over 10					
Carbon Monoxide	25 ppm					
Hydrogen Sulfide	10 ppm					
VOC						
Temperature	< 110°F/43°C					

**PREVENTION OF UNAUTHORIZED ENTRY**

1. Have Worker(s) to enter been trained for this specific entry? YES

2. Have Attendants been trained for this specific space?

3. Post "WORKER IN CONFINED SPACE" Sign

4. Set-up the following additional barriers:  
 \_\_\_\_\_  
 \_\_\_\_\_

**MANDATORY SAFETY EQUIPMENT REQUIRED**

	YES	N/A
1. Fire Extinguisher	<input type="checkbox"/>	<input type="checkbox"/>
2. Retrieval Lines	<input type="checkbox"/>	<input type="checkbox"/>
3. Respirator	<input type="checkbox"/>	<input type="checkbox"/>
4. Goggles	<input type="checkbox"/>	<input type="checkbox"/>
5. Hearing Protection	<input type="checkbox"/>	<input type="checkbox"/>
6. Protective Clothing	<input type="checkbox"/>	<input type="checkbox"/>
7. Special Boots or Shoes	<input type="checkbox"/>	<input type="checkbox"/>
8. Gloves	<input type="checkbox"/>	<input type="checkbox"/>
9. Other Safety Equipment Required	<input type="checkbox"/>	<input type="checkbox"/>
_____	_____	_____
_____	_____	_____
_____	_____	_____

**COMMUNICATION PROCEDURES AND EQUIPMENT TO BE USED FOR THIS ENTRY**

(Verify that chosen equipment is in place and operation.)

Verified by:

1. \_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_

**RESCUE EQUIPMENT TO BE PROVIDED ON-SITE**

	YES	N/A
a. Two chest harnesses or two wristlets	<input type="checkbox"/>	<input type="checkbox"/>
b. Two five minute supplied air escape respirators	<input type="checkbox"/>	<input type="checkbox"/>
c. One 30 minute S.C.B.A.	<input type="checkbox"/>	<input type="checkbox"/>
d. One emergency siren	<input type="checkbox"/>	<input type="checkbox"/>
e. Man basket	<input type="checkbox"/>	<input type="checkbox"/>
f. Retrieval wench	<input type="checkbox"/>	<input type="checkbox"/>
g. Other necessary Rescue Equipment	<input type="checkbox"/>	<input type="checkbox"/>
_____		
_____		
_____		

**IN CASE OF EMERGENCY**

Rescue Service	Phone Number or Ext.
1. _____	_____
2. _____	_____
3. _____	_____

**Confined Space Entry Supervisor or designee** must sign below AFTER all the above actions are fully understood and conditions necessary for SAFE entry have been met.

Authorization of Entry

\_\_\_\_\_  
Signature (if not CSE Supervisor, add title)

\_\_\_\_\_  
Date

\_\_\_\_\_  
Time

Termination of Entry

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Time

Appendix I  
Tennessee Wildlife Information

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## Wildlife State of Tennessee

For more information concerning wildlife in the state of Tennessee, please visit the Tennessee Wildlife Resources Agency website (<http://www.tn.gov/twra/>).

### 1 Insects

Care will be taken by all site workers to avoid stinging or biting insects such as ticks, spiders, bees, wasps, hornets, and yellow jackets. Workers allergic to any particular insect sting or bite should seek medical attention if stung or bitten and may need to carry emergency medicine prescribed by their doctor.

Care should always be taken to avoid insects and increased vigilance is necessary during high infestation seasons, when opening protective casings of monitoring wells, and when walking through areas of heavy vegetation or areas known to be infested.

To minimize the chance of bites/stings:

- Wear appropriate PPE, such as light colored clothing so you can see insects, long pants tucked into boots, long sleeves when possible, a hat, and gloves if you are cutting brush or need to handle or move vegetation.
- Check your body and clothing for insects, shower after work, and wash/dry clothes at as high of a temperature as possible.
- Don't swat at insects and don't eat in areas where there are insects.
- Avoid sweet smelling personal hygiene products and, unless contraindicated by the work being performed (e.g., sampling, data collection), wear USEPA-approved repellants such as those containing DEET.

#### 1.1 Ticks

Ticks are common, especially in the warmer weather months and may carry diseases such as Rocky Mountain Spotted Fever and Lyme disease.



*Tick*



*Removing a tick*

### ***First Aid for tick bites:***

- Using a fine tipped tweezers, grasp tick firmly as close to skin as possible and pull the body away from skin. Avoid crushing the body and don't twist.
- If parts of the tick remain in the skin, don't be alarmed as the mouth will dislodge as skin sloughs off.
- Wash the area with soap and water and apply antiseptic or antibiotic ointment to prevent infection.
- If unexplained symptoms develop such as severe headaches, fever, or rash within 10 days of the bite, seek medical attention.
- If possible, contain tick in an air tight container for identification purposes in the event of a serious reaction.

## **1.2 Chiggers**

Chiggers are tiny, 8-legged wingless organisms that grow up to become a type of mite. They are found in tall grass and weeds and their bites cause severe itching.



**1: Chigger**  
**2: Bites**

### ***First Aid for chiggers:***

- Reduce discomfort and prevent infection.
- Keep the affected area clean by washing with soap and water.
- Apply a topical hydrocortisone cream, antihistamine, or local anesthetic as needed to reduce itching.
- Do not scratch the wounds, if possible.
- If signs of infection occur, consult your physician.

## **1.3 Arthropods (e.g., bees and wasps)**

Bees and wasps belong to the phylum Arthropod family, and they are crucially important to the pollination of plants, specifically flowers, fruits, and vegetables. A sting from a bee or wasp will cause itching, irritation, redness and/or swelling at the sting site.



### ***First Aid for bee stings:***

- Remove the stinger as quickly as possible – venom continues to enter the skin from the stinger for 45 to 60 seconds following a sting – using a flat dull object, like a credit card. Slid the flat object in the opposite direction of the stinger to remove it from the skin.
- Wash the wound using soap and water.
- Apply ice for swelling and pain.
- Apply a topical hydrocortisone cream, antihistamine, or local anesthetic as needed to reduce itching.
- If the sting occurs on the neck or mouth, seek medical attention immediately because swelling in these areas may cause suffocation

A small percentage of people are allergic to stings and a sting can be fatal, when it causes a disruption to breathing and circulatory systems called anaphylactic shock. If the sting is followed by severe symptoms, seek medical attention immediately. Allergic people should never be alone for outdoor activities since help may be needed for prompt emergency treatment. Allergic people should have an identification bracelet as well as carry an “EpiPen,” or similar device, for immediate treatment for anaphylactic shock.

## **1.4 Fire Ants**

Fire ants are a variety of stinging ants with over 280 species worldwide. Typically, a colony produces large mounds in open areas, and feeds mostly on young plants, seeds, and insects. They nest in the soil, often near moist areas such as river banks and pond edges. Unlike other ants, which bite and then spray acid on the wound, fire ants bite only to get a grip and then sting, injecting toxic alkaloid venom. This results in a painful stinging sensation, similar to what a fire burn feels like.



***First Aid for fire ant bites:***

- Move rapidly away from the nest.
- Quickly remove or kill ants on skin and clothing to prevent further stings.
- Wash the area gently with soap and water to rid the skin of any venom.
- Place cool cloth or ice cloth on sites for 15 minutes; to relieve pain, dab the area with calamine lotion or a topical (cortisone); or take an oral antihistamine (e.g. benadryl) to help with swelling.
- Do not scratch the blister because this can lead to infection.
- An allergic response is rare; symptoms include difficulty breathing, light headedness, and weakness. Immediate medical attention is required.

## **2 Spiders**

Spider bites generally cause only localized reactions such as swelling, pain, and redness. However, if you are bit by a Black Widow or Brown Recluse, or if you are allergic to spiders, symptoms can be more serious.



*Black Widow Spider*



*Brown Recluse Spider*

***First Aid for spider bites:***

- Clean the bite area with soap and water and place a cold pack over the bite area to reduce swelling.
- Monitor for allergic reactions. If victim has more than minor pain, or if nausea, vomiting, difficulty breathing, or difficulty swallowing occurs, medical attention should be sought immediately.

## **3 Predatory Animals**

### **3.1 Snakes**

Snakes serve as an important role as predators in the ecosystem, and help maintain populations of rodents and other prey.

***First Aid for venomous snake bites:***

- Wash the bite with soap and water and immobilize the injured area, keeping it lower than the heart if possible.
- Seek medical attention immediately.
- DO NOT apply ice, cut the wound, apply a tourniquet, or suck the bite.
- Remain calm and try not to move the bitten body part.
- Remove jewelry or other items that may be affected by rapid swelling of affected body parts.
- Try to identify the type of snake: note color, size, patterns, and markings.
- The bite will be painful and have two distinct puncture wounds.
- If venom is injected there will be burning and swelling.
- ONLY FOR CORAL SNAKE BITES: apply a mild wrapping on the wound.

**Venomous Snakes of Tennessee\***



*Copperhead*



*Pygmy Rattlesnake*



*Timber Rattlesnake*



*Western Cottonmouth (aka Water Moccasin)*

\*Photos courtesy of Snakes of Tennessee ([www.tennsnakes.org](http://www.tennsnakes.org))

## Venomous Snakes of Tennessee\*

### Other Snakes (not specifically native to Tennessee)



*Rattlesnake*



*Coral Snake*

### 3.2 Bears

Bears are active between mid-March and early November. Bears will naturally shy away from humans and are rarely encountered. The American Black Bear is the most common species of bear in the United States. Although called a black bear, their fur can vary between honey-colored, blond, brown, and black. Depending on the season, food supply and gender, black bears may weigh anywhere from 100 to 450 pounds. Black bears measure about 3 feet high when on all four feet. They can be 5 feet tall when standing on back legs.



If encountering a bear:

- If you surprise a bear, stand still and stay calm. Let the bear identify you and leave. Talk in a normal tone of voice and be sure to leave the bear an escape route.
- If a bear doesn't leave, wave your arms slowly overhead and talk calmly. If the bear stands up, they are trying to identify you. If it huffs, pops its jaw or stomps it needs its space and step off the trail to the downhill side and keep looking at the bear.

If the bear approaches:

- Stand your ground, yell and throw rocks in the direction of the bear
- If you are attacked, do not play dead. Fight back with anything available.

The black bear has short claws (approximately four centimeters), which may not be easily visible in the tracks. The toe imprints are close together, though often there is a definitely space between the toes. The grizzly bear has longer claws (between 5 and 10 centimeters) that are often more visible in their tracks. The grizzly bear toes are closer together and are usually touching.



*Bear Track (front right paw and right hind paw, respectively)*

### 3.3 Coyote

The coyote is the size and shape of a small shepherd dog, about four feet in length with a full, black-tipped tail about 14 inches long. Typically weighs between 30 and 40 pounds. Their long hair varies in color with geography and season from pale grayish buff to rich reddish brown. The ears are rusty red behind.



Coyotes typically walk or trot in an alternating pattern; less common gaits include the two-print trot and a lope or gallop in a four-print pattern. Oval tracks are 2.5 to 3.5 inches long, and usually show foot pads (approximately 1/3 of entire print) and claw marks for at least the front two toes. Trails may meander, but are often straight-line routes.



### 3.4 Bobcat

The bobcat is active throughout the year but secretive and seldom seen. The bobcat is most abundant in foothills, canyons, mesas, and plateaus, where brush and woodland provide suitable habitat. Bobcats tend to avoid open prairies, tundra, heavy sub-alpine timber, and wetlands.



Bobcats are 32–37 inches long with a tail about 6 inches in length. Bobcats are similar in appearance to their cousin, the lynx. Bobcats or lynx are easily confused with mountain lion kittens, which are also spotted. The mountain lion kittens can be deciphered as they have much longer tails.



Bobcats walk in an alternating pattern, making prints about twice the size of a house cat's (2 to 2.5 inches long). Tracks could be confused with coyote or fox tracks — for bobcat, look for lack of claw marks, prints as wide as or wider than long, and lack of foot drag marks. As with lynx, hind legs sink in deep snow to make a “handle” at the back of the print. Bobcat trails meander rather than run directly.

## **Appendix B**

### **Page ETC Tennessee and Alabama Transport Licenses**



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STATE OF TENNESSEE  
DEPARTMENT OF ENVIRONMENT AND CONSERVATION  
DIVISION OF SOLID WASTE MANAGEMENT  
HAZARDOUS WASTE MANAGEMENT PROGRAM

**HAZARDOUS WASTE TRANSPORTER PERMIT**

A HAZARDOUS WASTE TRANSPORTER PERMIT IS REQUIRED IN THE STATE OF TENNESSEE BY THE DEPARTMENT OF ENVIRONMENT AND CONSERVATION FOR THE TRANSPORTATION OF HAZARDOUS WASTES THAT ORIGINATE IN THE STATE OF TENNESSEE AND / OR HAVE A TENNESSEE DESTINATION

**THIS PERMIT IS NOT TRANSFERABLE**

THIS PERMIT ISSUED TO:  
**PAGE E T C INC.**

**2758 TROMBLEY RD  
WEEDSPORT, NY USA**

PERMIT NUMBER	EFFECTIVE DATE	EXPIRATION DATE
<b>NYD986969947</b>	<b>January 15, 2015</b>	<b>January 31, 2016</b>

PERMIT EFFECTIVE UNTIL THE ABOVE EXPIRATION DATE UNLESS SUSPENDED, REVOKED, OR VOLUNTARILY RESCINDED

**SPECIAL INSTRUCTIONS:**

1. AN ORIGINAL OR PHOTOCOPY OF THIS PERMIT MUST BE KEPT IN EACH TRANSPORT VEHICLE.
2. GENERATORS OF HAZARDOUS WASTE IN THE STATE OF TENNESSEE ARE REQUIRED BEFORE SIGNING HAZARDOUS WASTE MANIFESTS, TO VERIFY THAT THE TRANSPORTERS TO WHOM THEY GIVE THEIR WASTE POSSESS A VALID TENNESSEE HAZARDOUS WASTE TRANSPORTER PERMIT. THE GENERATORS' VERIFICATION PROCESS ENSURES THAT:
  - (a) THE TRANSPORTER BUSINESS NAME ON THE PERMIT IS THE SAME AS THE MANIFEST'S ITEM 5, TRANSPORTER 1 COMPANY NAME;
  - (b) THE ASSIGNED PERMIT NUMBER IS THE SAME AS THE MANIFEST'S ITEM 6, U.S. EPA ID NUMBER;
  - (c) THE MANIFEST'S ITEM 16, GENERATOR'S CERTIFICATION, IS SIGNED BY THE GENERATOR ON OR AFTER THE EFFECTIVE DATE BUT NO LATER THAN THE EXPIRATION DATE.
3. THIS PERMIT SUPERCEDES ALL PREVIOUSLY ISSUED STATE OF TENNESSEE HAZARDOUS WASTE TRANSPORTER PERMITS INCLUDING ORIGINALS, FACSIMILES AND PHOTOCOPIES. DESTROY ALL PREVIOUSLY ISSUED PERMITS TO PREVENT ILLEGAL ACTIVITIES.
4. REPORT SPILLS WITHIN THE STATE OF TENNESSEE IMMEDIATELY TO 1-800-262-3300 (THE TENNESSEE EMERGENCY MANAGEMENT AGENCY - T.E.M.A.).

*Patrick J. Flood* 1/15/2015

Patrick J. Flood, PE, Director  
Division of Solid Waste Management

FOR MORE INFORMATION CONTACT:

STATE OF TENNESSEE  
DEPARTMENT OF ENVIRONMENT AND CONSERVATION  
DIVISION OF SOLID WASTE MANAGEMENT  
WASTE ACTIVITY AUDIT SECTION -- ATTENTION CONNIE JONES  
WILLIAM R. SNODGRASS TENNESSEE TOWER  
312 ROSA L. PARKS AVENUE, 14th FLOOR  
NASHVILLE, TN 37243  
PHONE: 615-532-0815 FAX: 615-532-0938 eMail: Connie.Jones@tn.gov

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# HAZARDOUS WASTE TRANSPORT PERMIT

**PERMITTEE:** PAGE ETC, Inc.

**ADDRESS:** 2758 Trombley Road  
Weedsport, New York 13166

**PERMIT NUMBER:** NYD 986 969 947

**HAZARDOUS WASTES APPROVED:** All hazardous wastes identified by Rules 335-14-2-.02 through 335-14-2-.04, inclusive, and used oil identified by Rule 335-14-17-.02 of the ADEM Administrative Code.

**TRANSPORTATION MODE:** Highway

*In accordance with and subject to the provisions of the Hazardous Waste Management Act of 1978, as amended, Code of Alabama 1975, §§22-30-1 to 22-30-2, the Alabama Environmental Management Act, as amended, Code of Alabama 1975, §§22-22A-1 to 22-22A-15, and rules and regulations adopted thereunder, and subject further to the conditions set forth in this permit, the Permittee is hereby authorized to transport the approved hazardous wastes by the approved transportation mode.*

**ISSUANCE DATE:** April 8, 2013

**EFFECTIVE DATE:** April 15, 2013

**EXPIRATION DATE:** April 14, 2016

Alabama Department of Environmental Management