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**Fernald Preserve Site
Harrison, Ohio
Paddys Run Streambank
Stabilization**

LTS-111-0051-49-001

Prepared by:

Apex Companies, LLC
155 Tri-County Parkway, Suite 250
Cincinnati, Ohio 45246

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Contents

Division 1: General Provisions and Summary Requirements

01010	Statement of Work	
01020	Construction Health and Safety	
01025	Measurement and Payment	Rev-1
01050	Field Engineering	Rev-1
01100	Special Project Procedures	
01200	Environmental Compliance	
01300	Submittals	Rev-1
01500	Construction Facilities and Temporary Controls	

Division 2: Site Work

02100	Sediment and Erosion Control	Rev-1
02200	Earthwork	Rev-1
02203	Geotextiles	
02205	Regrade, Fabric & Plant Bank Treatment	Rev-1
02215	Soil Encapsulated Lifts	Rev-1
02275	Rock Toe Bank Treatment	Rev-1
02920	Revegetation	Rev-1
02921	Woody Pole Installation	Rev-1
02925	Container Tree and Shrub Planting	Rev-1
02934	Rock Cross Vane	Rev-1

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Section 01010: Statement of Work

Part 1—General

1.1 Introduction

This Statement of Work (SOW) describes the scope of services requested of the subcontractor to construct a streambank stabilization within a 450 foot (ft) reach of Paddys Run at the Fernald Preserve Site (Site), Harrison, Ohio. Stabilization shall consist of channel reconfiguration, installation of a rock toe, soil encapsulated lifts, two in-stream cross vanes, regrading and revegetation. The subcontractor shall have previous construction experience in streambank stabilization using bio-engineering techniques.

1.2 Project Background

The U.S. Department of Energy (DOE) is managing the Legacy Management Program including the Fernald Preserve Site. The S.M. Stoller Corporation, a wholly owned subsidiary of Huntington Ingalls Industries (hereinafter referred to as Contractor) is the Legacy Management Support Contractor for the DOE Office of Legacy Management. Work will be administered from the Contractor's Fernald Preserve Site, office.

1.3 Site Description

The Site is situated on a 1,050-acre tract of land, approximately 18 miles northwest of Cincinnati, Ohio. The Site is located near the unincorporated communities of Ross, Fernald, Shandon, and New Haven in Hamilton County (refer to Figure 1). The Site is a former uranium processing facility that was shut down in 1991. Since then, the Site has undergone extensive remediation pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Remedial activities and subsequent ecological restoration have converted the site from an industrial production facility to an undeveloped park, encompassing a series of wetlands, prairies, and forested communities. Approximately 900 acres of the Site were ecologically restored.

While remediation of buildings and soil contamination was completed in 2006, several structures remain on site including a 123-acre On-site Disposal Facility (OSDF), a Converted Advanced Wastewater Treatment (CAWWT) structure, and supporting infrastructure, extraction wells and associated piping and utilities, the outfall line to the Great Miami River, and the Visitors Center. General and historical information regarding the Fernald Preserve is also available online (<http://www.lm.doe.gov/fernalld/Sites.aspx>).

1.4 Project Area Background

Paddys Run is a third order stream that runs in a southerly direction along the west boundary of the Site and flows into the Great Miami River approximately 1.5 miles downstream of the Site. The stream is approximately 8.8 miles long and drains approximately 15.8 square miles, including most of the Site. For most of the on-property reach, Paddys Run has eroded through the glacial overburden into the underlying Great Miami Aquifer. This results in the stream being intermittent in nature from June through October.

- C. The subcontractor shall establish access, staging and laydown areas as indicated on the drawings. The subcontractor shall not drive, or set materials and equipment off of designated roads, access areas, right-of-ways, staging or lay-down areas, etc.
- D. No excavation, grading, leveling, grubbing, backfilling, etc., shall be performed beyond that specifically stated as a part of this subcontract unless pre-approved by Contractor.
- E. Explosives, minors, domestic animals, firearms, alcohol, or drugs shall not be brought on the site under any circumstances.

1.6 Communication with Local Agencies

All communications with state agencies and local businesses/residents will be coordinated through Contractor. Emergencies will be coordinated directly by subcontractor with local authorities and Contractor will be contacted immediately following.

Part 2—Products

(Not Used)

Part 3—Execution

3.1 Scope of Work

Scope of work shall consist of constructing the features as listed in Article 3.4 of this section in conformance with the plans and specifications.

The work shall consist of furnishing all labor, tools, equipment, materials, transportation, services, and incidentals, and performing all operations necessary for the work as shown and noted on the drawings and as specified in these specifications. To ensure completion of the project in accordance with the construction schedule included with the solicitation documents, the subcontractor shall have labor and equipment resources available and dedicated to this subcontract.

3.2 Subcontract Drawings

Call-out dimensions shown on the drawings take precedence over scaled dimensions. Large-scale details have precedence over smaller scale drawings or details.

3.3 Work Schedule

Work schedule will be allowed Monday through Friday. Subcontractor shall submit with project proposal the proposed work schedule including days and hours to be worked. Any deviation from the accepted schedule will need to be proposed to and approved by the Contractor a minimum of 1 week in advance of schedule change implementation.

3.4 General Construction Sequence

A General Construction Sequence is provided in this section. The actual Project Construction Sequence shall be established by the Project Construction Schedule submitted by the subcontractor and accepted by Contractor in accordance with Section 01100: Special Project Procedures. Since some of the overall project work elements may be performed concurrently, only the most critical activities are listed. The tasks listed below shall be shown in the Project Construction Schedule submitted by the subcontractor. Changes to the Project Construction Schedule shall be accepted by Contractor prior to implementation.

1. Mobilization
2. Establish site controls
3. Establish sediment and erosion controls
4. Survey control and project layout
5. Clearing and grubbing
6. Diversion berm and channel construction
7. Earthwork grading
8. Rock toe construction
9. Soil encapsulated lifts construction
10. Fabric and plant bank treatment construction
11. Construct in-stream cross vanes
12. Woodlands re-establishment
13. Reclamation
14. Demobilization

3.5 Hold Points

Subcontractor shall acquire approval to proceed with work at designate hold points. Hold points are identified in specification sections when required.

3.6 Ongoing Site Activities

Contractor is currently conducting operations associated with site management and contaminated ground water remediation. The subcontractor shall perform all construction activities so that disruptions to current operations are minimized. Note that while the Fernald Preserve is open to the public, the project location is not accessible to the public.

3.7 Project Coordination

The subcontractor shall supervise and direct all work required under this subcontract. The subcontractor shall be solely responsible for the construction methods, controls, techniques, sequences, procedures, and construction safety, except in cases where Contractor written direction to the subcontractor overrides the subcontractor's choice. The subcontractor shall assign a dedicated supervisor/superintendent/foreman/competent person with no assigned work tasks to provide full time supervision, direction, and oversight of the project and personnel and who will be onsite full time during construction activities. The supervisor/superintendent/foreman/competent person shall have a minimum

5 years of experience in the scope of work covered in this SOW and shall have completed at least three projects of similar size and complexity in a supervisory position.

The Contract Administrator will be responsible for administrative issues. All contract modifications, invoices, submittals and other administrative issues shall be coordinated through the Contract Administrator.

End of Section 01010

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Section 01020: Construction Health and Safety

Part 1—General	1
1.1 Scope.....	1
1.2 Integrated Safety Management.....	1
1.3 Worker Safety and Health Program Rule 10 CFR 851.....	2
1.4 Submittals	2
1.5 Specifications, Codes, and Standards	4
Part 2—Products.....	4
Part 3—Execution.....	5
3.1 Worker Rights and Responsibilities	5
3.2 OSHA Compliance	5
3.3 Fitness-for-Duty Evaluation	5
3.4 Training Requirements	6
3.5 Jobsite Inspections	8
3.6 Work Clothing and Personal Protective Equipment.....	8
3.7 Industrial Hygiene	9
3.8 Environmental Hazards	10
3.9 Safety Data Sheets.....	11
3.10 Industrial Safety Requirements.....	11
3.11 Accident Reporting.....	13
3.12 Records	13
3.13 Lower-Tier Subcontractors.....	13

Part 1—General

1.1 Scope

This section describes the project health and safety requirements. All work shall be conducted in accordance with safety regulations promulgated by the U.S. Department of Energy (DOE), the Occupational Safety and Health Administration (OSHA), these subcontract documents, and state and local agencies.

1.2 Integrated Safety Management

The Contractor will define, direct, and coordinate health and safety for all site activities. DOE and the Contractor are committed to systematically integrating environment, safety, and health management into all facets of work planning, practices, and execution at all levels, using an Integrated Safety Management System (ISMS) so that the work is accomplished while protecting the workers, the public, and the environment. For the purposes of integrated safety management, the definition of safety encompasses safety, health, and environmental protection, including pollution prevention and waste minimization. Subcontractor personnel, including lower-tier subcontractors, are responsible for following work instructions and procedures, and for taking precautions to prevent injury to themselves and others.

The Contractor will prepare a Job Safety Analysis (JSA) using the ISMS's Five Core Functions for work planning and control to define the scope of work and specific activities of this project, analyze the hazards identified with the activities, and develop and implement the hazard controls and/or protective equipment to mitigate those hazards. Subsequently, the subcontractor shall perform the work within the controls and provide feedback and continuous improvement. Subcontractor personnel shall review and understand the JSA prior to the start of work and add any additional identified hazards or concerns to the JSA, thereby integrating safety management into the workplace.

1.3 Worker Safety and Health Program Rule 10 CFR 851

The Contractor and its subcontractors are subject to the provisions of the Worker Safety and Health Program (WSHP) rule, Title 10, Section 851 of the *Code of Federal Regulations* (10 CFR 851), and are required to comply with the Contractor's WSHP, which is implemented through the *Health and Safety Manual* (LMS/POL/S04321). The *Health and Safety Manual* must be followed by the subcontractors for work performed at any DOE site. Not following the *Health and Safety Manual* may result in penalty to a company or an employee.

The provisions of the *Health and Safety Manual* relevant to the scope of work will be communicated to the subcontractor through the work control process, including the Preconstruction conference, the Initial Site Briefing, and daily safety meetings, to ensure that all personnel understand the work scope, work sequence, associated hazards, hazard controls, safety equipment, and required procedures. All personnel will have an opportunity to question, comment on, and expand on hazard analyses and controls during the Preconstruction conference, Initial Site Briefing, daily safety meetings, and other contact with Contractor staff.

A copy of the Contractor's *Health and Safety Manual* is available by request. A copy of the WSHP rule, 10 CFR 851, including its implementation requirements and penalty provisions, can be found at <http://www.hss.doe.gov/HealthSafety/WSHP/rule851/851final.html>.

1.4 Submittals

- A. Submittals shall be made in accordance with Section 01300: Submittals.
- B. Submittals shall be made for proposed substitutions.
- C. Submittals shall be made as required on the Project Submittal List, Table 01300-1.
- D. Identify all subcontractor or lower-tier subcontractor employees anticipated to work at a DOE facility for more than 240 work hours during a rolling 12-month period. Submit completed 10 CFR 851 Fit For Duty Evaluation (Employee/Subcontractor) (FFD), form LMS 2115, to the Contract Administrator for each individual at least 5 working days prior to working on this subcontract, per Article 3.3 of this section, so that a fitness-for-duty physical evaluation may be scheduled.
- E. All employees will have their onsite work hours tracked, even those who have received the fitness-for-duty evaluation. Submit Subcontractor Hour Tracking

Monthly Report (SHTMR) form LMS 2146 to the Contractor with each invoice or at least monthly. Invoices received without this report shall not be paid.

- F. If an employee did not receive an initial fitness-for-duty physical and is anticipated to exceed 240 hours, then submit completed FFD form LMS 2115 to the Contract Administrator at least 5 working days prior to reaching the 240-hour threshold so the required physical may be scheduled, per Article 3.3 of this section. Employees shall not exceed 240 hours on any DOE site without a fitness-for-duty examination.
- G. Notify the Contract Administrator of all subcontractor or lower-tier subcontractor employees on the fifth consecutive day of any absence due to injury or illness, irrespective of work-relatedness. Those employees shall receive a fitness-for-duty evaluation prior to returning to work, per Article 3.3 of this section.
- H. Submit equipment operator qualifications per Article 3.4C.1 of this section at the Preconstruction conference.
- I. Submit a signed statement to document personnel proficiency to perform tasks and operate the equipment supplied under this subcontract per Article 3.4C.1 of this section at the Preconstruction conference.
- J. Submit the Subcontractor OSHA Competent Person Designation form LMS 2615CON attached to this section, per Article 3.4C.2 of this section at the Preconstruction conference.
- K. Submit First Aid training evidence in accordance with Article 3.4C.3 of this section at the Preconstruction conference.
- L. Submit ATV training letter indicating employees name, date training received, and trainers name per Article 3.4C.4 of this section at the Preconstruction conference.
- M. Submit subcontractor Safety Data Sheets (SDS) per Article 3.9 of this section upon bringing material onto site.
- N. Submit crane and derrick operator, rigger, and signal person information per Article 3.10C of this section.
- O. Submit hoisting and rigging equipment information per Article 3.10C of this section.
- P. Submit hoisting and rigging lift plan per Article 3.10C of this section.
- Q. Submit lifting equipment inspection documentation per Article 3.10C.3 of this section.
- R. Submit equipment list, the type of equipment used to transport, and the method for unloading (e.g., direct roll off, metal ramps, or temporary dirt ramps) per Article 3.10D.2 at the Preconstruction conference.
- S. Submit list of lower-tier subcontractors and suppliers delivering to or transporting from the site per Article 3.13 of this section at the Preconstruction conference. List shall be updated as lower-tier subcontractors or suppliers change.
- T. Submit a signed statement to document that electrical workers are qualified and have been trained in accordance with 29 CFR 1910.331 – 335 and NFPA 70E, and will have any required arc flash PPE.

1.5 Specifications, Codes, and Standards

The publications listed below form a part of this section to the extent referenced. The publications are referred to in the text by the basic designation only.

Code of Federal Regulations

10 CFR 851 Worker Safety and Health Program

29 CFR 1910 Occupational Safety and Health Standards and for General Industry and standards incorporated by reference

29 CFR 1926 Safety and Health Regulations for Construction and standards incorporated by reference

American National Standards Institute

ANSI Z308.1-2009 Minimum Requirements for Workplace First Aid Kits and Supplies

ANSI Z87.1 American National Standard for Occupational and Educational Eye and Face Protection Devices

ANSI Z89.1 American National Standard for Industrial Head Protection

American Society for Testing and Materials

ASTM F 2412 Standard Test Methods for Foot Protection

ASTM F 2413 Standard Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear

National Fire Protection Association

NFPA 70E Standard for Electrical Safety in the Workplace

Part 2—Products

(Not Used)

Part 3—Execution

3.1 Worker Rights and Responsibilities

Workers are responsible for identifying safety concerns, potential hazards, or unsafe conditions to management. Each worker has the right, responsibility, and authority to report unsafe or environmentally unsound conditions or practices and stop work activities without fear of reprisal for the prevention of injuries or accidents. Prior to the start of work, all subcontractor and lower-tier subcontractor personnel shall read the attached Worker Safety and Health Poster, which outlines worker rights.

3.2 OSHA Compliance

The subcontractor and all lower-tier subcontractors shall comply with all applicable requirements identified under 29 CFR 1910 and 29 CFR 1926, as required by the Department of Occupational Safety and Health. In addition to complying with OSHA, subcontractor shall comply with all state and local health and safety regulations. The subcontractor shall have a health and safety program in accordance with 29 CFR 1910 and 29 CFR 1926.

The subcontractor shall perform all work safely and in accordance with the requirements of the Contractor *Health and Safety Manual*, the subcontractor's health and safety program, and any associated JSAs, safe work permits, and appropriate federal and state health and safety regulations, such as those promulgated by OSHA.

3.3 Fitness-for-Duty Evaluation

All subcontractor or lower-tier subcontractor employees who work on DOE-controlled site(s) for more than 240 hours in a rolling 12-month period, inclusively, are required to have a fitness-for-duty physical evaluation. The site addressed in this SOW is a DOE-controlled site.

For each subcontractor or lower-tier subcontractor employee who is expected to exceed the 240-hour threshold, the subcontractor shall notify the Contract Administrator 5 or more working days prior to performing any work on this subcontract, and shall complete the attached FFD form. A fitness-for-duty evaluation will be scheduled by the Occupational Program Coordinator (OPC) for each employee. The subcontractor shall track all other employee workdays and/or hours and notify the Contract Administrator at least 5 working days prior to the employee reaching the 240-hour threshold. The attached SHTMR form shall be submitted at least monthly, attached to the subcontractor invoice.

Subcontractor fitness-for-duty evaluations will not be scheduled until a completed FFD form is received. The FFD is used by the Contractor's occupational medicine provider clinic to determine the type of physical examination required for each employee based on job tasks and exposure risks. The Contractor is billed directly by contracted clinics, and notification will be sent to Project Management and Accounting when the fitness-for-duty process is complete.

Subcontractor or lower-tier subcontractor employees will not be permitted to work on the site for more than 240 hours in a rolling 12-month period without a fitness-for-duty evaluation on file with the OPC. Failure to submit the completed FFD form and ensure an employee completes the physical evaluation process prior to reaching the 240-hour threshold will result in the employee being restricted from the job site. Any subcontractor downtime that results from such restriction shall be at the subcontractor's expense.

Notify the Contract Administrator of all subcontractor or lower-tier subcontractor employees on the fifth consecutive day of any absence due to injury or illness, irrespective of work-relatedness. Those employees shall receive a fitness-for-duty evaluation and shall not return to work until they receive clearance from the Contractor's provider clinic.

3.4 Training Requirements

Workers are responsible for performing tasks in accordance with provided training and may not perform tasks for which they have not been adequately trained. Minimum training requirements include the following:

- A. **Initial Site Briefing:** All subcontractor field personnel shall attend a Contractor initial site briefing on the first day of work before conducting any field work. The briefing will be held when the subcontractor mobilizes to the site. If circumstances require the use of personnel who did not attend the initial site briefing, arrange individual briefings with the Contractor for the replacement personnel before they begin field work.
- B. **Tailgate Safety Meetings:** At the beginning of each day's work, or at a frequency specified by the Contractor, and before specific tasks with significant or changed safety considerations, the Contractor and subcontractor shall conduct a health and safety and operations meeting for all personnel. The scope of the upcoming day's operations and activities will be reviewed, and hazards associated with those activities will be identified along with the safety implications and procedures to mitigate the hazards. Relevant safety documentation associated with the upcoming work will be reviewed. In addition, issues or concerns noted from the previous days' activities will be discussed. This briefing will be documented to identify the topics discussed and personnel in attendance (per Hazard Communication Standard, 29 CFR 1910.1200).
- C. **Personnel Qualifications**
 - 1. **Qualified Operator/Laborers**

Provide personnel that are trained, qualified, professional, licensed, and certified as required to operate equipment or perform their tasks as required under this subcontract. Operators shall be qualified and experienced operating the equipment that they are assigned to and shall demonstrate proficiency onsite. Submit a signed statement to document personnel proficiency to perform tasks and operate the equipment supplied under this subcontract at the Preconstruction conference.

2. OSHA Competent Person

For each phase of work, the subcontractor shall designate one trained, qualified, professional person from the personnel provided to act as a working Superintendent/Foreman/Lead Site Manager and provide subcontractor crew supervision. The individual shall also be designated as the OSHA competent person. Provide name(s) of competent person(s) in accordance with OSHA regulations on the Subcontractor OSHA Competent Person Designation form LMS 2615CON attached to this specification. The identified OSHA competent person shall meet the requirements of a competent person for each OSHA component of the work (e.g., hoisting and rigging, scaffolding, electrical, excavations). The form shall be updated as the project progresses and changes in personnel occur and specialized phases of the work required are initiated.

3. First Aid/CPR

The subcontractor shall ensure at least one person is onsite at all times while work is being performed who is currently trained in first aid/CPR. Submit evidence of current training at the Preconstruction conference.

4. All-Terrain Vehicle (ATV) Training

Subcontractors who use ATVs during the course of their work shall provide ATV training from an accredited ATV trainer to their employees. Submit evidence of training at the Preconstruction conference.

5. Fall Protection, Scaffolding, and Aerial Lift Training

Provide personnel that are trained and qualified to perform the work covered by this contract. The subcontractor shall provide documentation of training completed to perform this work or shall submit a signed statement to document personnel proficiency to perform tasks required by this section at the Preconstruction conference.

6. Lockout/Tagout (LO/TO) Training

The subcontractor shall follow the Contractor's LO/TO program. To ensure compliance with the Contractor's LO/TO program, the subcontractor shall ensure all workers required to perform LO/TO during the project have attended the Contractor's LO/TO training before they have a need to apply LO/TO. Refer to Exhibit 2 to this section: Standard 10.2 "Lockout/Tagout for Hazardous Energy Control" for additional information. The subcontractor should plan for this training to take up to 2 hours. Contractor will pay for the cost of the trainer. Subcontractor shall include in their bid cost, the time for their employees to take the training.

7. Qualified Electrical Worker

The subcontractor shall use qualified electrical workers when performing electrical work.

The training of qualified persons must include at least the following:

- Ability to distinguish exposed live parts from other parts of electrical equipment.
- Ability to determine the nominal voltage of live parts.
- Knowledge of clearance or approach boundaries specified in NFPA 70E, “Standard for Electrical Safety in the Workplace”.
- Proper use of test equipment and PPE.

Submit a signed statement to document that electrical workers are qualified.

3.5 Jobsite Inspections

The subcontractor shall conduct daily inspections of the jobsite for unsafe conditions or practices. The subcontractor shall inspect vehicles, heavy equipment, and materials prior to mobilization to the site to ensure that the equipment and materials comply with and meet the manufacturer’s safety and operating requirements and applicable regulatory standards—including OSHA, State of Ohio Department of Transportation, and DOE requirements. The subcontractor shall make vehicles, heavy equipment, construction equipment, and materials available to the Contractor for an initial safety and radiological inspection prior to commencement of work. The subcontractor shall allow up to 1 workday for the Contractor to conduct the initial inspection and up to 1 hour for each piece of equipment delivered to the jobsite after work has begun at the site. If vehicles, heavy equipment, construction equipment, or materials do not meet the manufacturer’s safety and operating requirements and applicable regulatory standards the vehicles, heavy equipment, or materials shall not be used on a jobsite until approved by the Contractor.

3.6 Work Clothing and Personal Protective Equipment

A. Work Clothing

1. Clothing such as tank tops, shirts cut off at the midriff, cut-off pants, shorts, sandals, sneakers, and jogging shoes are considered unacceptable dress and shall not be worn.
2. Adequate dress for personnel on a jobsite shall consist of the following:
 - a. Full-length trousers, slacks, or jeans in good condition.
 - b. Safety boots with sturdy soles that meet the requirements of ASTM F 2412/F 2413.
 - c. Shirts that cover the shoulders, with sleeves at least T-shirt length.
 - d. Leather, cotton, or synthetic work gloves when required to protect from abrasions, cuts, bruises, and to enhance the ability to safely grasp objects.

B. Personal Protective Equipment

1. The subcontractor shall be responsible for providing personal protective equipment (PPE) to the workers. This equipment includes, but is not limited to, the following:
 - a. Safety glasses, with side shields or wraparounds when required, that meet the requirements of ANSI Z87.1A.
 - b. Hardhats that meet the requirements of ANSI Z89.1.
 - c. Hearing protection, required when a noise level equals or exceeds an 8-hour time-weighted average (TWA) sound level of 85 dBA.
 - d. Full-face shields with safety glasses for any equipment that produces flying particles and/or sparks.
 - e. High-visibility traffic vests.
 - f. PPE for voltage and arc flash protection that meet the requirements of NFPA 70E.
2. The requirement for specific PPE, including when to wear it, will be determined by the Contractor in the JSA or Safe Work Permit for specific tasks. The Contractor reserves the right to adjust PPE requirements to protect personnel from hazards.

3.7 Industrial Hygiene

A. Sanitation

The subcontractor shall provide a chemical toilet and hand-washing station at the worksite. The subcontractor shall ensure that washing facilities meeting the following criteria are available for employees:

- The facility must use potable water. Potable wash-water containers shall be clearly marked for exclusive use as wash-water containers and include prohibition of use for drinking. Hand soap or similar cleansing agents shall be available.
- Individual hand towels, cloth, or paper shall be available in the immediate vicinity of the temporary toilet facility, and a receptacle for used towels shall be provided.

B. Drinking Water

The subcontractor shall provide bottled water or potable drinking water in a clean, sanitary vessel with individual drinking cups. A receptacle for disposing of the used cups or bottles shall be provided (29 CFR 1926.51(a)(5)). The subcontractor shall provide:

- Potable water adequate for the number of personnel at the site.
- Potable water containers equipped with tight-fitting caps.
- Water dispensers (if used) equipped with a tap to dispense the water. Water shall not be dipped from the container.

- Containers used to dispense drinking water, clearly marked for exclusive use as drinking water containers.
- Single-serve disposable cups, with a sanitary container for the unused cups and a receptacle for the used cups.

3.8 Environmental Hazards

A. Heat Stress

1. Hazards related to heat stress can be controlled through proper planning and effective monitoring of personnel. Factors that could affect a worker’s ability to function in extreme temperatures include PPE, physical fitness, acclimatization, age, obesity, alcohol consumption, drug use, infections, and disease. Personnel could potentially be exposed to heat stress conditions when ambient temperature exceeds 85 °F (75 °F when wearing double-layer of clothing) because of factors such as high humidity, low air movement, high radiant heat, and level of physical activity of the worker.
2. Because of the concern about heat stress, the Contractor recommends that the subcontractor train employees to recognize the signs of heat stress, monitor employees for symptoms, and take appropriate action, including initiating a work-rest schedule, if the symptoms are present. The actual work-rest schedule will be determined by conducting physiological (pulse rate) monitoring after each work period. The frequency for physiological (pulse rate) monitoring will be determined based on the work demand category specified in the Heat Stress Assessment completed by the Contractor for the work activity. The recommended frequency for physiological monitoring is shown in Table 01020-1.

Table 01020-1. Physiological Monitoring for Heat Stress

Recommended Frequency for Initial Physiological Monitoring		
Work Demand Rate	Non-Acclimated Worker	Acclimated Worker
Light	60 minutes	120 minutes
Moderate	45 minutes	90 minutes
Heavy	30 minutes	60 minutes
Very Heavy	15 minutes	30 minutes

- If worker’s heart rate is below 110 beats per minute (bpm) when checked, rehydrate and resume work activity.
- If worker’s heart rate is at or above 110 bpm when checked, rehydrate and take at least 15 minute break in a shaded or cooler area. DO NOT return to work until heart rate has recovered and is below 110 bpm.
- If worker’s heart rate is at or above their Target Heart Rate (180 minus their age) when checked, they must rest in a cooler or shaded area, rehydrate and notify their supervisor or a co-worker of their elevated heart rate.
- If a worker’s heart rate is elevated above their Target Heart Rate, their supervisor or a co-worker must stay with the worker until the worker shows signs they have recovered from their elevated heart rate. When a worker exceeds their target heart rate due to working in the heat, it is recommended the worker either be removed from the heat for the rest of the day or be assigned another work task with a much lower work demand rate.

B. Lightning

1. When an electrical storm is close enough to the work site to be a hazard to site employees, personnel shall seek shelter in buildings, vehicles, equipment with cabs, low areas, or ground depressions and remain there until the Contractor authorizes the resumption of work. Stream beds and other drainages are not suitable because of potential for flash flooding.
2. The subcontractor shall follow the Contractor's site-specific procedure for lightning safety using an automated lightning detector.

C. Biological Hazards

Be aware of the possibility of insect, reptile, and animal bites, including spiders, snakes, wasps, bees, etc.

D. Excavations

Excavations shall not exceed 4 feet in depth without proper consideration to soil types by competent person in accordance with OSHA.

3.9 Safety Data Sheets

The subcontractor shall submit to the Contractor a copy of the SDS for each chemical the subcontractor intends to use on the jobsite. SDS books shall be provided by and made available by the subcontractor. The books shall contain only the SDS for the chemicals used on the site. The books must be clearly marked and placed in a convenient location for all personnel to access.

3.10 Industrial Safety Requirements

A. Hearing Conservation

Hearing protection shall be worn in areas if a noise level equals or exceeds an 8-hour TWA sound level of 85 dBA. If sound level surveys are not available, hearing protection with a noise-reduction rating of at least 25 shall be worn whenever motorized equipment is operating in the immediate area or when the Contractor suspects the sound levels exceed the action level. The subcontractor shall comply with OSHA standard 29 CFR 1910.95.

B. Safe Work Permits

The safe work permit shall be used for non-routine jobs that are not covered by a written procedure or JSA. The Contractor may require safe work permits for tasks such as cutting/welding, using chainsaws, or working on energized electrical lines. A 24-hour notice is required prior to issuance of any safe work permit.

C. Hoisting and Rigging

1. All lifts shall comply with Exhibit 1 to this section: Standard 3.2 "Hoisting and Rigging."
2. Subcontractor shall submit with equipment or product submittals manufacturer's recommended lift points for the piece of equipment or the product to be lifted.

3. If the lifting equipment meets the requirements of 29 CFR 1926, Subpart CC, “*Cranes and Derricks in Construction*”, the subcontractor shall submit documentation to the Contractor that the lifting equipment has been inspected by a qualified person in the last 12 months and the equipment operator is trained and qualified to operate the lifting equipment.
4. Subcontractor shall submit current certification of crane and derrick operators, qualified riggers, and signal persons if the work involves cranes or derricks

D. Heavy Equipment Unloading

1. Heavy equipment shall not be unloaded until the unloading portion of the JSA has been reviewed and understood for this activity.
2. Subcontractor shall notify the Contractor 1 day prior to equipment being unloaded and shall provide the following information to the Contractor:
 - a. Type of equipment being unloaded.
 - b. Type of equipment transport.
 - c. Method for unloading (for example, direct roll off, metal ramps, or temporary dirt ramps).
3. Equipment shall only be unloaded with the Contractor present.

E. Equipment Use

All tools and equipment shall be operated as specified in their operating manuals.

F. Electrical Safety

All electrical installations shall be performed by qualified, trained, professional personnel and under the supervision of a licensed electrical contractor in the State of Ohio. Electrical work shall be performed in accordance with Subpart K of 29 CFR 1926 and NFPA 70E.

All electrical work shall comply with Exhibit 2 to this section: Standard 10.2 “Lockout/Tagout for Hazardous Energy Control.” Associated forms will be provided prior to project commencing.

G. Fall Protection, Scaffolding, Aerial Lifts

Fall protection shall be implemented when working at unprotected heights of 6 feet or greater. When fall protection is required, fall protection shall comply with the requirements of Subpart M of 29 CFR 1926.

H. First Aid Kits

The subcontractor shall provide a first aid kit that meets the requirements of ANSI Z308.1-2009, including providing minimum supplies and supplemental supplies as necessary. The type and quantity of supplemental supplies shall be based upon consultation of a person competent in first aid and cognizant of the hazards found in the particular work environment, and upon the number of people who may need first aid at one time. Additionally, the subcontractor shall inspect the first aid kits in accordance with 29 CFR 1910.151 and 1926.50.

I. Radioactive Sources

Radioactive sources, including radiography sources, radiation generating devices, and nuclear soil density gauges, shall not be brought on a jobsite by the subcontractor without prior notification to the Contractor Radiological Control Manager. Radioactive sources shall be identified by serial number, isotope, and the most current integrity test.

3.11 Accident Reporting

The subcontractor shall immediately report to the Contractor any accident, incident, or near miss that could affect the health and safety of the site workers or general public involving personal injury or property damage, however minor, as well as any illness or injury known or suspected to have an occupational cause. The subcontractor shall immediately secure the equipment and/or work site involved in an accident, event, or near miss until the Contractor grants permission to return to work. The subcontractor shall cooperate fully with Contractor and DOE personnel in any investigation of an accident, illness, or injury.

3.12 Records

The Contractor may require the subcontractor to record, on a Contractor-supplied Site Entrance Log, the names of all persons entering or exiting the jobsite each day. These logs, if required, shall be filed at the Contractor's office after completion of the project. All records shall be controlled by the Contractor.

3.13 Lower-Tier Subcontractors

The subcontractor shall notify the Contractor of any lower-tier subcontractors working on the site or suppliers delivering to or from the site. The subcontractor shall ensure that lower-tier subcontract documents contain applicable health and safety flow-down requirements and that those requirements are enforced. The information and ratings provided from the OSHA 300 Log, OSHA 300A Log, and Experience Modification Rate for lower-tier subcontractors must be acceptable and approved by the Contractor prior to their start of work.

End of Section 01020

U.S. Department of Energy Office of Legacy Management

OSHA Competent Person Designation

Site: _____ **Project:** _____

Legacy Management Support Services Contract: Stoller Legacy Management Team

The following individual(s) representing _____ are designated as the
Company Name

OSHA Competent Person, and are capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to personnel on the site or the public, and has authorization to take prompt corrective measures including "stop work" authority to eliminate them, while overseeing the specific work scope outline in this Subcontract.

1. Competent Person

Name Date

Descending Order of Designated Competent Person in Line 1's or 2's Absence:

2. _____
Name Date

3. _____
Name Date

Specialized Work Competent Person:

Name Date

Type of Work: _____

**Subcontractor Supervisor/Superintendent/
Foreman/Lead/Site Manager
Acknowledgement of Understanding**

Site: _____ Project: _____

Legacy Management Support Services Contract: Stoller Legacy Management Team

I, _____ designated as the assigned on-site Subcontractor
(Name)

Supervisor/Superintendent/Foreman/Lead/Site Manager for Subcontract or P.O. No. _____

acknowledge that I have read and understand the Subcontract documents relative to the scope of work
for this project.

Supervisor/Superintendent/Foreman/Lead Site Manager Signature

Company Date

U.S. Department of Energy Office of Legacy Management

10 CFR 851, Fit For Duty Evaluation (Employee/Subcontractor)

Please carefully read the instructions on Page 2 before completing this form.

Name: _____ Date: _____
 Company or Subcontractor: _____ Phone: _____
 Job Site Location: _____ E-Mail: _____
 Position Description: _____ Charge No.: _____
 Functional Manager (FM): _____ New Hire: Yes No
 FM Phone: _____ Change in Job Duties: Yes No
 FM E-Mail: _____ Return to Work: Yes No

The employee may be performing the following job duties, working in the following conditions, and should possess the following abilities (check all that apply or are anticipated):

Job Requirements Checklist	
<input type="checkbox"/> Primarily office duties, heavy computer use	<input type="checkbox"/> Accurate distance vision
<input type="checkbox"/> Working in excessive heat (temperatures above 85°F)	<input type="checkbox"/> Accurate near vision
<input type="checkbox"/> Working in wet and/or cold (temperatures below 40°F)	<input type="checkbox"/> Depth perception
<input type="checkbox"/> Working during periods of excessive humidity	<input type="checkbox"/> Color perception
<input type="checkbox"/> Using ladders or scaffolds or working at heights	<input type="checkbox"/> Working prolonged/irregular hours
<input type="checkbox"/> Climbing steps	<input type="checkbox"/> Prolonged driving of or riding in motor vehicle
<input type="checkbox"/> Prolonged walking/standing	<input type="checkbox"/> Driving all-terrain or utility vehicles off road
<input type="checkbox"/> Repeated pushing/pulling	<input type="checkbox"/> Crane operation
<input type="checkbox"/> Performing initial site walk-downs in unknown hazard environments	<input type="checkbox"/> Working around moving equipment/machinery
<input type="checkbox"/> Ability to wear safety shoes/foot protection	<input type="checkbox"/> Driving/operating heavy equipment
<input type="checkbox"/> Ability to wear hearing protection	<input type="checkbox"/> Using vibratory tools
<input type="checkbox"/> Exposure to noise levels in excess of 85 dBA as an 8-hour per day average (one or more days per year)	<input type="checkbox"/> Occasional to frequent reaching, or working at or above shoulder level
<input type="checkbox"/> Ability to wear respiratory protection, including dust mask	<input type="checkbox"/> Squeezing hand tools (repetition)
<input type="checkbox"/> Respirable environment—exposure to chemicals, dust, fumes, mists, vapors, gas	<input type="checkbox"/> Working in confined spaces
<input type="checkbox"/> Respirable environment—exposure to asbestos, silica, coal, etc.	<input type="checkbox"/> Ability to work in protective clothing which restricts air or vapor movement at temperatures over 60°F (heat stress).
<input type="checkbox"/> Foreign travel	<input type="checkbox"/> Duties at remote worksite or working alone
<input type="checkbox"/> Working in a toxic environment, e.g., radiological contamination area, area with carbon monoxide	
<input type="checkbox"/> Perform work with potential exposure to legacy site contaminants by treatment, sampling or analysis of groundwater or collecting soil samples on 30 or more days per year	
<input type="checkbox"/> Sedentary work—mostly seated work with occasional walking, standing or lifting up to 10 lbs	
<input type="checkbox"/> Light work—significant degree of walking or standing, lifting up to 20 lbs. of force occasionally and/or up to 10 lbs. of force frequently	
<input type="checkbox"/> Medium work—frequent squatting, bending, stooping, and kneeling. Occasional work on uneven surfaces. Lifting or exerting up to 50 lbs. of force occasionally, and/or up to 20 lbs. of force frequently, and/or up to 10 lbs. of force constantly	

U.S. Department of Energy Office of Legacy Management

10 CFR 851, Fit For Duty Evaluation (Employee/Subcontractor) (continued)

Job Requirements Checklist
<input type="checkbox"/> Heavy work—frequent squatting, bending, stooping, or kneeling. More than occasional work on uneven work surfaces. Exerting up to 100 lbs. of force occasionally, and/or up to 50 lbs. of force frequently, and/or up to 20 lbs. of force constantly
<input type="checkbox"/> Very heavy work—frequent squatting, bending, stooping, and/or kneeling. Frequent work on uneven surfaces. Exerting more than 100 lbs. of force occasionally, and/or more than 50 lbs. of force frequently, and/or more than 20 lbs. of force constantly
Site-specific hazards, conditions, or activities not detailed above:

Project Manager or Site Lead (sign and date)

Occupational Program Coordinator (sign and date)

Industrial Hygienist (sign and date)

Instructions

The Project Manager, Site Lead, or person most familiar with specific demands of the job being performed should check all boxes that identify tasks the employee must be fit to perform. Information contained in shaded portions of Page 1 of this form is used exclusively by the scheduler in selecting the appropriate exam protocol.

Contact information, including telephone and e-mail must be provided for the employee referenced in this form.

This form may be signed and dated electronically, or it may be printed, signed and dated, scanned, and e-mailed to the Industrial Hygienist who is supporting the project work identified on this form.

The Industrial Hygienist should review the completed form, make changes as needed, sign the form electronically, and e-mail it to: Occupational Medicine at OccMed@lm.doe.gov.



Job Safety and Health



It's the law!

EMPLOYEES:

Must have access to:

- DOE safety and health publications;
- The worker safety and health program for their location;
- This safety and health poster;
- Copies of their medical records and records of their exposures to toxic and harmful substances or conditions; and
- Results of inspections and accident investigations.

Must be able to:

- Express concerns related to worker safety and health;
- Decline to perform an assigned task because of a belief that the task poses an imminent risk of death or serious physical harm;
- Stop work in imminently dangerous conditions; and
- Anonymously request an investigation.

EMPLOYERS must:

- Establish a written Worker Safety and Health Program;
- Use qualified worker safety and health staff;
- Provide mechanisms to involve workers and their elected representatives in developing the safety and health program;
- Establish procedures for workers to report without reprisal job-related hazards and for prompt response to such reports;
- Provide for regular communication with workers about workplace safety and health matters; and
- Display this poster in the workplace where it is accessible to all workers.

This poster is available at:

http://www.hss.doe.gov/healthsafety/wshp/rule851/2012_Safety_Health_Job_poster.pdf

10 CFR 851, Worker Safety and Health Program is available at:

www.hss.doe.gov/healthsafety/wshp/rule851/851final.html

How to Request an Investigation:

Employees have the right to request, anonymously if desired, that the Director of DOE's Office of Enforcement and Oversight conduct an investigation of potential regulatory violations.

Employees can make the request at:

<http://www.hss.doe.gov/enforce/riforms/options.asp>.

DOE encourages employees to use local employee concerns processes before requesting an enforcement investigation.

Local employee concerns processes:



For more information contact: **Shelly Vigil**
(303) 410-4822
shelly.vigil@lm.doe.gov

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Exhibit 1

**Standard 3.2, “Hoisting and Rigging”
and
Form LMS 1987
Form LMS 1985**

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Standard 3.2 Hoisting and Rigging

1. Purpose

This standard establishes requirements for hoisting and rigging of ordinary, pre-engineered production, and critical lifts for cranes, derricks, and other material-handling equipment as specified in this standard regardless of their classification, which could include construction, maintenance, or operations activities.

2. Scope

This standard applies to all hoisting and rigging activities controlled by Contractor, including work performed by subcontractors.

3. Definitions

Competent Person: A person who has the following:

- Thorough experience, training, and (where required) certification.
- The skills and knowledge necessary to identify existing and potential hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees.
- The authority to control or take prompt corrective actions to eliminate such hazards or conditions.

Crane: Any machine used for lifting and lowering a load vertically and moving it horizontally that has a hoisting mechanism as an integral part. Examples of cranes include bridge, gantry, jib, overhead, wall-mounted, crawler, truck-mounted, or mobile cranes.

Critical Lift: A lift shall be classified critical if any of the following conditions are met:

- If loss of control of the item being lifted would likely result in the declaration of an emergency as defined by the facility's emergency plan.
- The load item is unique and, if damaged, would be irreplaceable or not repairable and is vital to a system, facility, or project operation.
- The cost to replace or repair the load item, or the delay in operations of having the load item damaged would have a negative impact on the site, facility, or organizational or DOE budgets to the extent that it would affect program commitments.
- For steel erection: The lift exceeds 75 percent of the rated capacity of the equipment being used, or the lift requires the use of more than one piece of equipment to complete the lift.
- For crawler, wheel-mounted, or commercial truck-mounted cranes with outriggers (stabilizers) fully extended: The lift exceeds 85 percent of the rated capacity for the crane.
- For crawler, wheel-mounted, or commercial truck-mounted cranes without outriggers (stabilizers) fully extended: The lift exceeds 75 percent of the rated capacity for the crane.

Fall Zone: The area, including but not limited to the area directly beneath the load, in which it is reasonably foreseeable that partially or completely suspended materials could fall in the event of an accident.

Ordinary Lift: Any lift not designated as a critical lift or a pre-engineered production lift.

Person in Charge: The responsible individual (other than the operator) known to be qualified and assigned overall responsibility and control for the safe handling of all loads. The line manager/supervisor responsible for the lift designates the person in charge. The person in charge may be a contractor or subcontractor. The person in charge may also be the competent person for the activity.

Pre-Engineered Production Lift: Repetitive, production-type lifting operation, independent of the nature of the load to be lifted, in which the probability of dropping, upset, or collision is reduced to a level acceptable to the responsible manager by preliminary engineering evaluation, specialized lifting fixtures, detailed procedures, operation-specific training, and independent review and approval of the entire process.

Qualified Person: A person who, by possession of a recognized degree, certificate, or professional standing, or who, by extensive knowledge, training, and experience, has successfully demonstrated an ability and competence to solve or resolve problems related to the subject matter and work.

Rated Capacity: The maximum working load permitted by the manufacturer of the equipment under specified working conditions. Such working conditions typically include a specific combination of factors such as equipment configuration, radii, boom length, and other parameters of use. The combination of factors that enter into rated capacity is set forth in the load chart that must be on or with the equipment. The load chart states the weight of the load that the equipment can lift at different boom radii. The longer the radius at which the lift occurs, the smaller amount of weight the equipment can lift.

Rigging: The hardware or equipment used to safely attach a load to a lifting device. The art, or process, of safely attaching a load to a hook by means of adequately rated and properly applied slings and related hardware. Types of hardware include slings, cables, chains, shackles, lifting beams, fixtures, or any other devices below the hook used for a lift. This includes eye bolts, clamps, or welded attachments connected to the item to be lifted.

Sling Protection: Protective padding material used to protect a sling from edges on the load. Protective padding shall be cut-resistant.

Slings: Wire ropes, chains, synthetic web, and metal mesh made into forms, and with or without fittings, for handling loads.

Tag Line: A line, usually of nonconductive rope, secured to the load and used to guide the load into its desired position while keeping the user safely away from the load. One or more tag lines shall be used when there is potential for rotation of the load and as specified in the Lift Plan or in the Hoisting and Rigging Plan (for critical lifts). All tag lines must be long enough to allow the user to remain clear of the fall zone.

4. Standard

4.1 General (for all lifts regardless of equipment to be used)

When hoisting and rigging activities are required, a competent or qualified person shall classify the lift into one of the following categories: ordinary lift, pre-engineered production lift, or critical lift. A Lift Plan shall be required when the hoisting and rigging activity involves loads suspended below the hook or other attachment point. When a forklift, tele-handler, or other equipment equipped with fork attachment is used to move a load where the forks are positioned under the load, this activity is not considered hoisting and rigging and a Lift Plan is not required.

Hoisting and rigging operations must be planned properly, because hoisting and rigging activities can result in accidents potentially involving significant property damage, serious injuries, or death. The *Lift Plan (for Mobile Crane, Forklifts, and Earthmoving Equipment)* (form LMS 1987) must be used to plan and document the hoisting and rigging activity.

Operators, riggers, and other personnel involved in hoisting and rigging activities must have adequate training and experience in accordance with Section 4.4, “Personnel Qualifications,” of this standard, must plan and work together as a team, and must execute applicable plans with careful attention to detail. The use of reliable equipment that is designed and sized for the task, regularly inspected, and appropriately maintained is essential to a safe lift. **No employees shall ever be permitted to enter the fall zone while material is being hoisted.**



Note 1

*When an articulating/knuckle boom crane is used to **deliver** materials to the job site by unloading materials for placement directly on the ground, the requirement for providing documentation of annual crane inspection and operator training to the contractor does not apply. This exception only applies to **deliveries**. If the crane is used to assist with installation of the delivered materials, all requirements of this standard do apply to the hoisting and rigging activity.*



Note 2

The operation of a drill rig does not fall under this standard, but as a precautionary measure, before using the drill rig for unloading pipe casings or other items that will be used to support drilling operations, inspect the wire rope using the criteria listed under Section 4.5.1, “Slings,” Section 4.5.2, “Hooks,” and Section 4.5.3, “Shackles” (as needed) of this procedure as a guideline or follow the manufacturer’s recommendations for use. Also ensure that the rated capacity of the lifting mechanism is acceptable for the weight that will be hoisted. When a mobile crane is used to support drill rig operations, the operation of the mobile crane shall meet the requirements of this standard.

Operators shall be aware of any site conditions that could affect the crane operation. It is the contractor’s responsibility to inform the operator of any pre-existing site conditions prior to performing hoisting and rigging activities. The operator is not to continue operation if the crane, hoist rope, or load will come closer to a power line than the limit of approach specified on the Lift Plan.

Operators must remain with controls at all times during the lift and secure the machine properly when it is unattended.

All hoisting and rigging activities performed during contractor-controlled activities shall comply with 29 CFR 1910 Subpart N, “Materials Handling and Storage”; 29 CFR 1926 Subpart CC, “Cranes & Derricks in Construction”; Subpart H Standard 1926.251, “Rigging Equipment for Material Handling”; and with applicable American Society of Mechanical Engineers (ASME) B 30.5 standard, “Mobile and Locomotive Cranes.”

Hoisting and rigging equipment shall not be used to lift personnel except in extreme cases. In such cases, ASME B30.23-2011 shall be followed. Lift plans that involve lifting personnel shall be approved by the H&S manager or designee.

When hoisting and rigging activities are anticipated during projects that will be performed by subcontractors, the SOW provided to the subcontractor shall provide the technical specifications and requirements for hoisting and rigging.

4.2 Hoisting and Rigging Performed Using Cranes and Derricks

4.2.1 Ground Conditions Required for Crane Operation

Adequate ground conditions are essential for safe crane operations. If the ground is muddy or otherwise unstable, a crane could overturn even if operated within the load limits specified by the manufacturer. The crane should not be assembled or used unless ground conditions are firm, drained, and graded to a sufficient extent so that, with the use of supporting materials (such as blocking, mats, or cribbing), the equipment manufacturer’s requirement for adequate support and degree of level are met.

The contractor shall inform the user and operator of the equipment of hazards beneath the equipment setup area (such as voids, tanks, vaults, underground utilities, previously excavated/disturbed soil) if those hazards are identified in site drawings or through site knowledge.

The subcontractor operating the equipment will often be more qualified to determine if ground conditions are adequate at the work location. If the equipment operator determines that the ground conditions are inadequate, they shall notify the contractor that the problem needs to be corrected before beginning or continuing hoisting and rigging operations.

4.2.2 Operating Near Power Lines (up to 350 kilovolts)

Keeping a safe distance from power lines is the key to preventing power line accidents. The first step when planning to operate a crane on a site where power lines are present is to identify the crane’s work zone and use the work zone to determine how close the crane could come to the power line. If no part of crane, load, load line, or rigging could get closer than 20 feet to a power line, no further precautions are required.

There are two ways to identify the work zone: (1) if the equipment (crane, load, load line, and rigging) could not get within 20 feet even if the crane is operated at its maximum working radius,

the 20-foot requirement is met; or (2) boundaries to the work zone can be established using flags, barricade, or other range-limiting devices that are set more than 20 feet from the power line for use in prohibiting the operator from moving within 20 feet of the power line.



Note 1

Assume that all power lines are energized unless the owner of the power line confirms the line has been and will continue to be de-energized and the line is visibly grounded at the work site.



Note 2

The 10-foot clearance discussed below only applies to voltages up to 50 kilovolts (kV). If line voltage is above 50 kV, refer to Table A in 29 CFR 1926.1407 for the safe clearance distance when working in the vicinity of power lines with voltages over 50 kV.

If the crane operation work zone will be within 20 feet of the power line, there are two steps that can be taken: (1) The preferred process is to de-energize and ground the power lines to protect against electrocution and to avoid the need for any additional precautions. (2) In cases where the power lines cannot be de-energized, such as when owned by a public utility and the utility is unwilling to de-energize the lines since it will cut off service to their customers or the power is feeding an operation that cannot be de-energized due to regulatory requirements, the following process shall be used.

- The voltage of the power line must be known. If the power line is owned by a public utility, they are required to respond within 2 working days if asked for the line voltage of their power line.
- If the line voltage is known, and the voltage is 50 kV or lower, the minimum clearance from the power line can be reduced to 10 feet if the following precautions are taken:
 - A pre-job briefing shall be held with the crane operator and all other workers who will be in the area of the equipment or load during the lift to review the location of the power line(s), and steps that will be implemented to prevent operating within 10 feet of the power line.
 - If tag lines are used, they must be non-conductive.
 - An elevated warning line, barricade tape, traffic cones, or line of signs equipped with flags or similar high-visibility markings shall be placed at the minimum clearance distance of 10 feet.
 - A dedicated spotter must be used to signal the operator that the crane is passing the marked line. The spotter must be provided with a visual aid (such as a clearly visible line painted on the ground or a clearly visible line of stanchions or cones) to assist in identifying the minimum clearance distance. If necessary, the spotter should be provided with a two-way radio or cell phone for direct communication with the crane operator during the lift.

When a crane is delivered to or travelling on a work site where power lines are present, the following minimum clearance distances must be maintained when the crane travels beneath the power line(s) without a load:

- If the line voltage is up to 750 volts, the minimum clearance distance is 4 feet.
- If the line voltage is over 750 volts up to 50 kV, the minimum clearance distance is 6 feet.

4.2.3 Inspection Requirements for Cranes and Derricks

To ensure that equipment being used for hoisting and rigging activities controlled by the contractor is maintained in a safe condition, the owner of equipment (subcontractor) shall provide copies of their most recent monthly crane inspection and their current annual comprehensive crane inspection to the contractor prior to the equipment being used for hoisting and rigging activities.

The equipment operator shall also perform a daily shift inspection of the equipment on each day the equipment is used. In addition to their daily shift inspection, the *Pre-Lift Checklist* (form LMS 1985) shall be completed by the subcontractor's competent person in conjunction with a contractor representative prior to performing lifting activities.

4.2.4 Operation of Cranes and Derricks



Note

Whenever there is a concern about the safety of the crane operation, the operator has the authority to stop and refuse to handle the load until a qualified person has determined that the load and the operating conditions are safe.

The contractor shall review the path of travel onsite prior to the crane's arrival to ensure that appropriate overhead clearance and belowground substructure are adequate to support the load of the crane in travel, including bridge capacities and compaction of the surface.

When setting up a crane near an excavation, a competent person for excavation shall be present to determine if the soil is adequate to support the load of the crane operation. For stable ground (stable rock, moist clay [type A]) conditions, the standard procedure positions the crane away from the excavation or trench, a distance equal to at least 1.5 times the depth of the trench. In situations where the ground consists of loose soil, fresh backfill, sand, or crushed rock, the distance from the trench or excavation should be at least 2 times the depth of the excavation.

Cranes are most stable when the center of gravity of the load and the center of gravity of the crane are closest to each other, and operators shall therefore always set up as close to the load as possible to decrease radius. This can be done by either limiting the extension of the boom or increasing the boom angle. Do not assume that lower angle means less capacity since decreased boom length at a lesser angle can increase the crane's tip capacity. Utilize load charts to maximize capacity for the required radius. To decrease the likelihood of tipping, keep the load as close to ground level as feasible. This will shorten the distance between the center of gravity of the load and the crane even though the radius remains the same.

One of the most serious hazards that cranes present is collapse of the equipment caused by exceeding the crane's rated capacity. A crane shall never be operated in excess of its rated capacity. To ensure that the load does not exceed the rated capacity, the weight of the load must be known. To document the process for determining the weight of the load, the Lift Plan shall be completed before the lift is performed.

When the load to be handled and the operating radius require the use of outriggers, or at any time that outriggers are used:

- The outriggers must be fully extended or, if manufacturer's procedures permit, deployed as specified in the load chart.
- The outriggers must be set to remove the equipment weight from the wheels.
- Each outrigger must be visible to the operator or a signal person during the extension and setting of the outriggers.
- Outrigger blocking must be the correct size, amount, and condition. The blocking must be placed only under the outrigger float/pad of the jack or, where the outrigger is designed without a jack, under the outer bearing surface of the extended outrigger.
- Cribbing shall be 3 times the area of the float, and the base must be larger than the top of the cribbing. There shall be no gaps present within the cribbing.
- Floats shall be level to the ground.
- Crane shall be leveled to a maximum 1 percent grade.

The operator of the equipment shall not engage in any practice or activity that diverts their attention while actually engaged in operating the equipment, such as use of a cell phone or other communication device (except when used for signal communication).

The operator must remain at the controls of the equipment while the load is suspended, except when the weight of the load is negligible compared to the capacity of the equipment. Examples include leaving slings, spreader bars, ladders, or welding machines suspended.

When the equipment is out of service, a tag must be placed in the cab stating the equipment is out of service and is not to be used. If a function on the equipment is out of service, a tag must be placed in a conspicuous position stating the function is out of service and is not to be used. The equipment or function may not be used until the tag is removed by an authorized person.



Note

Hoisting and rigging operations shall not be performed and the equipment must be secured when lightning is within 6 miles of the work location or if sustained wind speeds are at or above 25 miles per hour. When the equipment manufacturer has more restrictive limits on weather conditions, they shall be observed.

The competent person shall monitor the equipment and operations to address the effect of wind, ice, and snow on equipment stability and rated capacity.

A crane shall never be used to drag or pull loads sideways.

Travelling with a load is prohibited if the practice is prohibited by the manufacturer. Where it is not prohibited, precaution must be taken to prevent hazardous movement of the load and to avoid excessive movement of the load that could overload the crane.

4.2.5 Use of Signals During Hoisting and Rigging Activities

During many lifts, the crane operator needs a second set of eyes, in the form of a signal person, to be able to operate safely.

A signal person must be provided in each of the following situations:

- When the path the load will travel or the area where the load is placed is not in full view of the operator.
- When the equipment is travelling, and the operator's view in the direction of travel is obstructed.
- When, due to site-specific safety concerns, either the operator or the person handling the load determines that a signal person is needed.

The type of signals used and the means of transmitting signals to the operator (such as direct line of sight, video, radio) must be appropriate for the site conditions. The type of signal used shall be agreed upon by the operator, signal person, and person in charge prior to the lift.

4.2.6 Work Area Control During Crane Operations

Workers who are near a crane have the potential to be struck or crushed by the crane's superstructure. To ensure that workers do not enter an area where they could be struck or crushed, boundaries shall be established to ensure that employees do not enter the strike or crush hazard area near the crane's superstructure. The boundaries shall be sufficient to ensure that personnel do not enter the hazard area. Workers shall also be instructed to recognize the hazard posed by the rotating superstructure of the crane and to stay out of the protected area.

4.2.7 Keeping Clear of the Load

When a load is being hoisted, the route chosen to move the load shall minimize the exposure to other personnel.

Personnel who are not involved with the lift shall remain outside the crane's work area.

While the operator is not moving a suspended load, no worker may be within the fall zone of the load unless they are engaged in the hooking, unhooking, or guiding the load.

Tag lines should be used to control the load while it is suspended and being moved. The tag line assists with controlling the load while it is suspended and allows workers assisting the lift to stay out of the fall zone during the lift. When tag lines are required, their use shall be noted in the Lift Plan.

The end of the tag line shall be free of knots or loops so the tag line can be quickly released, if necessary.

When workers in the fall zone are engaged in hooking, unhooking, or guiding the load, the material being hoisted must be rigged to prevent unintentional displacement, and the load must be rigged by a qualified rigger.

Only workers needed to receive a load shall be within the fall zone when the load is being landed.

4.3 Hoisting and Rigging Performed Using Equipment Other Than Cranes

A backhoe, excavator, front-end loader, tele-handler, forklift, or similar type of equipment may be used as a hoisting device if designed to do so by the manufacturer. Only manufacturer-created attachments shall be used and shall be marked with the rated capacity (if applicable). Such equipment must comply with the following:

- Applicable standards in 29 CFR 1926.602, “Material Handling Equipment”
- Applicable standards in 29 CFR 1910.178, “Powered Industrial Trucks”

One of the most serious hazards present when equipment is used for hoisting and rigging is loss of control or failure of the equipment due to exceeding the rated capacity of the equipment. Lifting equipment shall never be operated in excess of its rated capacity. To ensure that the load does not exceed the rated capacity, the weight of the load must be known. To document the process for determining the weight of the load, the Lift Plan shall be completed before the lift is performed.

When equipment (other than cranes) is used for hoisting and rigging activities, the following requirements apply:

- Ground conditions must be considered to ensure the lift can be performed safely using the equipment planned for the activity.
- If overhead power lines are present, no part of the equipment, rigging, or load may get within 10 feet of the overhead power line during the lift. If the work activity has the potential to get within 20 feet of an overhead power line, a dedicated spotter shall be used to signal the operator to ensure that they do not operate within 10 feet of the power line. If work must be performed within 10 feet of an overhead power line, the line must be de-energized before the work can proceed.
- The lifting capacity of the equipment shall be verified by referring to the load chart in the operator’s manual for the equipment or from the load capacity posted on the equipment. The load capacity for the equipment shall not be exceeded.
- Verify that the attachment point on the hoisting equipment that will be used to connect the rigging equipment is an approved attachment point according to the equipment operator’s manual or manufacturer’s requirements.
- When a powered industrial truck (PIT) is equipped with an attachment for lifting, the weight and capacity of the attachment shall be present on the attachment. If this information is not present on the attachment, or the information is not available from the manufacturer of the attachment, the rated capacity must be determined by, and written approval received from, a registered professional engineer before the attachment can be used.

4.4 Personnel Qualifications

The following qualifications apply to personnel involved with hoisting and rigging activities.

4.4.1 Contractor Representative

The contractor representative providing oversight of crane and derrick operations being performed by subcontractor personnel shall be qualified and designated as a competent person for hoisting and rigging and crane and derrick operations and shall have completed the required reading of this standard.

Contractor representatives designated as competent persons for hoisting and rigging or crane and derrick operations shall have the competent person designation listed in their training records.

4.4.2 Crane and Derrick Operator

Any person engaged in construction activity who is operating a crane or derrick must be certified and qualified according to this paragraph, except operators of side-boom cranes, digger derricks used for electrical or telecommunication pole work, and cranes or derricks with a rated capacity of 2,000 pounds or less.

Certification for crane and derrick operators is achieved through a two-part process that consists of a written examination and a practical examination on the type of equipment to be operated. The certificate must note the type and capacity of equipment for which the operator is certified. The certificate is valid for up to 5 years.

Qualification for crane and derrick operators is achieved through certification from an accredited crane operator testing organization or through an audited employer training program. Licensing by an accredited testing organization may be good for up to 5 years and is portable across other employers. Licensing by an employer training program may be valid for up to 5 years and is not portable if the operator leaves the employer.

Prior to November 10, 2017, the employer of the crane operator must ensure that the operator is competent, trained, and evaluated to operate the type and size of crane the operator will use. After November 10, 2017, crane operators must be qualified in accordance with the previous paragraph.

When a subcontractor plans to use a crane or derrick during the performance of work controlled by the contractor, the subcontractor shall provide documentation that the crane or derrick operator is qualified and certified in accordance with 29 CFR 1926.1427 to operate the type and size of crane that will be used for the work.

4.4.3 Equipment Operator

When a backhoe, excavator, front-end loader, digger derrick (used for electrical or telecommunication work), or similar type of equipment is used for hoisting and rigging activities, the operator shall be qualified to operate the equipment for hoisting and rigging activities.

When a subcontractor uses heavy equipment during the performance of work controlled by the contractor, the subcontractor shall provide documentation to the contractor that the operator is qualified and experienced operating the equipment.

4.4.4 Forklift/Powered Industrial Truck Operator

When a PIT (e.g., forklift, tele-handler, or similar type of equipment) is used as a hoisting and rigging device, the operator shall be trained and qualified to operate the equipment in accordance with the training requirements of 29 CFR 1910.178(l).

When a subcontractor elects to use a PIT during the performance of work controlled by the contractor, the subcontractor shall provide documentation that the operator of the PIT has successfully completed training and is qualified to operate the PIT.

4.4.5 Rigger

During work activities performed using a crane or derrick, a qualified rigger must be present and responsible whenever other workers are within the fall zone during the lift; when hooking, unhooking, or guiding a load; or when doing the initial connection of a load to a component or structure. When a lattice boom or tower crane is being assembled or disassembled at the work location, a qualified rigger shall perform the rigging work.

The employer must determine whether a person is qualified to perform certain rigging tasks. A qualified rigger is a person who possesses a recognized degree, certificate, or professional standing or has extensive knowledge, training, and experience and can successfully demonstrate the ability to solve problems related to rigging loads. The person designated as the qualified rigger must have the ability to properly rig the load for a particular job; it does not mean that a rigger must be qualified to do every type of rigging job. Determination of whether a person is a qualified rigger is based on the nature of the load, lift, and equipment used to hoist that load plus the person's experience and knowledge.

Riggers do not have to be certified by an accredited organization or assessed by a third party, although employers may choose to use a third party to assess the qualifications of the rigger candidate. A certified crane or equipment operator does not necessarily meet the requirements of a qualified rigger.

4.4.6 Signal Person

When a signal person is required in accordance with Section 4.2.5 of this standard, the signal person shall be qualified and have documentation from their employer or a third-party evaluator showing they meet the qualification requirements. Employers must make the documentation of qualification available at the worksite, either in paper form or electronically. The documentation must specify each type of signaling (e.g., hand signals, radio signals) for which the signal person is qualified under the requirements of the standard.

4.5 Rigging Equipment Categorization and Requirements

The following requirements apply to the use and maintenance of rigging equipment:

- Rigging equipment shall be inspected by a competent person prior to each use. Equipment that is damaged or defective shall not be used.
- All lift points/attachment points on items being lifted shall be verified for capacity ratings. If capacity ratings are not available from the manufacturer or supplier, a registered professional engineer shall determine the rated capacity and provide the information in writing before the item can be used for the lift.

4.5.1 Slings

Slings shall be clearly marked with a manufacturer's label or stamped tag to indicate the sling's lifting capacity.

- The competent or qualified person shall verify that all slings and hardware are rated for more than the expected load and are appropriate for the intended type of load.
- Slings shall be padded or protected from the sharp edges of the load using cut-resistant material.
- Slings shall not be shortened with knots or bolts or other makeshift devices.
- Shock loading a sling is prohibited.
- A sling shall not be pulled from beneath a load when the load is resting on the sling.
- Hands or fingers shall not be placed between the sling and its load while the sling is being tightened around the load.
- Extreme caution should be used to lift a load if the sling angle formed between the sling and the horizontal surface of the load is less than 30 degrees. Angles less than 30 degrees significantly increases the tension applied to the sling during the lift.
- Two slings shall be used when lifting a load that is over 12 feet in length to prevent shifting of material.
- Wire rope slings shall be inspected to ensure that the following conditions are not present:
 - Severe abrasion (a dark purple color)
 - Distorted rope structure
 - End attachments damaged or worn
 - $\frac{1}{3}$ wear of outside wire
 - Heat damage
 - 2 broken wires near the eye
 - 10 broken wires in one lay
 - 5 broken wires in one strand in one lay

- Synthetic slings shall be inspected to ensure that the following conditions are not present:
 - Acid or caustic burns
 - Melting or charring
 - Snags, punctures, tears, or cuts
 - Broken or worn stitches
 - Distortion of fittings

Chain slings shall be inspected to ensure that no links are bent or twisted and no cracks are present.

4.5.2 Hooks

- Hooks, shackles, and eyebolts shall be marked, at a minimum, to show the manufacturer's name or trademark and the rated capacity. The marking shall be forged, cast, or die-stamped on the hardware. If the manufacturer's name or trademark and rated capacity are not present, the equipment may be a suspect, counterfeit item and shall not be used.
- Hooks used for lifting shall be equipped with an installed safety latch, unless use of the safety latch is impractical, unnecessary, or unsafe.
- When using hook slings, ensure that hooks are always turned outward.
- Inspect hooks to ensure that the following conditions are not present:
 - Wear of the saddle of 10 degrees or more
 - Increased throat opening exceeding 15 degrees
 - Bent or twisted 5 degrees or more

4.5.3 Shackles

- Never side-load shackles.
- Inspect shackles to ensure that the following conditions are not present:
 - Cracks, bending, twists
 - Opening of throat has changed
- Inspect shackles to ensure that the following conditions are present:
 - Pin is seated properly
 - Pin is straight and properly seats in shackle threads

4.6 Inspections Required by This Standard

To ensure that equipment being used for hoisting and rigging activities during work controlled by the contractor is maintained in a safe condition, the owner of equipment (subcontractor) shall provide copies of their most recent monthly crane inspection and their current annual comprehensive crane inspection to the contractor prior to the equipment being used for hoisting and rigging activities.

The equipment operator shall also perform a daily shift inspection of the equipment on each day the equipment is used. In addition to their daily shift inspection of the crane or derrick, the *Pre-Lift Checklist* shall be completed by the subcontractor's competent or qualified person in conjunction with a contractor representative prior to performing lifting activities. The *Pre-Lift Checklist* shall be completed when the crane or derrick is set up for the first time at the work location. An additional *Pre-Lift Checklist* shall be completed when the crane is moved to a new location if site conditions change from the initial location where the crane was set up. Changing site conditions would include moving closer to overhead power lines or other overhead obstructions or structures or changes in ground conditions.

When a backhoe, excavator, front-end loader, tele-handler, forklift, or similar type of equipment is used for hoisting and rigging activities, the equipment shall be inspected prior to use each day, and the daily inspection shall be documented on the *Weekly Equipment and Vehicle Inspection Checklist* (LMS 2621bCON).

When a subcontractor brings equipment (other than cranes) onsite that will be used during hoisting and rigging activities, the equipment shall be inspected by the subcontractor's competent person in conjunction with a contractor representative, and the *Initial/Beginning of Shift Motor Vehicle, Truck, and Equipment Inspection* (LMS 2622CON) shall be completed prior to the equipment being used for the activity.

Rigging equipment discussed in Section 4.5 of this standard shall be inspected by a competent person prior to each use. Equipment that is damaged or defective shall not be used.

4.7 Requirement for Lift Plans

When hoisting and rigging activities are required, a competent or qualified person shall classify the lift into one of the following categories: ordinary lift, pre-engineered production lift, or critical lift. A Lift Plan shall be required for ordinary or critical lifts when the hoisting and rigging activity involves loads suspended below the hook or other attachment point. When a forklift, tele-handler, or other equipment equipped with fork attachment is used to move a load where the forks are positioned under the load, this activity is not considered hoisting and rigging and a Lift Plan is not required.



Note

If the lift is a pre-engineered production lift, lift personnel must follow the requirements of DOE-STD-1090-2011, Section 3, to plan and perform the activity. A specific step-by-step procedure or work instructions shall be prepared that eliminates rigging decisions or calculations by lift personnel. The lifting procedure or work instructions shall address details of the specific operation, including the attachment and detachment of all lifting equipment, fixtures, and accessories.

The competent person, line supervisor/construction site supervisor (CSS), and H&S representative shall evaluate hoisting and lifting activities, including the structural and mechanical aspects, and shall review adequacy (with respect to lifting capacity, lift point capacity, loadings, and safety factors) of hoisting and rigging plans for lifts.

The line supervisor/CSS shall ensure that the subcontractor submits an acceptable hoisting and rigging plan for each lift. Qualified individuals must plan all crane operations, including the identification and control of all known and anticipated hazards, and shall identify all capacity ratings for hoisting and rigging equipment and lift points on items being lifted.

If other federal, state, or local requirements apply, subcontractors will be responsible for compliance with all such requirements.

4.7.1 Completing the Lift Plan

The person in charge for the lift shall be responsible for submitting all Lift Plans. All lifts shall be performed in configurations to ensure maximum stability for all components of the lift.

The person in charge, line supervisor/CSS, and H&S representative shall review and approve each Lift Plan. When the person in charge determines that a rigger and/or signal person is required for a lift, the rigger and/or signal person shall also sign the Lift Plan.



For many lifts, the person in charge may also be the line supervisor or CSS.

Note

When creating Lift Plans, it is necessary to obtain all weights not previously included by the manufacturer, including, but not limited to:

- Net weight of material/item to be lifted
- Weight of the headache ball
- Weight of the auxiliary boom head
- Weight of the auxiliary winch
- Weight of the sheave block
- Weight of any lift bars
- Total weight of slings and shackles used during the lift
- Weight of the jib (stowed or attached)
- Weight of any unaccounted-for hoist rope (when more parts of rope are required for the load)

Once the gross weight of the load has been obtained, the operator shall use the load chart to obtain load radius, boom angle, boom length, hook elevation, length of jib, and jib offset information. The information chosen should place the crane in the configuration creating the highest capacity permitted by range and elevation limitations.

It is the operator's responsibility to determine the number of parts of hoist line required and the capacity of reeving in that particular configuration.

Determine appropriate sling, arrangement based on sling capacity, load size, number of connection points of load, and sensitivity of material being transported.

Verify capacities of shackles in the rigging configuration, which must be stamped and legible on shackles, and capacities of any below-the-hook lifting devices. If the load appears to have manufactured lifting points, verify with the manufacturer that the points are intended to be used as lift points.

For lifts meeting any of the following criteria, a lift diagram shall be required:

- Critical lifts
- Lifts in areas with load movement limitations
- Lifts in the vicinity of overhead power lines
- Rigging requiring multiple slings lifting materials with excessively off-centered center of gravity
- Pick and carry operations

Rigging sketches should include the following (as applicable):

- Identification and rated capacity of slings, lifting bars, rigging accessories, and below-the-hook lifting devices. Calculate and provide the rated capacity of equipment in the configuration in which it will be used.
- Load-indicating devices.
- Load vectors.
- Lifting points.
- Sling angles.
- Boom and swing angles.
- Methods of attachment.
- Crane orientations.
- Other factors affecting equipment capacity (e.g., load path sketch, key point heights, floor- or soil-bearing capacity).
- Location of the crane in relation to the object to be lifted.
- Boom height and angle.
- Adjacent features.
- Overhead utility lines.
- Personnel locations.
- Traffic control.
- Known hazards.
- Swing path.
- Final location of the object to be lifted.

4.7.2 Revisions to Lift Plan

Lift plans are written to place minimum parameters regarding boom length, angle, and radius. It should be anticipated that operators will adjust crane configuration during lifts; however, no documentation of these changes shall be required when changes to any of these categories increase the crane's capacity.

Any changes in the lifting equipment or rigging to be used, or changes in load or equipment, or changes in conditions shall require revision of the Lift Plan. Reviews and approvals of the revised Lift Plan shall be the same as for the original plan. If the revisions are minor, the review and approval can be documented by initialing and dating the Lift Plan next to the original approval signatures on the Lift Plan.

4.7.3 Performing the Lift

Before performing the lift, all personnel participating in the lift activity shall meet to:

- Review and discuss the Lift Plan.
- Discuss any issues such as hazards, unique conditions, emergency contingencies, and safety concerns.
- Discuss how any work within 20 feet of overhead power lines will be controlled.
- Resolve any questions or concerns before commencing the lift.
- Assign personnel and responsibilities for the lift.
- Establish the methods for communications during the lift, including signals that will be used during the lift.

Personnel shall sign the Lift Plan after completion of the Lift Plan meeting. For Lift Plans that will be issued for more than one day, use the *Plan of the Day/Plan of the Week* (form LMS 2130) or *Pre-Job Brief/Safety Meeting Attendance Record* (form LMS 1554) to document the briefing to the Lift Plan for lifts performed after the initial issue of the Lift Plan.

For a critical lift, a practice lift shall be performed to ensure the lift can be completed as planned. The practice lift should duplicate all phases of the actual lift but without the load.

5. Responsibilities

5.1 Line Supervisor/CSS

The line supervisor/CSS is responsible for:

- Performing overall management and control of the hoisting and rigging activity.
- Determining a lift as ordinary, critical, or pre-engineered production.
- Ensuring that personnel are qualified for the activity they are assigned.
- Providing oversight to ensure that the requirements of this standard are met.
- Ensuring that an SOW is prepared for work performed by a subcontractor.

- Preparing and implementing procedures for lifts to comply with applicable requirements of OSHA and this standard.
- Ensuring that required submittals are received and properly reviewed and approved.
- Directing operations in the case of an accident.
- Exercising authority to start and stop work activities.
- Organizing a pre-lift meeting and ensuring all the appropriate people are present.
- Providing a well-prepared working area for the crane before it arrives on the job. The preparation includes, but is not limited to, the following:
 - Access roads that are adequate for the crane.
 - Sufficient room to assemble and disassemble the crane.
 - An operating area that is suitable for the crane with respect to levelness, surface conditions, support capability, proximity to power lines, excavations, slopes, underground utilities, subsurface construction, and obstructions to crane operations.
 - Traffic control as necessary to restrict unauthorized access to the cranes working area.
- Ensuring that the rigging crew is experienced and competent. They must be capable of judging distances, heights, and clearances; selecting lifting gear suitable for the loads; and rigging the load safely and securely.
- Ensuring that the signal person is competent and capable of directing the crane and load to ensure the safety and efficiency of the operation.

5.2 Health and Safety Staff

H&S staff is responsible for assisting and supporting the line supervisor/CSS with the following:

- Reviewing all plans to ensure that they meet the requirements described in this procedure.
- Reviewing operator, rigger, and signal person qualifications prior to start of work.
- Ensuring that hoisting and rigging equipment is inspected before use.
- Reviewing purchase requisitions and SOWs that involved hoisting and rigging activities.
- Providing oversight to ensure that the requirements of this standard are met when the line supervisor/CSS is not qualified by this standard as competent in hoisting and rigging or crane activities.

5.3 Person in Charge/Competent Person

The person in charge shall have the necessary knowledge and experience of the specific type of equipment and the hazards of lifts to direct the safe completion of the operation.

The person in charge shall understand the rules and procedures at the site to ensure that the following are completed:

- Personnel assignments and responsibilities are specified.
- Proper equipment and tools are selected.

- Hazardous or unsafe conditions are recognized and controlled.
- Lift plans are developed with guidance from the qualified operator, H&S, and the CSS.
- The work is performed efficiently and safely.

6. Records

Records generated from this standard include, but are not limited to, the following:

- Lift Plan form.
- *Pre-Lift Checklist*
- Inspection records.
- Equipment documentation.
- Employee or subcontractor qualifications.
- Pre-lift meeting attendance sheet and agenda.

Contractor records shall be maintained in accordance with health and safety working file index and plan, applicable project working file indexes, and the *Records Management Manual*.

7. References

Code of Federal Regulations:

29 CFR 1910, "Occupational Safety and Health Standards"

29 CFR 1926, "Safety and Health Regulations for Construction"

DOE Standard "Hoisting and Rigging," DOE-STD-1090-2011, September 2011

"Mobile and Locomotive Cranes," ASME B30.5-2011

"Personnel Lifting Systems," ASME B30.23-2011

Records Management Manual, LMS/POL/S04327, continually updated, prepared by The S.M. Stoller Corporation, a wholly owned subsidiary of Huntington Ingalls Industries, for the U.S. Department of Energy Office of Legacy Management, Grand Junction, Colorado.

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U.S. Department of Energy Office of Legacy Management

Lift Plan

Type of Lift: <input type="checkbox"/> Ordinary Lift <input type="checkbox"/> Critical Lift	Prepared by :
If Pre-Engineered Lift, work instructions or lift procedure are required in place of lift plan.	Expires (maximum 1 year from date):
Location:	
Load description:	
Lift description:	

All areas applicable to be completed. If not applicable, mark N/A.

A. WEIGHT	D. HOIST ROPE
1. Gross weight of load: lb	1. Number of parts of rope:
2. Weight of headache ball: lb	2. Size of rope:
3. Weight of block: lb	3. Capacity of rope (per part):
4. Weight of lifting bar: lb	E. SLINGS AND SHACKLES
5. Weight of slings and shackles: lb	1. Sling Selection: <input type="checkbox"/> Synthetic <input type="checkbox"/> Chain <input type="checkbox"/> Wire Rope
6. Weight of jib: <input type="checkbox"/> Erect <input type="checkbox"/> Stowed lb	a. Type of arrangement:
7. Weight of headache ball on jib: lb	b. Number of slings in hook-up:
8. Weight of hoist rope: lb	c. Sling size:
9. Allowance for unaccounted material:: lb	d. Rated capacity of sling (per tags):
Total load weight: lb	2. Shackle selection:
10. Verify manufacturer lift-point capacity rating:	a. Shackle size: inches
B. JIB	b. Capacity: tons
1. Length of jib: lb	c. Number of shackles:
2. Angle of jib: lb	F. LIFTING EQUIPMENT
3. Rated capacity of jib (from chart): lb	1. Type: <input type="checkbox"/> Mobile Crane <input type="checkbox"/> Forklift <input type="checkbox"/> Earthmoving
C. LIFTING EQUIPMENT	2. Manufacturer and model:
1. Any deviation from smooth solid surface in area? <input type="checkbox"/> Yes <input type="checkbox"/> No	3. Maximum rated capacity from chart::
Explain:	4. Lifting arrangement:
1a. Cribbing or mats required <input type="checkbox"/> yes <input type="checkbox"/> No	a. Max distance—center of load to center pin of crane (radius): ft
2. Electrical hazards within 20 feet of load or crane? <input type="checkbox"/> Yes <input type="checkbox"/> No	b. Boom length: Min. Max.
a. If yes, what is maximum voltage of lines:	c. Angle of boom at pick:
b. If yes, what is minimum clearance required by the voltage: ft.	d. Angle of boom at set:
c. If yes, pre-job briefing required to discuss controls to prevent operating too close to overhead lines.	5. Capacity
Explain:	a. Over front: lb
3. Obstacles or obstructions to lift or swing? <input type="checkbox"/> Yes <input type="checkbox"/> No	b. Over rear: lb
Explain:	c. Over side: lb
4. Swing direction and degree (boom swing):	6. Chart capacity for configuration:
5. Travel with load required? <input type="checkbox"/> Yes <input type="checkbox"/> No	Max load on crane:
Multiple crane lifts require a separate lift plan for each crane. Changes in the configuration of the crane, placement, rigging, lifting scheme, etc., or changes in any calculations require the lift plan be reappraised.	Lift is percent of crane's rated capacity:
Pre-Lift Checklist (LMS 1985) must be attached for each location a lift is being performed. Pre-lift briefing/meeting required before initiating lifting activities each day. Job supervisor will verify conditions have not changed since pre-lift meeting.	

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Lift Plan (continued)

Comments:

LMS Representative or CSS Signature Date Person In Charge Signature Date

Rigger Signature Date Operator Signature Date
(as required)

Signal Person Signature (as required) Date Health & Safety Signature Date

Attach additional sheets for diagrams of crane lifts, load placement, and rigging configuration as required. At least 24 hours is required for all lift plan submittals to the LMS Representative/CSS. Failure to comply could result in denial of lift plan approval.

Sketch of Lift:

U.S. Department of Energy Office of Legacy Management

Pre-Lift Checklist
To be completed prior to making the lift

	YES	NO	N/A
1. Annual/Monthly Crane Inspection provided	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Operator qualifications verified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Rigger qualifications verified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Signal person qualifications verified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Load chart in crane	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Verify adequate overhead clearance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Overhead power lines within 20 feet of crane or load line	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Safety spotter assigned	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Acceptable wind conditions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Adequate tail swing room (2 foot minimum clearance)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Tail swing guarded	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Maximum counterweights used	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Outriggers fully extended	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Matting/cribbing acceptable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Crane in good operating condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Verify rated capacity of lifting hardware	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Verify manufacturer lift-point capacity on item being lifted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Rigging hardware inspected	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Site control established	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Pre-lift briefing conducted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Crane inspected by:			Date:
22. Functional test of crane conducted by:			Date:

Competent Person: _____
Printed Name
Signature
Date

LMS Representative: _____
Printed Name
Signature
Date

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Exhibit 2

**Standard 10.2, “Lockout/Tagout for Hazardous Energy Control”
and
Form LMS 1009**

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Standard 10.2 Lockout/Tagout for Hazardous Energy Control

1. Purpose

This procedure describes the steps authorized workers shall take to control the release of hazardous energy while servicing, maintaining, or modifying machinery, equipment, or systems. The procedure will be used when work is performed on any equipment that may release any form of hazardous energy, including but not limited to electrical, rotational, mechanical, chemical, hydraulic, thermal, or pneumatic energy.

Subcontractors will use this procedure when performing lockout/tagout at DOE-controlled sites. Subcontractors may not perform lockout/tagout activities without an authorized contractor employee providing oversight.



Note

Compliance with this standard is mandatory. If an authorized worker or employee trained to an awareness level knowingly and willfully violates this procedure, and a root-cause analysis determines the employee was at fault, disciplinary action will be taken.

2. Scope

This procedure describes the minimum requirements for lockout/tagout for control of hazardous energy. For electrical energy, this procedure applies to energy levels over 50 volts. Only authorized workers may apply this procedure, although other employees at a work site may need to be trained to an awareness level about lockout/tagout processes.

This procedure applies to work performed by employees of the contractor or subcontractors performing any kind of service, maintenance, or modifications to machinery, equipment, or systems. When a subcontractor is used, the subcontract will specify that the subcontractor is to comply with contractor requirements, as well as OSHA requirements, and that the subcontractor is responsible for the performance of its lower-tier subcontractors.

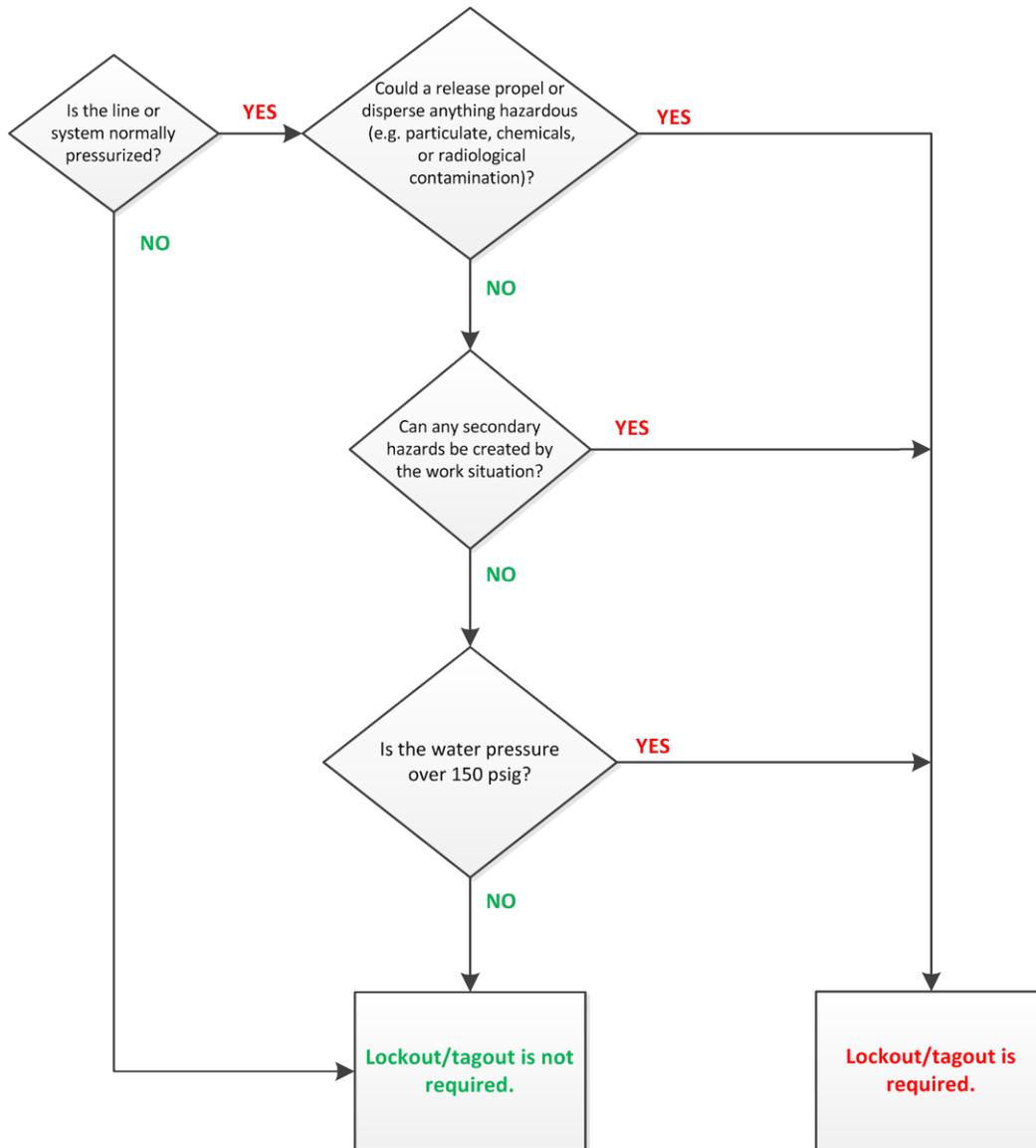
This procedure does not apply to the employees of a local utility or other responsible entity. When a local utility or other entity locates lines within a contractor work area, contractor employees will complete any actions required by this procedure but not performed by the utility or entity.

The following are exempt from the contractor's lockout/tagout requirements specified in this procedure:

- Work on cord- and plug-connected electrical equipment that, when unplugged, contains no stored energy and cannot be unexpectedly energized or started up, provided that the employee working on the equipment always has exclusive control of the plug.
- Work performed by journeyman electricians on, near, or with conductors or equipment in electrical utilization installations that are covered by the specific requirements of 29 CFR 1910, Subpart S, "Electrical." Subpart S typically applies to construction of electrical-power generating or transmitting equipment.

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- Equipment and facilities that are under the exclusive control of electrical utilities, including related equipment for communication, control, or metering.
- Routine operations, such as tool adjustments, provided that the operation is repetitive and integral to use of the item, and hazards have been mitigated.
- Calibration and troubleshooting of energized equipment when the equipment must be energized to perform the work.
- Work performed by the landlord or the landlord’s contractors at facilities not owned by DOE that are leased to provide office and other space for DOE employees. The landlord should notify the DOE employees if any work is going to affect them.
- Water systems 150 psig or less where secondary hazards do not exist. Use the flow chart below to determine if lockout/tagout is required.



3. Definitions

Affected Employee: An employee whose job requires him or her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout/tagout, or whose job requires him or her to work in an area in which such servicing or maintenance is being performed.

Authorized Employee: A person who has been trained on this procedure and who locks or tags machines or equipment in order to perform servicing or maintenance. Authorization is specific to equipment and job tasks. The authorized employee must be familiar with the equipment, machinery, or system to ensure that all hazardous energy sources have been isolated.

Energy-Isolating Device: A mechanical device that physically prevents the transmission or release of hazardous 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 no pole can be operated independently, a line valve, and a block. Push buttons, selector switches, and other control circuit-type devices are not energy-isolating devices.

Hazardous Energy Source: Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, rotational, or other energy.

Facility Owner Lock: Lock installed by facility owner as the first lock on and last lock removed to allow the facility owner to maintain control over when equipment is placed back in service.

Group Lockout/Tagout: A means of isolating equipment that reduces the number of locks required to isolate the equipment or system while providing the same level of protection.

Lockout Device: A device that uses a positive means, such as a lock (either key or combination type), to hold an energy-isolating device in a safe position and prevent the energizing of a machine or equipment or the release of hazardous energy. Included are blank flanges and bolted slip blinds.

Occupational Safety and Health Administration: The Occupational Safety and Health Administration and its implementing regulations at 29 CFR 1910 and 29 CFR 1926.

Servicing and/or Maintenance: Workplace activities, such as constructing, installing, setting up, adjusting, inspecting, modifying, maintaining, and servicing machines or equipment, where an employee may be exposed to the unexpected energization or startup of the equipment or release of hazardous energy.

Simple Lockout/Tagout: A simple lockout/tagout event must meet all of the following criteria:

- The machine or equipment has no potential for stored or residual hazardous energy or reaccumulation of stored hazardous energy, which could endanger employees, after shutdown.
- The machine or equipment has a single hazardous energy source that can be readily identified and isolated.

- The isolation and locking out of that hazardous energy source will completely deenergize and deactivate the machine or equipment.
- The machine or equipment is isolated from that hazardous energy source and locked out during servicing or maintenance.
- A single lockout device will achieve a locked-out condition.
- The lockout device is under the exclusive control of the authorized employee performing the servicing or maintenance.
- The servicing or maintenance does not create hazards for other employees.
- The site/project, in utilizing the H&S manager's exception, has had no accidents involving the unexpected activation or reenergization of the machine or equipment during servicing or maintenance.

Site Manager/Lead or Designee: Person with overall responsibility for an entire site or project; this position shall be referred to as site manager throughout this standard.

Site Operations Manager/Lead or Designee: Person responsible for all operations work at a site. This person fills the roles previously called supervisor and line manager. This position shall be referred to as site operations manager throughout this standard.

Specific Equipment Plan (SEP): A plan written by an authorized employee to document the details for locking and tagging a specific piece of equipment or a system that requires more than one isolation device to be used (see Attachment 1). The preparer of the SEP may not sign as approver of the plan.

Tagout Device: A warning device and its means of attachment that are securely fastened to an energy-isolating device to indicate that the device and the equipment being controlled shall not be operated until the tagout device is removed by the authorized worker.

4. General Requirements

- Lockout/tagout shall be performed only by the authorized employees performing the service or maintenance.
- No employee shall remove another employee's lock or lockout/tagout tag, except as described in Section 6.6 of this standard, "Alternative Authorization for Removing Locks and Tags."
- No authorized employee shall apply a lockout/tagout device for another employee to perform work.
- No employee shall work on equipment, machinery, or systems that have been locked or tagged out unless that employee is authorized and has affixed his or her own lockout/tagout device.
- Locks and tags shall remain in place for the duration of the work, except while testing, positioning, or calibrating are occurring.
- Multi-lock hasps shall be used when possible to accommodate additional authorized employees' locks. If a multi-lock hasp cannot be used, a lock box may be used instead.

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- Before controls are applied, the site operations manager, or the authorized employee shall notify affected employees, including employees of subcontractors, of the application of lockout/tagout devices. Similarly, after the devices are removed from the machine or equipment, management or the authorized employee shall notify affected employees.
- Subcontractors shall adhere to this standard.
- Locks shall be red, and tags shall be as shown in Figure 10.2-1. Red locks, with approved lockout devices, and the approved tags shall be the only devices used for controlling hazardous energy and shall not be used for any other purpose.
- At least once each year, a lockout/tagout activity will be observed and assessed by the H&S manager or designee to ensure that this procedure is being applied correctly.
- The site operations manager may determine that a facility owner lock should be used for specific lockout/tagout events. A facility owner lock will be installed before any workers install their locks. It shall be accompanied by a tag as shown in Figure 10.2-1. The facility owner lock should be the last lock removed before placing the equipment back in service. The purpose of the facility owner lock is to ensure that the equipment is not restarted until all associated equipment and systems are ready for restart. The facility owner lock is not mandatory for all lockout/tagout events. It provides for additional control when the site operations manager determines that additional control is needed.

**DANGER
DO NOT OPERATE**

Lock number _____

Name _____
(authorized employee)

Phone _____

Employer _____

Date/time work started _____

Date/time completed _____

Work to be performed _____

E/M/S location _____

E/M/S description _____

Energy-isolating device _____
(panel, c.o., disconnect, valve, etc.)

Energy-isolating device position _____
(open, closed, on, off, etc.)

(authorized employee signature)

LMS 10/4
07/06/2014

**DANGER
DO NOT OPERATE**

Simple Lockout/Tagout Procedure

1. Evaluate possible energy source(s) on or near equipment, machinery, and systems (E/M/S) and energy-isolating device(s) for the E/M/S.
2. Complete required information on opposite side.
3. Notify the affected employee(s), and/or designee, if required.
4. Perform normal shutdown of E/M/S.
5. Isolate E/M/S from energy source(s).
6. Relieve possible stored energy from energy source(s) and LO/TO the E/M/S.
7. VERIFY the mechanical integrity of energy-isolation devices and verify that the deenergization of E/M/S has been accomplished (zero-energy state).
8. Perform required work SAFELY.

Return To Service

1. Check E/M/S and immediate area around it to ensure that
 - Nonessential items have been removed, and
 - E/M/S is ready for safe operation.
2. Check area to ensure that all people are safely positioned or have been removed from the immediate area.
3. Verify that controls are in the neutral or "off" position.
4. Notify as in Step 3 above.
5. After affected employee(s) has been notified,
 - Notify equipment owner/operator of intent to reenergize.
 - Remove lock, tag, and energy-isolating device(s).
 - Reenergize and test E/M/S or coordinate testing with owner/operator to ensure E/M/S can be operated safely.

LMS 10/4
07/06/2014

Figure 10.2-1. Authorized Tag

5. Responsibilities

5.1 Site Manager

The site manager shall:

- Ensure that employees receive training to this procedure and other site- or task-specific training necessary to ensure the employees are competent to perform lockout/tagout.
- Ensure that site operations manager thoroughly understands this lockout/tagout procedure and all hazardous energy sources at their assigned facilities.

The site manager may approve SEPs if the site operations manager signed the SEP as the preparer.

5.2 Site Operations Manager

The site operations manager shall have the following responsibilities

- Ensure that work planning includes resources and time for lockout/tagout activities.
- Determine if an SEP should be written for the proposed activity.
- Ensure that lockout/tagout requirements flow down to subcontractors through the subcontract.
- Approve SEPs unless the site operations manager is the preparer of the SEP.
- Ensure that project personnel are trained in this procedure as an authorized or affected employee, as appropriate.
- Ensure that any new drawings identify aboveground and belowground utility lines and process pipes, or that existing drawings are modified as necessary to show all utility lines and process pipes found.
- Ensure that only authorized workers apply or remove locks.
- Ensure that systems are locked and tagged out correctly.
- Ensure that pre-job briefings address lockout/tagout when locks and tags will be used.
- Ensure that the lockout/tagout does not adversely affect other machinery, equipment, or systems, or that the effects are mitigated.

5.3 Health and Safety Representative

- The site H&S representative may participate in work planning when requested to do so by the site manager or site operations manager to ensure that hazardous energy in machinery, equipment, or piping are addressed and controlled.
- The site H&S representative may approve SEPs if the site operations manager signed the SEP as the preparer.

5.4 Health and Safety Manager

The H&S manager shall:

- Review this standard at least annually to ensure that the requirements are being followed and that this standard conforms to requirements.
- Observe and assess at least one lockout/tagout event per year to ensure that this procedure is being applied correctly.

5.5 Authorized Employees

Authorized employees shall:

- Obtain lockout/tagout training to this procedure before beginning work.
- Ensure that he or she is familiar enough with the equipment, machinery, or system being isolated to identify all sources of hazardous energy.
- Comply with this standard.
- Prepare SEPs for lockout/tagout of hazardous energy sources.
- Apply locks and tags.
- Remove only his or her own locks and tags.
- Notify the site operations manager when locks and tags are applied and when they are removed.
- Ensure that his or her locks and tags remain in place and that tags remain legible for the duration of the lockout/tagout.
- Participate in pre-job briefings and adhere to hazard controls.
- Report any significant procedural deficiencies and participate in lessons learned.

6. Lockout/Tagout Process

Before lockout/tagout can begin, the site operations manager shall ensure that the following actions are complete:

- Determine the scope of work and who will perform the work.
- Determine the necessary lockout/tagout points for the work. Review drawings and other documentation as needed to identify all lockout/tagout points.
- Determine if any employees other than those performing the work will be affected by the lockout/tagout.

6.1 Steps for Simple Lockout/Tagout

Simple lockout/tagout may only be used if the situation meets all of the criteria listed in definition of simple lockout/tagout in Section 3. If all of the criteria are not met, simple lockout/tagout does not apply and an SEP must be written and used for the lockout/tagout event.

Only authorized workers may apply locks and tags, using the following steps:

- [1] Tell the site operations manager what machinery, equipment, or system will be locked and tagged, and what related machinery, equipment, and systems will be affected by the lockout/tagout.
- [2] Legibly fill in information on the lockout/tagout tag (Figure 10.2-1).
- [3] Notify all affected employees. If there is a question about who the affected employees are, the authorized employee shall contact the site operations manager.
- [4] Shut down the hazardous energy source on or related to the machinery, equipment, or system.
- [5] Isolate the machinery, equipment, or system from the hazardous energy source.
- [6] Apply lock and tag, ensuring that only one key per lock exists and that the key remains in the authorized worker's control until the lock is removed.
- [7] Relieve or restrain stored hazardous energy, such as energy in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and chemical lines or tanks, by shorting, repositioning, blocking, bleeding, or taking another appropriate action.
- [8] Verify that the machinery, equipment, or system is inoperable by using normal operating controls to attempt to start it; perform any other tests to ensure that isolation has been achieved and stored hazardous energy is relieved, and return all operating controls to the neutral or "off" position. The employee performing electrical verifications shall also be an authorized employee.

6.2 Specific Equipment Plan

Authorized employees servicing, maintaining, modifying, or conducting similar work on or near equipment that has potentially hazardous energy shall identify and evaluate the possible energy sources (including stored energy) and the disconnecting means. A *Lockout/Tagout: Specific Equipment Plan* (form LMS 1009) shall be completed for all equipment, machinery, and systems unless the lockout/tagout meets the criteria for a simple lockout/tagout.

SEPs must be approved by the site operations manager who is knowledgeable about the equipment, machinery, or system to be locked out. If the site operations manager signed the SEP as the preparer of the plan, a different person must sign as the approver of the plan. The approver may be the site manager another operations representative, or an H&S representative who has walked the equipment, machinery, or system down with the site operations manager.

The Lockout/Tagout SEP shall be completed and approved, shall be available at the work site, and shall contain the following information:

- What machinery, equipment, or system will be locked and tagged, and what related machinery, equipment, and systems will be affected by the lockout/tagout.
- Who the affected employees are.
- How all hazardous energy sources on or related to the machinery, equipment, or system will be shut down.

- How the machinery, equipment, or system will be isolated from the hazardous energy sources.
- Which authorized employees will apply locks and tags.
- How stored hazardous energy, such as energy in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and chemical lines or tanks will be relieved. This may include shorting, repositioning, blocking, bleeding, or other appropriate actions.
- How it will be verified that the machinery, equipment, or system is inoperable, such as by using normal operating controls to attempt to start it, performing any other tests to ensure that isolation has been achieved and stored hazardous energy is relieved, and returning all operating controls to the neutral or “off” position. The employee performing electrical verifications shall be a qualified electrical worker in accordance with Standard 10.1, “Electrical Safety.”
- The name of the person with overall responsibility for the lockout/tagout activity.

6.3 Group Lockout/Tagout

When more than one person will be working on machinery, equipment, or systems that have been locked out, a group lockout/tagout is required. The responsible site operations manager shall appoint a lead authorized employee for the group. The lead authorized employee shall coordinate the activities of all members of the group—regardless of occupation, craft, or employer—to ensure continuity of protection. The lead authorized employee should be a person with thorough knowledge of the machinery, equipment, or systems to be locked out and shall install the first locks on the machinery, equipment, or systems to be isolated. The lead authorized employee shall be responsible for the notification steps of the lockout/tagout.

The lead authorized employee shall install the *Lockout/Tagout Tags* (form LMS 1004) shown in Figure 10.2-1 with each of his or her locks. All other workers in the group can use the LMS 1004 tag or personnel working tags of the type shown in Figure 10.2-2. The tags shown in Figure 10.2-2 are reusable and are not records. A photo is not required on the tags shown in Figure 10.2-2 but may be included if desired by the worker. The name of the worker is the only mandatory information on the tag.

Lockout/tagout for a group may be accomplished in either of two ways:

- A hasp or hasps capable of receiving more than one lock may be installed at each isolation point, and every person working shall install his or her own lock and personnel working tag at each isolation point.

OR

- The lead authorized employee shall install his or her locks at each isolation point and then place the keys for those locks in a group lockbox. Every person working shall agree that the isolation points are correctly isolated and locked out and that the keys are in the group lockbox. The lead authorized employee and every person working shall then install locks and personnel working tags on the group lockbox. Use of a group lockbox reduces the overall number of locks required without reducing the protection for the workers.

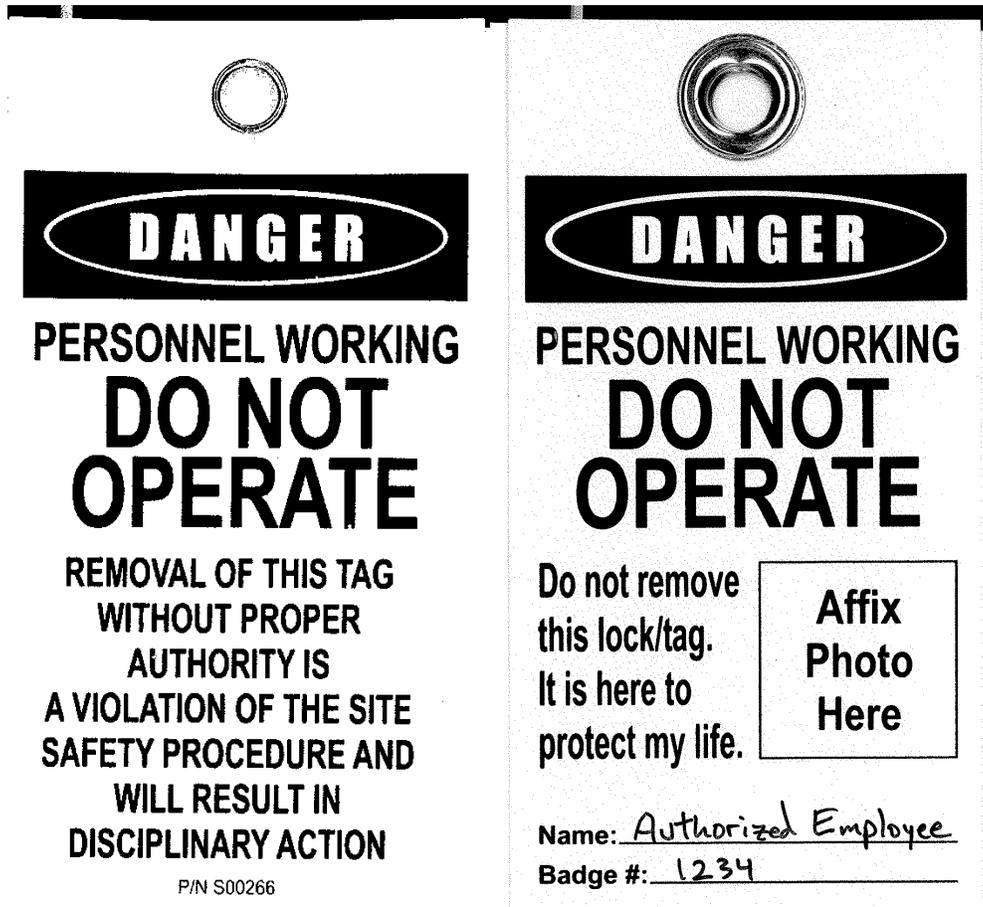


Figure 10.2-2. Example: Reusable Personnel Working Tag

Before the group begins to work, each authorized employee shall:

- Understand the simple lockout/tagout activity or the Lockout/Tagout SEP (when an SEP is required).
- Ensure that the group lockout/tagout procedure is acceptable for his or her personal safety.
- Legibly complete the information required on his or her lockout/tagout tag.
- Attach his or her own approved red lock and tag either at the isolation points or on the group lockbox.
- Verify the integrity of the mechanical isolation.
- Verify that the equipment, machinery, and systems have been deenergized by:
 - Using normal operating controls to attempt to start the item.
 - Performing all other required tests specific to the item to ensure that isolation has been achieved and that stored hazardous energy has been relieved.

Verification of electrical isolation must be performed by an electrically qualified person; all other workers can observe the verification.

One authorized employee from the group may perform the verification activities, but each member of the group must observe and agree that the hazardous energy source is controlled.

6.4 Temporary Removal of Locks or Tags

An authorized employee is permitted to remove his or her locks and tags temporarily for the purpose of testing, positioning, and/or calibrating equipment, machinery, or systems, and this activity does not constitute a separate lockout/tagout event. For testing or positioning items, the authorized employee must follow steps [1] through [7] in Section 6.5, “Steps for Return to Service.” To continue servicing, maintaining, modifying, or conducting similar work on the item after testing or positioning has been complete, the authorized employee shall reverify the isolation of hazardous energy in accordance with Section 6.1 or the Lockout/Tagout SEP.

6.5 Steps for Return to Service

Only authorized workers may remove locks and tags. Workers shall remove only locks and tags that they placed. The only exception is discussed in Section 6.6. Locks and tags are removed using the following steps:

- [1] Check the machinery, equipment, or system and the immediate area to ensure that nonessential items have been removed and that the machinery, equipment, or system is ready for safe operation.
- [2] Check the work area to ensure that all employees are in a safe location or have been removed from the area.
- [3] Verify that the controls are all in the neutral or “off” position.
- [4] Notify all affected employees. If there is a question about whom the affected employees are, the authorized employee shall ask the site operations manager.
- [5] Remove locks, tags, and energy-isolating devices.
- [6] Replace any guards removed for lockout.
- [7] Reenergize the machine, equipment, or system.
- [8] Check the machine, equipment, or system to ensure that it can be operated safely.
- [9] Notify the site operations manager that the locks and tags have been removed and the item is back in service.

6.6 Alternative Authorization for Removing Locks and Tags

When an authorized employee who applied a locking/tagging device is not available to remove the device, the site operations manager shall personally take the following steps:

- [1] Confirm that the authorized employee is not available by contacting the employee by phone or confirming with their manager/supervisor that they are no longer at the site and are not expected to return to the site.
- [2] Document the alternative authorization for removing the device on an *Alternative Authorization for Removing Locks and Tags* (form LMS 1003) and make the form available at the work site while the work is being performed.

- [3] Follow the steps in Section 6.5 of this standard, “Steps for Return to Service,” to remove the lock device.
- [4] Make a reasonable effort to inform the authorized employee that the locking/tagging device was removed.
- [5] Ensure that the authorized employee has knowledge of the removal before returning to work at the facility.

6.7 Using a Tag Only

When machinery, equipment, or systems can be locked out, they must be locked out when they are serviced, maintained, or modified.

If machinery, equipment, or systems cannot be locked out, they must be tagged out with a level of safety equivalent to that of a lock, such as removing an isolating-circuit element or blocking a controlling switch.

Using a tag only shall require a Lockout/Tagout SEP.

Tags shall be placed where they are clearly visible to potential users of the machinery, equipment, or system and shall indicate that operating or moving the energy-isolating device is prohibited.

Tags must be securely attached to energy-isolating devices so that they cannot be inadvertently detached during use. If a tag cannot be attached to the energy-isolating device, the tag shall be located as close as safely possible to the device.

6.8 Shift or Personnel Changes

Information shall be transferred during shift or personnel changes to ensure the continuity of lockout/tagout protection. The information will include a provision for the orderly transfer of lockout/tagout device protection between outgoing and incoming employees to minimize exposure to hazards from the unexpected energization or startup of the machine or equipment, or from the release of stored hazardous energy.

7. Training

Each authorized employee shall be trained in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available, and the methods necessary to isolate and control the hazardous energy by completing Lockout/Tagout Training (HS 318).

Each affected employee shall be instructed in the purpose and use of this procedure by completing Awareness Level Lockout/Tagout Training (HS 341).

All other employees whose work operations are or may be in an area where lockout/tagout may be used shall be instructed about this procedure by completing Awareness Level Lockout/Tagout Training (HS 341).

Authorized and affected employees shall be retrained when there is a change in their job assignments, equipment, or processes that creates a new hazard or when there is a change in this standard.

Retraining shall also be conducted annually for all authorized employees.

8. Records

The following records shall be generated and maintained in the project files for a minimum of 2 years:

- Completed *Lockout/Tagout Tag* (form LMS 1004 [see Figure 10.2-1]).
- *Lockout/Tagout: Specific Equipment Plan* (form LMS 1009).
- *Alternative Authorization for Removing Locks and Tags* (form LMS 1003).

9. References

Code of Federal Regulations:

29 CFR 1910. U.S. Department of Labor, Occupational Safety and Health Administration, “Occupational Safety and Health Standards.”

29 CFR 1926, U.S. Department of Labor, Occupational Safety and Health Administration, “Safety and Health Regulations for Construction.”

Health and Safety Manual, LMS/POL/S04321, continually updated, prepared by The S.M. Stoller Corporation, a wholly owned subsidiary of Huntington Ingalls Industries, for the U.S. Department of Energy Office of Legacy Management, Grand Junction, Colorado.

National Fire Protection Association, *Standard for Electrical Safety in the Workplace*, 70E, current edition.

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U.S. Department of Energy Office of Legacy Management

Lockout/Tagout: Specific Equipment Plan (continued)

Verification Method(s) for Zero Energy
Other Safety Issues
Specific Steps for Removal of Locks and Tags and Restart of Item (include notification of all affected employees)
Post-Restart Testing Requirements
Permits or Other Plans/Documents Required

Signature of Preparer _____ **Date** _____

Approval and Work Authorization for this Lockout/Tagout

(Responsible Line Manager) (date)
Same person may not sign as Preparer and Approver

File Index Number _____

Section 01025: Measurement and Payment

(Rev-1)

Part 1—General

1.1 Scope

This section describes measurement and payment methods and requirements as they apply to this subcontract.

1.2 Related Work

- A. Division 1 of these specifications.
- B. Terms and Conditions for Construction Subcontracts (Terms and Conditions).

1.3 Unit Prices

- A. The number of units and quantities contained in the unit-price schedule represent the best available known quantities of the work. Final payment will be made for the actual number of units and quantities incorporated in or made necessary by the work included in this subcontract.
- B. In the event that work and/or materials or equipment are required to a greater or lesser extent than is indicated by the drawings and specifications refer to the Terms and Conditions.

1.4 Submittals

- A. Submittals shall be made in accordance with Section 01300: Submittals.
- B. Submittals shall be made for proposed substitutions.
- C. Submittals shall be made as required on the Project Submittal List, Table 01300-1.
- D. Submit daily summary weigh sheets accompanied by daily weigh tickets with request for payment when measurement for payment is by weight in accordance with Article 3.1.1. Submit weight tickets to Contractor daily.
- E. With each request for payment, the subcontractor shall submit supporting information as necessary to justify the payment request as outlined in Article 3.2 of this section with the payment request.

Part 2—Products

(Not Used)

Part 3—Execution

3.1 Measurement Method

3.1.1 General

- A. The subcontractor shall compute for payment purposes all quantities of work performed and materials and equipment delivered to the Site. All such computations shall be subject to approval by the Contractor before any related progress or final payments are made.
- B. The Contractor may take any action necessary to verify quantities calculated by the subcontractor.
- C. All work to be paid for at a subcontract price-per-unit-of-measurement shall be measured in accordance with United States Standard Measures.
- D. All measurements will be based on the lines, grades, and dimensions shown on the drawings and specified herein, plus any Contractor-approved changes that revise the lines, grades, or dimensions shown on the drawings. No payment will be made for work outside of the approved lines, grades, or dimensions. The designed outside toe of slopes catch-point to existing ground are based on topographic data. As long as the excavations and embankments are constructed to the lines and grades indicated on the drawings, there will be no price adjustment to increase or decrease the lump-sum price on the unit-price schedule for initial grading if actual catch points in the field vary from the drawings.
- E. Measurement of volume shall be by the cubic dimension listed or indicated in the unit-price schedule. Method of volume measurement shall be as specified in Article 3.1.2 of this section.
- F. Measurement by area shall be by the square dimension listed or indicated in the unit-price schedule, plus any Contractor-approved changes that revise the lines, or dimensions shown on the drawings. No payment will be made for work outside of the approved lines or dimensions. As long as the work is constructed to the lines and dimensions indicated on the drawings. Method of square measurement shall be as described in Article 3.1.2 of this section.
- G. Linear measurement shall be by the linear dimension listed or indicated in the unit-price schedule. Method of linear measurement shall be as described in the specific line items. Generally items, components, or work to be measured by linear measurement shall be measured at the centerline of the item in place.
- H. Field survey is defined as a survey of measurement performed by a licensed land surveyor per Section 01050: Field Engineering of these specifications.
- I. Lump-sum measurement shall be for the entire item, unit of work, structure, or combination thereof, as listed or indicated in the unit-price schedule.
- J. Subcontractor assumes all liability in using quantities provided by Contractor. Subcontractor has responsibility to verify all quantities provided.

3.1.2 Specific Line Items

1. Measurement for payment for mobilization and demobilization shall be by the lump sum.
2. Measurement for payment for establishing sediment and erosion controls shall be by the lump sum.
3. Measurement for payment for clearing and grubbing shall be by the acre as measured on a horizontal plane by land surveying methods.
4. Measurement for payment for the cofferdam and diversion channel shall be by the lump sum.
5. Measurement for payment for initial earthwork grading to establish new stream channel and to establish subgrade prior to topsoil placement, gravel drainage layer or rock toe shall be by the lump sum.
6. Measurement for payment for the Rock Toe construction shall be by the lump sum.
7. Measurement for payment for Soil Encapsulated Lifts shall be by the lump sum.
8. Measurement for payment for the Fabric and Plant Bank Treatment construction shall be by the lump sum.
9. Measurement for payment for the in-stream cross vanes shall be by the lump sum.
10. Measurement for payment for tree and shrub species for the Fabric and Plant Bank Treatment Area shall be by each plant installed.
11. Measurement for payment for trees for woodlands re-establishment in the swale area shall be by each plant installed.
12. Measurement for payment for woody poles used in the Rock Toe shall be by each pole.
13. Measurement for payment for reclamation of disturbed areas outside of the Soil Encapsulated Lifts and Fabric and Plant Bank Treatment areas shall be by the acre as measured on a horizontal plane by land surveying methods. Areas shall also include access roads, and staging area.

3.2 Payment Methods

3.2.1 General

- A. Payment will be full compensation for furnishing all labor, materials, tools, equipment, transportation, services, and incidentals as required to perform the work, and for performing all work necessary for completing the installation of the item or work classification, including all surveying, testing, cleaning, and all other incidental work.
- B. Full compensation for all expenses involved in conforming to the requirements for measuring materials or work shall be included in the unit or lump-sum prices in the unit-price schedule for the items of work being measured.
- C. When progress payments are to be made on a portion, area, or section of work, that portion, area, or section of work shall be clear of deficiencies and nonconforming items, as determined by the Contractor, prior to making a progress payment.

- D. If the subcontractor requests progress payments for lump-sum items or amounts in the unit-price schedule, such progress payments will be made upon concurrence between the Contractor and subcontractor on payable quantities and in accordance with the Terms and Conditions.
- E. Quantities of material wasted or disposed in a manner not called for under the subcontract; rejected loads of material, including material rejected after it has been placed by reasons of the failure of the subcontractor to conform to the provisions of the subcontract; material not unloaded from the transporting vehicle; material placed outside the limits indicated on the drawings or established by the Contractor; or material remaining on hand after completion of the work, will not be paid for, and such quantities shall not be included in the final total quantities. No compensation will be permitted for loading, hauling, and disposing of rejected material.
- F. No separate payment shall be made for items that are not specifically identified in the unit-price schedule. The subcontractor shall include the cost for these items in the closest related unit-price item specifically identified in the unit-price schedule unless specific measurement and payment sections within this specification indicate otherwise.
- G. The subcontractor shall represent by submittal of their proposal, that all work shown on drawings and in specifications is reflected in their total proposal price.
- H. No separate payment will be made for the items required in the following sections unless otherwise provided for by separate items in the unit-price schedule. Full compensation for such work will be considered incidental to completing the work and shall be included in the most applicable related unit-price item.

Section 01020: Construction Health and Safety
 Section 01050: Field Engineering
 Section 01100: Special Projects Procedures
 Section 01200: Environmental Compliance
 Section 01300: Submittals
 Section 01500: Construction Facilities and Temporary Controls

3.2.2 Specific Line Items

1. Payment for mobilization and demobilization will be made at the lump-sum price in the unit-price schedule for mobilization and demobilization, and shall include all related work as specified herein. Payment will be made as follows:
 - a) Payment of 50 percent of the lump-sum price will be made upon completion of mobilization. Mobilization is defined as organization of the subcontractor labor, supplies, and equipment; transporting equipment to the site; and installation of the subcontractor's field offices and other support facilities.
 - b) Payment for the remaining 50 percent will be made as a part of the final payment to the subcontractor after completion of the project. Demobilization is defined as removal of all construction equipment and support facilities, final site cleanup, and site restoration.
2. Payment for establishing sediment and erosion controls shall be by the lump sum and shall include preparation and implementation of the Erosion and Sediment Control Plan.

3. Payment for clearing and grubbing shall be by the acre and include material disposal.
4. Payment for construction of the cofferdam and diversion channel shall be by the lump sum and shall include removal of the cofferdam and restoration of the diversion channel to pre-construction grades.
5. Payment for initial earthwork grading shall be by the lump sum. The price quoted shall include full compensation for excavating/filling on-site materials and excavating, loading, compacting, and testing of salvaged excavation and imported fill materials.
 - a) No separate payment will be made for compaction of natural ground under fills or fill materials. Full compensation for such work will be considered incidental to the applicable items of work.
 - b) No separate payment will be made for dust-control watering, pumping, disposal of groundwater and surface water, and for moisture control during compaction. Such work will be considered incidental to the applicable items of work.
 - c) No payment will be made for overexcavation.
6. Payment for the Rock Toe construction shall be by the lump sum and shall include all subgrade preparation, rock, and geotextile.
7. Payment for Soil Encapsulated Lifts shall be by the lump sum and shall include gravel drainage layer, coir fabric, topsoil, geogrid, soil preparation/amendment, seeding and container plantings associated with the lifts.
8. Payment for the Fabric and Plant Bank Treatment construction shall be by the lump sum and include topsoil, soil preparation/amendment, seeding, and coir fabric associated with the bank treatment.
- .
9. Payment for the in-stream cross vanes shall be by the lump sum.
10. Payment for tree and shrub species for the Fabric and Plant Bank Treatment area shall be by each plant installed.
11. Payment for woodlands re-establishment in the swale area shall be by each plant installed.
12. Payment for woody poles used in the Rock Toe shall be by each pole.
13. Payment for reclamation of disturbed areas outside of the Soil Encapsulated Lifts and Fabric and Plant Bank Treatment areas shall be by the acre and shall include soil preparation, soil amendments and seeding.

End of Section 01025

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Section 01050: Field Engineering

(Rev-1)

Part 1—General

1.1 Scope

This section specifies the requirements for surveying, layout work, and locations of sampling, testing points, and project as-builts.

A. Subcontractor Responsibilities

The subcontractor shall stake all construction points as shown on the drawings to ensure the work is completed to the required lines and grades.

B. Contractor Responsibilities

The Contractor will provide clarification of any work in question. If any line or grade is in question, the subcontractor shall not proceed until written clarification/response is received.

1.2 Related Work

A. Division 1 of these specifications.

B. Section 02200—Earthwork.

1.3 Submittals

A. Submittals shall be made in accordance with Section 01300: Submittals.

B. Submittals shall be made for proposed substitutions.

C. Submittals shall be made as required on the Project Submittal List, Table 01300-1.

D. Submit licensed surveyor, registration number, and resume of qualifications per Article 1.4A of this section 7 days prior to commencing surveys. Include name and qualifications of lead surveyor for the project.

E. Submit finish grade topographical map in accordance with Article 3.3.1J within 7 days of survey completion.

F. The subcontractor shall submit survey and quantity documentation for unit-priced work to support quantities indicated on pay applications in accordance with Article 3.3.4 of this section with the pay application.

G. Submit project record documents: as-builts redlines, in accordance with Article 3.5 within 3 days of project completion.

H. Submit survey as-built drawings per Article 3.5 of this section within 7 days of project completion.

1.4 Quality Assurance

A. The subcontractor shall provide experienced construction surveyors. All survey and layout work performed by the subcontractor shall be performed under the

supervision and direction of a licensed land surveyor. Determination of licensing in the State of Ohio shall be the responsibility of the subcontractor. The licensed surveyor shall have a minimum of 3 years' experience in construction surveys for construction work similar in nature to that required by the project. The subcontractor shall maintain sufficient qualified personnel to perform required surveying work. All survey work shall be subject to review by the Contractor.

- B. Sealing of surveys is required. Earthwork surveys for as-built purposes or for calculating quantities for payment shall be sealed.
- C. The subcontractor instruments and other survey equipment shall be accurate, suitable for the surveys required in accordance with recognized professional standards, and in proper condition and adjustment at all times. Any equipment found to be inaccurate (beyond allowable tolerances) or defective shall immediately be repaired or removed from the job site by the subcontractor at no additional cost to the Contractor.

1.5 AutoCAD Drawings

Upon Notice to Proceed, Contractor will provide AutoCAD files to subcontractor for their use in downloading design points for survey layout.

Part 2—Products

(Not Used)

Part 3—Execution

Definition

Surveys: The use of the term “surveys” in these specifications shall mean any measurement of land for the purposes of setting or controlling a construction feature including but not limited to excavation/embankment control, structures erections, pipeline or other utility control. Surveys shall be performed by a surveyor as defined in Article 1.4A of these specifications.

3.1 Establishing and Maintaining Lines and Grades

- A. Subcontractor
 - 1. Before commencing any layout of work and surveys, the subcontractor shall provide verbal notice to the Contractor so the Contractor may witness or independently check such work.
 - 2. Benchmarks and horizontal control points have been provided and are shown on the drawings. All additional base lines and benchmarks for grades will be established by subcontractor. Subcontractor shall provide such materials as templates, stakes, range markers, spikes, nails and boards, surveyors, electronic measuring devices, and given such assistance as may be required.

3. The subcontractor shall anticipate actual conditions to vary from those shown on the drawings. The subcontractor shall have three (3) days to verify that the drawings furnished are a true or reasonably accurate representation of the conditions of the site. Subcontractor shall survey in existing features and topography around the project area and compare to the drawings to assure conformity. Any error or apparent discrepancy in the data shown, or omissions of data required for accurately accomplishing the stakeout survey shall be referred immediately to the Contractor for interpretation or correction.
4. Establish a minimum of two project-control monuments located where they will be protected and undisturbed during the project activities. Project-control monuments will be referenced horizontal coordinates and elevation (X, Y, Z) to the Coordinate System or to the site-specific coordinate system shown on the drawings.
5. The subcontractor shall secure all field measurements required for proper and accurate fabrication and installation of the work included in this subcontract.
6. Subcontractor shall establish all base lines for the location of the principal component parts of the work together with a suitable number of benchmarks and range markers adjacent to the work. Based upon the information provided by the drawings, subcontractor shall develop and make all detail surveys and install stakes for all working points, lines, elevations and quantity surveys necessary for the completion of the work. Where no other specific dimensions are provided, layout dimensions shall be scaled from the drawings.
7. Subcontractor shall have the responsibility to carefully preserve the benchmarks, reference points and stakes, and in the case of destruction thereof by subcontractor or resulting from its negligence, subcontractor shall be charged with the expense and damage resulting there from, and subcontractor shall be responsible for any mistakes that may be caused by the unnecessary loss or disturbance of such benchmarks reference points, and stakes.
8. Existing or new control points, property markers and monuments that will be or are destroyed during the normal course of construction shall be re-established by subcontractor, and all reference ties recorded thereafter shall be furnished to Contractor. All computations necessary to establish to exact position of the work shall be made and preserved by subcontractor. All such work shall be done at no additional cost to Contractor.

3.2 Field Measurement

- A. Field-tape measurements may be allowed to document installed quantities for use as payment application backup at the discretion of the Contractor.
- B. Tolerances in survey layout of work shall not exceed the following:

<u>Types of Line or Mark</u>	<u>Horizontal Position</u>	<u>Elevation</u>
Permanent reference points, control points, and survey control points.	1 in 10,000	± 0.02 ft
Reference points for general excavation and earthwork grade staking.	1 in 2,000	± 0.10 ft

The Contractor may perform field surveys to verify that the subcontractor's field survey work is within acceptable tolerances and accurately depicts requirements of the drawings and these specifications. In the event that the Contractor's survey differs from the subcontractor's survey, the Contractor's survey shall govern.

C. Sampling and Test Locations

Horizontal and vertical locations of all sampling and test points shall be indicated on all sample and test reports. Horizontal locations may be tied to permanent physical features and vertical locations may be tied to finished grades. Horizontal locations shall have a tolerance of ± 1.0 foot (ft) and vertical locations shall have a tolerance of ± 0.3 ft. Sample and test locations shall be identified by surveyed XYZ site coordinates.

3.3 Survey Scope

Subcontractor will be responsible for the following survey work that will be performed by a surveyor as defined in Article 1.4A of this specification:

3.3.1 Excavation/Backfill Control and Quantities

- A. Prior to commencing excavation of any material, the subcontractor shall perform a survey of the existing grade in order to establish horizontal control coordinates and elevation.
- B. Subcontractor shall conduct topographic surveys of all surfaces before and after placement of engineered embankment fill, in order to verify thickness and quantity.
- C. Unless otherwise approved by the Contractor, survey points for grades shall be along a grid no more than fifty (50) feet on center, with elevations measured at all changes in slope, high points and low points. Contours shall be one (1) ft, and labels shall be at five (5) ft and ten (10) ft.
- D. Develop existing grade topographical survey based on 30-ft grid and all major grade breaks. Provide existing grade topographical drawing in accordance with Article 3.4 of these specifications.
- E. Provide survey support during excavation.
- F. Excavation Control
 - 1. Survey and establish the preconstruction alignment of fence lines, ditches, drainage structures, roadways, known utilities, and any other cultural features.
 - 2. Survey, establish, and make the boundaries of the areas to be excavated in accordance with the excavation sequence indicated on the drawings.
- G. Develop final excavation grade topographical survey based on 30-ft grid and all major grade breaks.
- H. Establish 30-ft backfill control grid.
- I. Provide survey support during backfill.

- J. Develop final finish grade topographical survey based on 30-ft grid and all major grade breaks. Provide existing grade topographical drawing in accordance with Article 3.4 of these specifications.
- K. Remove and dispose of staking at end of project only after receiving written direction from Contractor
- L. Copies of all survey drawings prepared by the Contractor will be made available to the subcontractor when requested.

3.3.2 Stream Channel ~~Trench~~ Alignment Surveys

Subcontractor shall stake the alignment of ~~trenches~~ stream channel shown on the drawings. Alignment survey shall contain, at a minimum, the following:

- A. A minimum of ~~100~~25-ft stationing with stationing indicated on stakes.
- B. Location of all direction changes where bends and ~~tees~~ curves are required.
- ~~C. Location for all valve structures including gate valves, check valves, and air/vacuum release valves.~~
- ~~D.~~C. Provide a minimum of one offset stake for each of the points staked above. Each offset stake shall be placed at a location where it will not be disturbed during the course of the work and shall have stationing and feature (i.e., P.C., P.T., ~~valve, A/VR~~) marked on it.
- ~~E.~~D. Remove and dispose of staking at end of project only after receiving written direction from Contractor.

Rev-1

3.3.3 Structural Features Layout

Subcontractor shall stake the layout necessary for the construction of site features. Layout staking shall contain, at a minimum, the following:

- A. Staking of each major corner of the feature.
- B. Staking of each major grade break of the feature.
- C. Provide a minimum of one offset stake for each of the points staked above. Each offset stake shall be placed at a location where it will not be disturbed during the course of the work and shall have feature marked on it including stationing.
- D. Remove and dispose of staking at end of project only after receiving written direction from Contractor

3.3.4 Quantity Documentation

Prior to payment for applicable work, the Contractor will provide to the subcontractor documentation of work quantity estimates from site surveys.

3.3.5 Survey As-Builts

Prepare survey as-builts in accordance with Article 3.6 of this specification.

3.4 Survey Submittals

Survey data submittals shall consist of the following:

3.4.1 Electronic Deliverable Formats and File Transfer Methods

- A. Topo Drawing—AutoCAD Civil 3D 2012 or compatible version.
- B. All other AutoCAD Drawing Format—AutoCAD 2012 or compatible.
- C. Microsoft Office Word 2010 or Excel 2010 documents or ASCII text files.
- D. Acceptable media—CD-ROM or DVD.
- E. FTP Transfer—The Contractor will be available to assist the subcontractor in setting up connections to the FTP site for electronic file transfers.
- F. E-mail—the subcontractor may utilize appropriate e-mail channels if file sizes permit.

3.4.2 Electronic Map Requirements

- A. An electronic map will be generated that represents all survey points collected. Features derived from these points will be assembled (connected). At a minimum, survey points will be annotated with its point number, northing, easting, and description.
- B. Survey drawings shall be developed to match the same coordinate system that the drawings are in.
- C. The subcontractor shall include an electronic file that defines completely all layers in the AutoCAD drawing.
- D. Two (2) paper copies will be submitted.

3.4.3 Electronic Survey Data Requirements

- A. Description of survey equipment used, including manufacturer, make, model, and serial number.
- B. Data collector manufacturer, make, model, and serial number.
- C. Type of equipment used to perform the survey (i.e. Total Station, GPS).
- D. Data collection method for horizontal locations (i.e. RTK GPS, Total Station).
- E. Data collection method for vertical elevations (i.e. Level Loop, RTK GPS).
- F. Date(s) when the field work was performed.
- G. Name(s) of surveyor(s).
- H. Electronic copy of field notebooks.
- I. Combined scale factor (Grid/Ground scale factor), and the scaled from location (x,y).
- J. Level Loop closure report.
- K. Survey control points.

- L. Point Number, GPS Latitude, GPS Longitude, Elevation, and Description.
- M. Point Number, Northing, Easting, Elevation, and Description in the coordinate system specified.
- N. Electronic copy of the survey control data sheets.
- O. Survey points (minimum requirements)
Point Number, GPS Latitude, GPS Longitude, Elevation, Description.
- P. Point Number, Northing, Easting, Elevation, Description in the coordinate system specified.
- Q. The subcontractor shall include an electronic file that defines completely all abbreviations used in the acquisition of the field data which describes points or any other survey information.

3.4.4 Electronic Topographic Drawing Requirements

- A. AutoCAD Civil 3D 2012 or compatible version, two (2) paper copies will be submitted.
- B. Other data required for submittal from field surveys used to generate topography is the AutoCAD file containing the AutoCAD objects (e.g., points, 3d-polylines, faultlines or breaklines, polylines, outer boundaries, hide boundaries) to generate the surface (Digital Terrain Model/Triangular Irregular Networks) that produced the contours.
- C. Data shall be presented as follows:
 - 1. Contours – Present contours as continuous 2D-Polylines.
 - 2. Break or Fault Lines – Present as 3D-Polyline or 3D-Line Segments when representing drainage channels, edges of pavement/gravel/dirt, ground surface structures such as concrete headwalls, etc.
 - 3. All DTM surfaces or TIN's shall be accompanied by a 2D-Polyline boundary (closed) that represents the limits of the area being described or changed.
 - 4. The subcontractor shall include an electronic file that defines completely all abbreviations used in the acquisition of the field data describing points and miscellaneous information.
 - 5. The subcontractor shall include an electronic file that defines completely all layers in the AutoCAD drawing.
 - 6. Resulting contour maps generated from topographical surveys shall be generated to an accuracy of $\pm \frac{1}{2}$ the contour interval that will be specified in the project-specific SOW.

3.4.5 Drawing Scale

Drawings shall be drawn to an engineering scale which can be scaled with a conventional engineer's scale (i.e., 1 inch = 10 foot, 1 inch = 50 feet). If observation points are collected in phases, all phases shall be combined into one drawing.

3.5 Project Record Documents: As-Built

- A. Promptly following receipt of the Notice to Proceed, the subcontractor shall secure from the Contractor, at no charge to the subcontractor, up to five sets each of full-size drawings and specifications. Subcontractor shall request number of sets required upon Notice of Award.
 - 1. Throughout progress of the project, the subcontractor shall maintain a neat, current, and accurate record of the as-built status of the project on the job set of the project record documents.
 - 2. One set of the drawings shall be used to record as-built survey data only.
 - 3. The drawings and these specifications are the project record documents.
 - 4. As-built documents shall include documentation of all deviations from the original or revised drawings and these specifications.
- B. Upon receipt of the job set, identify the document set with the title, “RECORD DOCUMENTS—JOB SET.”
- C. The subcontractor shall thoroughly document changes on each page of the specifications and each sheet of drawings and other documents where such entry is required to show all changes. Documentation shall include the Change Order number as appropriate and shall be initialed and dated by the individual making the entry.
- D. Make entries within 24 hours after receipt of information that a change has occurred.
- E. Project record document entries shall be made using terminology and drafting standards that match those used in the subcontract documents. Deviations from standards, if required, will be noted on glossaries, legends, or other appropriate lists of definitions included in the project record documents for that work.
- F. Making Entries on Drawings
 - 1. Use an erasable red pencil (not ink or indelible pencil) and clearly describe the change by graphic line and note.
 - 2. Date and initial all entries (provide an initial log).
 - 3. Call attention to the entry by a “cloud” drawn around the area or areas affected and reference the change order number as appropriate.
 - 4. In the event of overlapping changes, use a different color for each overlapping change.
- G. Contractor acceptance of the project record documents as-builts is required before final payment will be made.

3.6 As-Built Documentation

- A. Project survey as-built shall also be required in addition to the project records documents.
- B. The subcontractor shall provide surveying services to document as-built conditions. The subcontractor shall provide survey data (XYZ coordinates) to confirm that as-built locations of the work conform to the drawings where coordinates and/or elevations are shown. Where the drawings or specifications permit variable locations

or detail for specific items of work, the subcontractor shall survey the as-built locations or details. Surveys shall be sufficient to define the features or details at any given locations.

- C. Buried Features: XYZ coordinates for underground features shall be obtained before backfilling. For utility lines at all changes in direction, tees, pull boxes, valves, existing utility line crossings, and road crossings. Active and abandoned utilities encountered as well as any other underground structural features shall be included in the as-builts. Single line drawings of utility line as-builts are acceptable.

End of Section 01050

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Section 01100: Special Project Procedures

Part 1—General

1.1 Scope

This section describes the following project-specific requirements and procedures.

- A. Inspections.
- B. Project Meetings.
- C. Project Construction Schedule.

1.2 Related Work

Division 1 of these specifications.

1.3 Submittals

- A. Submittals shall be made in accordance with Section 01300: Submittals.
- B. Submittals shall be made for proposed substitutions.
- C. Submittals shall be made as required on the Project Submittal List, Table 01300-1.
- D. Submit schedule revisions per Article 3.2B.7 of this section prior to implementation.
- E. Submit initial project schedule per Article 3.2C of this section with project proposal.
- F. Submit recovery Schedule per Article 3.2D of this section.

Part 2—Products

(Not Used)

Part 3—Execution

3.1 Project Meetings

- A. Preconstruction Meeting
 - 1. Following subcontractor receipt of the Notice to Proceed, the Contractor will arrange the time and place of the preconstruction meeting with the subcontractor.
 - 2. Authorized representatives of the subcontractor including project manager and site superintendent, and lower-tiered superintendents shall be in attendance.
 - 3. Information about the following items will be distributed and/or discussed.
 - a. Project construction schedule, work hours, and overtime anticipated, including sequence of critical work.

- b. Preconstruction documents, including distribution of copies of documents and revisions.
- c. Procedures for field question forms, construction interface documents, change orders, and field decisions.
- d. Health, safety, and security requirements such as: health and safety plans, job safety analysis, emergency actions, lockout/tagouts, safe work permits, quality control, housekeeping, channels and procedures for communications, postings, etc.
- e. Quality control.
- f. Review of Plan of the Day implementation.
- g. Work quantity measurement and payment request procedures.
- h. Submittal procedures.
- i. Visiting regulatory agencies.
- j. Restricted areas/authorized access/project areas.
- k. The job site will be toured with the subcontractor representative present.

B. Daily Tailgate Safety Meetings

Daily meetings between the Contractor and subcontractor will be held. These meetings will take place each morning to review the scope of the upcoming day's activities, communicate hazards, resolve health and safety and operations concerns, and discuss schedule and future activities. Issues or concerns noted on the previous days will be discussed.

C. Plan of the Day

Contractor, in conjunction with the subcontractor, will prepare a Plan of the Day which will list all activities that will be planned for the project for that duration of time. The Contractor's Plan of the Day/Plan of the Week form (LMS 2130) will be reviewed with the subcontractor during the Tailgate Safety Meetings and subcontractor personnel will sign off on the form prior to work being allowed to commence.

D. Weekly Progress Meeting

Weekly progress meetings will be conducted between the Contractor and subcontractor. Meetings will be held at the start of a mutually agreeable workday. A subcontractor superintendent with the authority to act on behalf of the subcontractor shall be in attendance at this meeting.

At a minimum, the following items will be discussed at the weekly meetings.

1. Review of applicable specifications for work to be conducted in the near future.
2. Review of field questions, construction interface documents, and change orders.
3. Review of safety or permit issues and requirements.
4. Required equipment and personnel.

5. Weekly progress and production.
6. Submittal review.
7. Two-week look-ahead schedule.

3.2 Schedules

A. General Requirements

Schedules shall describe the subcontractor's work in sufficient detail to provide a basis for determining the sequence and progress of the work.

B. Project Construction Schedule

1. The project construction schedule shall consist of a time-scaled Gantt bar chart that depicts proper restraints, activity durations, total float, free float, and planned and actual start and completion dates for each schedule activity and milestone. Schedule shall include, at a minimum, all tasks as listed in the General Construction Sequence in Section 01010: Statement of Work, Article 3.4.
2. The bar chart shall show logic lines displaying the relationship of all tasks.
3. Schedules shall be in a black and white reproducible form. Minimum sheet size shall be 8-1/2 by 11 inches.
4. The project construction schedule shall have a horizontal time scale and shall identify the first workday of each week, from start of work through subcontract completion.
5. The project construction schedule shall provide a complete sequence of the project by activities.
6. Lower-tier subcontractor schedules shall be included and identified in coordination with the project construction schedule.
7. Schedule revisions shall reflect new developments in the project. Approved change orders shall be added to the schedules as separate activities. Revisions made to the schedule shall be given a new revision number and submitted to the Contractor for review and acceptance prior to implementation.
8. Monthly schedule updates shall show the relationship of the new schedule to the planned schedule or baseline schedule. The schedule updates shall show actual progress versus scheduled progress for each activity. Schedule status shall indicate percent complete by activity, remaining duration of in-progress activities, and total float and free float for each scheduled activity.

C. Submittal of Schedules

Copies of the required Initial Project Schedule shall be submitted to the Contractor with the cost proposal. The Contractor will review the schedule for format and content and will provide comments for acceptance of the schedule to the subcontractor after receipt. If revisions are required, the subcontractor shall provide a revised schedule.

D. Schedule Updates

The Contractor and subcontractor shall review the status of the construction schedule at each weekly progress meeting. An updated construction schedule shall be submitted monthly for the duration of the subcontract.

If the Contractor determines that critical path activities are behind schedule at the end of a given month, the subcontractor shall submit a detailed recovery plan for those activities that are behind schedule. The recovery plan shall include additional manpower and equipment necessary to recover the schedule. Costs associated with recovery of the schedule shall be at the subcontractor's expense. Subsequent updates of the schedule shall incorporate and reflect the recovery plan progress in accordance with Section 23 of the *Terms and Conditions for Construction Subcontracts*, as well as all other activities in the original schedule.

3.3 Weather Days

If unforeseen or uncontrollable severe weather delays occur, the Contractor may extend the completion date. Weather delay days will be added to the period of performance.

A "weather day" applies to any normal work day when weather conditions deteriorate to the point that fieldwork is neither safe nor practical, and when 5 hours or less of work have been completed. The Contractor, in consultation with the subcontractor, will decide whether or not to continue work. The safety of personnel will be the first consideration in determining whether or not to continue work. The subcontractor shall neither be compensated for weather delays nor be penalized for weather delays.

3.4 Inspections

- A. At the completion of this project, the subcontractor representative shall attend the final inspection to document any deficiencies in the completed project. A Notice of Final Completion Inspection form (LMS 2607CON) will be completed by the Contractor, with one copy delivered to the subcontractor. Form is attached to this section.
- B. The subcontractor may request an unofficial inspection of work items at the time of completion, but these items will be inspected again during the final inspection to verify compliance with this subcontract.

3.5 Compliance with Codes and Standards

- A. The subcontractor and lower-tier subcontractors shall comply with codes and standards as noted in other sections of these specifications and on the drawings.
- B. Prior to the start of work, the subcontractor shall obtain any required state, county, or local contractor licenses required.
- C. State or local permits will not be required to perform this work.
- D. Contractor will provide all regulatory type permits and requirements.

End of Section 01100

U.S. Department of Energy Office of Legacy Management

Plan of the Day/Plan of the Week (continued)

3. Roles and Responsibilities—Names and Phone Numbers: *This section should contain pertinent contact information and job assignments as deemed necessary by the site manager/site lead. Examples of contact information include: site managers, project leads, operations leads, construction inspector, technical monitor, and site safety supervisor. If multiple projects/activities are ongoing, the site manager/site lead may determine that each project/activity should include the respective positions. In this case, the site manager/site lead may elect to specify contact information for each project.*

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4. Emergent Work: *Emergent work is new or additional work activities that are identified for performance. Emergent work requires the same level of planning and authorization as normally approved activities. Emergent work cannot be performed unless it is authorized by the site manager/site lead.*

Item No.	Activity Description/Applicable JSA/ Roles and Responsibilities	Authorization (Site Manager or Site Lead Signature)

U.S. Department of Energy Office of Legacy Management

Notice of Final Completion Inspection

Site: _____ **Project:** _____

Legacy Management Support Services Contract: Stoller Legacy Management Team

Subcontractor: _____ **Subcontract No:** _____

Construction Start Date: _____ **Construction Completion Date:** _____

Final/No Variances: The work tasks and activities under this subcontract are certified by the undersigned to be complete under the terms and conditions of the subcontract documents.

Contractor Representative (print and sign/date)

Subcontractor Representative (print and sign/date)

Final with Variances: Any incomplete tasks or minor deviations from the terms and conditions of the subcontract documents are described below and shall be completed and/or corrected by the Subcontractor no later than the completion date mutually agreed on by the undersigned contractor and subcontractor representatives.

Completion and/or Correction Date: _____

Failure to complete these tasks and/or correct these minor deviations by the completion date (unless an extension of time is formally requested and granted) constitutes a substantial violation of the subcontract and subjects the subcontractor to the terms and conditions set forth in Clause 6 of the subcontract terms and conditions, "Termination."

The following variances are to be completed and/or corrected before final payment is authorized (attach separate sheets and photographs as required):

Contractor Representative (print and sign/date)

Subcontractor Representative (print and sign/date)

Date Variances Completed and/or Corrected: _____

Contractor Representative (print and sign/date)

Subcontractor Representative (print and sign/date)

Distribution: _____

Section 01200: Environmental Compliance

Part 1—General

1.1 Scope

This section describes the following project-specific requirements and procedures.

- A. Cultural Resources
- B. Environmental Requirements
- C. Dust Control
- D. Site Water Management
- E. Storm Water Controls

1.2 Related Work

Division 1 of these specifications.

1.3 Submittals

- A. Submittals shall be made in accordance with Section 01300: Submittals.
- B. Submittals shall be made for proposed substitutions.
- C. Submittals shall be made as required on the Project Submittal List, Table 01300-1.

1.4 Environmental Management System

In accordance with DOE Office of Legacy Management (LM) Environment, Safety, and Health Policy and Environmental Management System, all subcontractors performing work for LM through its Contractor shall follow safe and environmentally sound work practices. Work shall be conducted in a manner that protects workers and the public, complies with DOE directives, and complies with all applicable federal, state, local and tribal regulatory requirements, and agreements and permits under the LM contract. In addition, work shall be conducted in a manner that prevents pollution, minimizes wastes, and conserves natural and cultural resources to the extent that such activities are technically and economically feasible. Subcontractor personnel are responsible for informing the Contractor of any unsafe or environmentally unsound conditions, and have the authority to stop work without fear of reprisal if necessitated by such conditions.

A. Waste Management

The subcontractor shall properly manage all non-hazardous and hazardous waste that it generates. The site shall be kept clean and orderly at all times, and the subcontractor shall clean up debris and waste material from the site daily. Construction debris and non-hazardous waste material shall be disposed of in the receptacle provided by the subcontractor (*unless provided by Contractor*). The subcontractor shall immediately notify the Contractor if any hazardous waste is suspected or generated outside the scope of the subcontract and follow the Contractor's directions to manage the waste. Hazardous waste shall be managed,

including storage, transport, and offsite disposal, in compliance with applicable federal, state, and local regulations.

B. Waste Reduction and Recycling

As required by Executive Order 13423 and DOE directives, Contractor must meet certain waste reduction and recycling targets. The requirements for construction projects are:

- All subcontractors are encouraged to minimize the waste generated during construction and demolition projects and maximize the amount of material that is reused, salvaged and recycled.
- Subcontractors should take full advantage of all reuse and recycling programs available.

C. Spills

If the subcontractor spills any fluids from equipment operations or maintenance (fuel, hydraulic fluids, coolant, lubricants, cleaning solvents, used oil, etc.), the subcontractor shall immediately notify the Contractor and follow the Contractor's directions to clean up the spill. Equipment leaks and other types of spills shall be diapered or otherwise blocked to prevent ground surface contamination until the leak is fixed. The subcontractor shall clean up and subsequently manage spilled materials and associated wastes (e.g., contaminated soils), including storage, transport, and offsite disposal, in compliance with applicable federal, state, and local regulations at the subcontractor's expense.

Part 2—Products

Environmentally preferred products shall be used for construction activities when economically feasible to achieve comparable results.

Part 3—Execution

3.1 Cultural Resources

If cultural resources or human remains are unearthed during operations, activity in the vicinity of the cultural resource will cease, and the subcontractor shall notify the Contractor immediately. The subcontractor on-site manager shall protect the items discovered and allow no further site-disturbing activities until LM makes a decision concerning the disposition of the items and provides written notification to the on-site manager to proceed with work. The on-site manager is responsible for informing all persons associated with this project that they will be subject to prosecution for knowingly disturbing historic and prehistoric archaeology sites or for collecting artifacts of any kind, including historic items, arrowheads, and/or pottery fragments. The Contractor will implement notification and evaluation pursuant to the *Procedure for Unexpected Discovery of Cultural Resources at the Fernald Preserve* (LMS/FER/S02698-1.0). Subcontractor personnel shall be briefed to this procedure.

3.2 Dust Control

- A. Visible dust shall not be allowed. The subcontractor shall take measures to control dust within the construction boundaries shown on the drawings. Dust suppression shall include all roadways, soil stockpiles, and other areas disturbed by the subcontractor.
- B. The subcontractor shall take necessary measures to suppress visible dust. The subcontractor may use techniques that include, but are not limited to, the following:
 - 1. Minimizing exposed earth work areas.
 - 2. Enforcing lower speed limits (15 mph maximum) on all vehicles traveling within the site.
 - 3. Suppressing dust by spraying the area with water or a Contractor-accepted dust retardant, such as calcium chloride or magnesium chloride.
 - 4. Maintaining adequate moisture content at all times in areas where the pre-existing surface has been removed or disturbed, and in material that has been stockpiled on the job site so that dust shall not be generated.

3.3 Site Water Management

- A. The subcontractor shall control and manage storm water runoff, water used for dust control, and water from testing and cleaning activities.
- B. The subcontractor shall install temporary drainage piping or swales to control overland flow, and to route natural and man-made drainage under temporary roadways, if necessary. The subcontractor shall select the size and type of piping or swale to be used, and shall be responsible for the performance. The subcontractor shall provide adequate fill over piping and compact materials around the drainage piping to protect the pipe. The subcontractor shall perform regular maintenance of any temporary drainage system as necessary to prevent plugging or reduced capacity.

3.4 Storm Water Permit and Pollution Prevention Plan and Erosion-Control Measures

The subcontractor shall follow best management practices (e.g. hay bales, silt fencing) for storm water and erosion-control measures and implement prior to any work starting. Subcontractor shall prevent offsite movement of sediment from sediment sources during normal storm events and during dust control applications of water.

End of Section 01200

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Section 01300: Submittals

(Rev-1)

Part 1—General

1.1 Scope

The subcontractor shall provide submittals required by the subcontract documents in accordance with this section and revise and resubmit items, as necessary, to establish compliance with the specified requirements.

1.2 Related Work

Division 1 through 2 of these specifications.

1.3 Submittals

Provide submittals required in Table 01300-1. Subcontractor shall submit only one product proposal to meet a specific use. Contractor will not review multiple proposed products to determine if they will meet specifications.

1.4 General Submittal Requirements

- A. Submittal reviews are required for extensions of design, critical materials, proposed approved equal material substitutions, deviations, equipment that must be checked, compatibility with the entire system, and other items as designated in these specifications that require Contractor review.
- B. The Contractor's review of submittals shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing, and other information are satisfactory. Review will not relieve the subcontractor of responsibility for any error or defect in the work. The subcontractor, under the quality control requirements of this subcontract, shall be responsible for dimensions, the design of adequate connections and details (not specified by the Contractor or subcontract documents), and the satisfactory construction of all work. After submittals are reviewed by the Contractor, no resubmittal for the purpose of substituting materials or equipment will be considered unless the submittal is accompanied by a written explanation of why a substitution is necessary.
- C. The requirements specified in this section are supplemental to the requirements specified in the *Terms and Conditions for Construction Subcontracts* and any requirements specified in other sections.
- D. All submittals shall be legible, reproducible, and in the English language.
- E. All submittals shall be submitted directly to the Contractor from the subcontractor. Submittals directly from lower-tier subcontractors, suppliers, or manufacturers will not be accepted.
- F. The subcontractor shall provide submittals far enough in advance of scheduled installation dates to provide time required for reviews, securing necessary

acceptance, possible revisions and resubmittals, and for placing orders and securing delivery. If the subcontractor response to Contractor questions and comments regarding any submittal is not acceptable, any resulting delays in the project progress are the sole responsibility of the subcontractor and all required actions to accelerate the schedule to correct for delays shall be implemented by the subcontractor at no additional cost to the Contractor.

- G. Unless otherwise specified, allow 5 working days for review by the Contractor following receipt of the original submittal and any subsequent resubmittal or modifications of previously accepted submittals.
- H. All copies of all submittals shall be delivered to the Contractor via email to: lorraine.alvarez@lm.doe.gov

Each submittal shall be accompanied by a letter of transmittal showing all information required for identification and checking. A sample letter of transmittal (Figure 01300-1) is included at the end of this section.

- I. The Contractor will return one copy of the submittal as an attachment to the Contractor's review comments. The subcontractor may make and distribute copies as needed.
- J. The subcontractor shall use the submittal identification number indicated in Table 01300-1. Submittals shall satisfy the following requirements:
 - 1. Each submittal shall be referenced to the appropriate sheet number and detail; and specification section and paragraph to indicate compliance with the subcontract documents.
 - 2. Resubmittals shall use the same submittal identification number as the original submittal except that a revision extension shall be added to the original submittal identification number. For example, an original submittal with identification number 16 and submittal number 16.00 shall have subsequent resubmittal numbers of 16.01, 16.02, etc.
 - 3. All pages and/or pieces of each submittal shall be identified as parts of the same submittal by marking the submittal number on all individual parts of the submittal along with the total number of pages/pieces in the submittal. For example, a first revision of an original submittal with identification number 16 and submittal number 16.01 shall contain the following markings located as a header or footnote in an open portion of the submittal document, on page 3: "Submittal 16.01, page 3 of 6."
- K. The subcontractor shall notify the Contractor in writing at the time of submittal of deviations in submittals from requirements of the subcontract documents. The Contractor reserves the right to accept or reject deviations from the subcontract documents.
- L. The Contractor will clearly label the submittals with one of the following designations and return it to the subcontractor:
 - 1. NO EXCEPTIONS TAKEN
 - 2. FURNISH AS CORRECTED

3. AMEND AND RESUBMIT
 4. REJECTED
- M. Submittals returned marked “NO EXCEPTIONS TAKEN” and “FURNISH AS CORRECTED” do not constitute a waiver of detailed or specified requirements unless so stated in writing by the Contractor.
- N. The subcontractor shall make all corrections required by the Contractor and promptly furnish a corrected submittal. No payment for completed work will be made by the Contractor until after all relevant and required submittals have been delivered to, and accepted by, the Contractor.

1.5 Technical Submittals

Technical submittals include all required submittals not identified as a schedule.

A. Shop Drawings

1. Make shop drawings accurately to a scale large enough to show all pertinent aspects of the item and the method(s) of connection to the work.
2. Shop drawings shall show legibly the design details of all manufactured or fabricated items, indicate proper relation of adjoining work, and incorporate minor changes of design or construction to suit actual conditions. Shop drawings shall be drawn to scale and shall be completely dimensioned.
3. Sheet sizes of shop drawings shall be 8-1/2 × 11 inches, 11 × 17 inches, or 22 × 34 inches.
4. A clear space of 3 × 3 inches shall be provided on each drawing above the title block for the Contractor’s review stamp.

B. Samples

1. Each sample shall be identified completely as to product, color, manufacturer, trade name, lot, style, model, location of use, and subcontract document reference, as well as the names of the subcontractor, supplier, project, and Contractor.
2. Quality assurance test samples may be selected by the Contractor from the materials or equipment delivered by the subcontractor to the site for use in the work. If any test sample fails to meet the specification requirements, such materials or equipment failing the testing shall be removed and replaced by the subcontractor, at no cost to the Contractor, with materials or equipment meeting the specification requirements.
3. Field samples shall be prepared at the site by the subcontractor in the manner and number as specified in these specifications. Affected finish work shall not begin until the Contractor provides written approval of the field samples.
4. Samples shall be resubmitted until accepted by the Contractor. Approval of a sample shall not be taken by itself as approval to change or modify any subcontract requirement.

- C. Product Data
 - 1. Where contents of submitted literature from manufacturers include data not pertinent to the submittal, the subcontractor shall clearly show those portions of the contents that are being submitted for review.
 - 2. The subcontractor shall submit copies of product data to identify applicable products, models, options, and other data. Manufacturer's standard data shall be supplemented to provide information unique to the work.
- D. Certificates of Compliance: Certificates of compliance shall clearly identify the applicable materials and reference the applicable sections of the subcontract documents.
- E. Manufacturer's Instructions: The subcontractor shall submit manufacturer's warranty requirements, such as specific instructions for delivery, storage, shelf life, assembly, installation, adjusting, and finishing. The subcontractor shall submit manufacturer's instructions as required in relevant sections of these specifications.
- F. Design Calculations and Drawings
 - 1. Design calculations shall be submitted to the Contractor for review with all pertinent data, assumptions, objective, criteria, applicable codes, standards, and references. The calculations shall be on 8 1/2- by 11-inch or 11- by 17-inch sheets. Each design calculation set shall bear page numbers, titles, revision numbers, date, and calculation number. Where multiple number of items are designed in a particular system, the calculations shall be preceded by a table of contents.
 - 2. Drawings shall be submitted to the Contractor for review. Drawing submittals shall comply with the requirements for shop drawings defined in Article 1.5A of this section.

1.6 Submittal Quality Control

- A. Prior to each submittal, carefully review and coordinate all aspects of each item being submitted. Review all submittals from lower-tier subcontractors and suppliers for compliance with the subcontract documents. Verify field measurements, field construction requirements, and material certification or identification numbers. Correct defective or incomplete submittals prior to forwarding them to the Contractor.
- B. Verify that each item in the submittal conforms in all respects to the specified requirements.
- C. By affixing the subcontractor's signature to each submittal, the subcontractor certifies that this coordination has been performed.

Part 2—Products

(Not Used)

Part 3—Execution

3.1 Submittal List

- A. Table 01300-1 is a list of submittals required by these specifications. The submittals listed in Table 01300-1 include both specific and general types of submittals; for example, Table 01300-1 shows submittal requirements for certifications and product data, but does not show all of the specific items for which certifications or product data are required.
- B. If a submittal is not listed in Table 01300-1, but is listed in an individual section, the subcontractor is not relieved from the submittal requirement.

Date

John Doe Contractors
Company Name
Address

Contract Administrator
The S.M. Stoller Corporation
99 Research Park Road
Morgantown, WV 26505

Attn: Contract Administrator

Subject: Submittals for Contract # _____ Project name

In accordance with the project contract documents we submit the following items:

Submittal Number	Submittal Name	Reference Section No.	Estimated Due Date

Submittal # _____ deviates from the Subcontract requirements and a written explanation is attached to the submittal.

Submittal # _____ has been revised in accordance with the comments from S.M. Stoller dated _____. The original submittal number was _____.

If you have any questions please contact _____ at _____.

Sincerely,

Jane Doe, Subcontractor

Figure 01300-1. Sample Letter of Transmittal

Table 01300-1. Project Submittal List

Submittal No.	Specification Reference	Submittal Requirement	Submittal Due*
1.	01010 3.7	Superintendent resume	With proposal
2.	01020 1.4D	Employees anticipated meeting the 240-hour criterion	5 working days prior to working
3.	01020 1.4E	Subcontractor Hour Tracking Monthly Report (form LMS 2146)	Monthly
4.	01020 1.4F	Employees meeting the 240-hour criterion (form LMS 2115)	5 working days prior to working
5.	01020 1.4G	List of employees that are absent more than 5 consecutive days	Prior to returning to work
6.	01020 1.4H	Equipment operator qualifications	Preconstruction conference
7.	01020 1.4I	Certification of employee training	Prior to work beginning
8.	01020 1.4J	OSHA Competent Person Designation form (LMS 2615CON)	Preconstruction conference
9.	01020 1.4K	First Aid training evidence	Preconstruction conference
10.	01020 1.4L	Letter indicating employees name, date ATV training received and trainer's name	To the Contract Administrator and a copy to the onsite Technical Monitor prior to task commencing
11.	01020 1.4M	Safety Data Sheets (SDS)	Upon bringing material onto site
12.	01020 1.4N	Crane and Derrick operator, rigger, and signal person information	1 week prior to lift
13.	01020 1.4O	Hoisting and rigging equipment information	1 week prior to lift
14.	01020 1.4P	Hoisting and rigging lift plan	1 week prior to lift
15.	01020 1.4Q	Lifting equipment inspection documentation	1 week prior to lift
16.	01020 1.4R	Submit equipment list, including type of equipment used to transport, and the method for unloading	1 day prior to equipment being unloaded
17.	01020 1.4S	List of lower-tier subcontractors and suppliers delivering to or transporting from the site	Preconstruction conference
18.	01020 1.4T	Statement that electrical workers are qualified and trained and will have any required arc flash PPE	5 working days prior to working
19.	01025 1.4D	Daily summary weigh sheets	Daily
20.	01025 1.4E	Payment request and supplemental information	Monthly
21.	01050 1.3D	Surveyor resumes	7 days prior to commencing surveying
22.	01050 1.3E	Finish grade topographical map	Within 7 days of survey completion
23.	01050 1.3F	Survey and quantity documentation for unit-priced work	With pay application
24.	01050 1.3G	Project record documents	Within 3 days of project completion
25.	01050 1.3H	Sealed as-built drawings	Within 7 days of project completion
26.	01100 1.3D	Schedule Revisions	Prior to implementation

CSS – Construction Site Supervisor

Proj. Engr. – Project Engineer

Days shown are work days unless otherwise indicated.

* – Submittals dates shall be based on "scheduled" work from the subcontractor's project schedule and shall allow adequate time for Contractor review and resubmittal, if necessary, without causing project schedule delays.

Table 01300-1 (continued). Project Submittal List

Submittal No.	Specification Reference	Submittal Requirement	Submittal Due*
27.	01100 1.3E	Initial project schedule	With proposal
28.	01100 1.3F	Recovery schedule	Monthly, when required
29.	01500 1.3D	Layout of staging area	With the proposal
30.	01500 1.3E	Type of trailer, tool storage, locations where each will be installed, methods for anchoring and methods for connecting any utilities	Preconstruction conference
31.	01500 1.3F	List of vehicles and heavy equipment, model, type, and year	Preconstruction conference
32.	01500 1.3G	Fuel Plan (LMS 2623CON)	With proposal
33.	01500 1.3H	Certification of training for forklift operation	Prior to forklift operation commencing
34.	02100 1.3D	Erosion and Sediment Control Plan	7 calendar days prior to work commencing
35.	02100 1.3E	Coffer dam and diversion channel plan	7 calendar days prior to work commencing
36.	02100 1.3F	Sediment and erosion control materials	7 calendar days prior to work commencing
37.	02200 1.3D	Independent laboratory qualifications and certifications	5 days prior to utilization of service
38.	02200 1.3E	Radioactive source documentation	5 days prior to use onsite
39.	02200 1.3F	Salvaged excavation material	5 days prior to use onsite
40.	02200 1.3G	Imported common borrow material	5 days prior to delivery
41.	02200 1.3H	Imported topsoil material	5 days prior to delivery
42.	02200 1.3I	Soil compaction test reports	7 working days after testing, results shall be communicated verbally within 24 hours of taking test
43.	02200 1.3J	Water source	At site mobilization
44.	02203 1.3D	Manufacturer's certification for geotextiles	14 calendar days prior to ordering
45.	02203 1.3E	Material delivery tickets	Upon material delivery
46.	02205 1.3D	Material delivery tickets	Upon material delivery
47.	02205 1.3E	Coir fabric	7 calendar days prior to ordering
48.	02215 1.3D	Geogrid material cut sheets	7 calendar days prior to ordering
49.	02215 1.3E	Topsoil data	7 calendar days prior to delivery
50.	02215 1.3F	Coir fabric, Rolanka BioD-OCF cut sheets	7 calendar days prior to ordering
51.	02215 1.3G	Coir fabric, Rolanka BioD-Mat90 cut sheets	7 calendar days prior to ordering
52.	02215 1.3H	Drainage material	5 days prior to delivery
53.	02275 1.3D	Delivery tickets	Upon delivery
54.	02920 1.3D	Endomycorrhizal inoculum certificates	7 calendar days prior to application
55.	02920 1.3E	Seed analysis certificates	14 calendar days prior to seeding
56.	02920 1.3F	Seed labels	After use
57.	02921 1.3D	Approved species	14 calendar days prior to delivery to site

CSS – Construction Site Supervisor

Proj. Engr. – Project Engineer

Days shown are work days unless otherwise indicated.

* – Submittals dates shall be based on "scheduled" work from the subcontractor's project schedule and shall allow adequate time for Contractor review and resubmittal, if necessary, without causing project schedule delays.

Table 01300-1 (continued). Project Submittal List

Submittal No.	Specification Reference	Submittal Requirement	Submittal Due*
58.	02921 1.3E	Woody poles	14 calendar days prior to ordering
59.	02921 1.3F	Proposed substitutions	14 calendar days prior to ordering
60.	02925 1.3D	Approved species	14 calendar days prior to delivery to the project site
61.	02934 1.3D	Boulders material source	14 calendar days prior to delivery to the project site
62.	02934 1.3E	Channel lining and native stream gravel	5 days prior to deliver to site

End of Section 01300

CSS – Construction Site Supervisor

Proj. Engr. – Project Engineer

Days shown are work days unless otherwise indicated.

* – Submittals dates shall be based on "scheduled" work from the subcontractor's project schedule and shall allow adequate time for Contractor review and resubmittal, if necessary, without causing project schedule delays.

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Section 01500: Construction Facilities and Temporary Controls

Part 1—General

1.1 Scope

This section covers the installation, maintenance, and operation of all temporary facilities and controls necessary to support subcontractor and Contractor operations during the course of this subcontract. These temporary facilities and controls shall be removed at subcontract completion and include, but are not limited to, office trailers, drainage facilities, staging areas, access controls, lighting, and utilities.

1.2 Related Work

- A. Division 1 of these specifications.
- B. Section 02200—Earthwork.

1.3 Submittals

- A. Submittals shall be made in accordance with Section 01300: Submittals.
- B. Submittals shall be made for proposed substitutions.
- C. Submittals shall be made as required on the Project Submittal List, Table 01300-1.
- D. Submit layout of staging area per Article 1.4A.
- E. Submit type of trailer, tool storage, location where each will be installed, method(s) for anchoring, and methods for connecting any utilities to the trailer per Article 1.5E3.
- F. Submit list of vehicles and heavy equipment to be used on project at the Preconstruction Conference in accordance with Article 1.14B of this section. Include model, type, and year of equipment and proof of equipment operator's proficiency.
- G. Submit a fueling plan per Article 1.14E of this section with the proposal.
- H. Submit certification of training for forklift operation per Article 1.14F of this section prior to forklift operation commencing.

1.4 Field Offices and Supporting Facilities

- A. Staging Area and Haul Routes

During the project mobilization phase, the subcontractor shall develop and establish a project staging area. The staging area shall be located as shown on the drawings for the duration of the project. The staging area shall be used for vehicle parking and to place subcontractor facilities, material, laydown yard equipment, storage, and any other temporary items associated with the project.

1. Submit to the Contractor for acceptance the location, size, and layout of the staging area.
2. Material storage shall be located in the staging area.

3. Haul traffic shall comply with all applicable local and state traffic control requirements.
4. Mud Free Site Access: The subcontractor shall provide mud-free conditions at the access/egress locations of the job site.

For the North Construction Access Route, mud free site access shall be at the north edge of the staging area.

For the South Construction Access Route, mud free site access shall be at the south rope barrier.

The subcontractor shall remove mud from onsite roadways and parking lot on a daily basis, as directed by the Contractor.

5. At project completion, remove all facilities, demobilize the staging area and haul routes, and reclaim to preexisting conditions. The subcontractor is responsible for any damage to on-property roads.

1.5 Temporary Facility Requirements

- A. The subcontractor shall adequately prepare all surfaces for utility and facility installation and provide adequate stability and durability for the duration of this subcontract.
- B. The subcontractor shall consider the efficient use of space available at the project site and schedule material deliveries, equipment use, and other activities to minimize storage and field facility requirements. The subcontractor may locate, arrange, and lay out the facilities to best suit an efficient operation in coordination with the Contractor's current operations.
- C. All facilities and utilities shall be designed and installed to allow uninterrupted service during all seasons.
- D. The subcontractor shall not conduct operations during periods of darkness.
- E. Field Office Trailer(s)
 1. The subcontractor has the option to furnish and install one or more temporary office trailer(s) of suitable sizes for subcontractor personnel.
 2. Trailers shall be installed in accordance with local and national building codes and properly anchored.
 3. Submit type of trailer, tool storage, location where each will be installed, method(s) for anchoring, and methods for connecting any utilities to the trailer.

1.6 Project Information

- A. The subcontractor shall provide the following information in a 3-ring binder and maintain at the site for full access by all employees.
 1. A list containing the following telephone numbers:
 - 911 or other local emergency telephone numbers
 - Location of nearest telephone

- U.S. Department of Energy (DOE), Office of Legacy Management Security 24-hour telephone number (970) 248-6070.
 - Contractor Contract Administrator name and telephone number (supplied by Contractor)
 - Contractor Construction Manager name and telephone number (supplied by Contractor)
 - Subcontractor name and main office telephone number, the name of the competent person in charge of the project, and the local telephone number
- a. Hospital/emergency route map with written instructions and the route highlighted (supplied by Contractor).
 - b. Federal Labor Law Postings (provided by Contractor):
 - Equal Employment Opportunity poster
 - Occupational Safety and Health Administration (OSHA) poster
 - Family Medical Leave Act
 - Federal minimum wage
 - Employee Polygraph Protection Act
 - USERRA poster
 - c. Davis-Bacon wages per U.S. Department of Labor Wage Decision.
 - d. DOE Poster—Contractor Employee Occupational or Health Complaint form (provided by Contractor).
 - e. State Minimum Wage Poster (provided by Contractor)
 - f. Notice to employees working on government contracts (provided by the Contractor).
 - g. Rights under Worker’s Compensation (provided by the Contractor).
 - h. Unemployment for Ohio (provided by the Contractor).
 - i. 10 CFR 851 Poster (provided by the Contractor).
- B. The subcontractor shall repair and maintain signs throughout the duration of the project.

1.7 Access Control Barriers

Install access-control barriers at the three locations as shown on Sht. 2 of the drawings. Barriers shall be used to restrict, or reduce access by unauthorized personnel into the project work area.

Barriers shall, at a minimum:

1. Be 4 ft in height.
2. One steel T-posts set each side of road.

3. High visibility rope stretching between both posts across road.
4. “Caution: Construction Area” signs shall be placed on the rope.

1.8 Temporary Utilities

A. Water and Sewer

Provide sanitation facilities and drinking water in accordance with Section 01020: Construction Health and Safety, Article 3.7.

B. Telephone/Radio Service

1. The subcontractor shall use subcontractor provided cell phones for emergency use and communications. Communications must be maintained for emergencies between subcontractor field personnel working at all points on the project and supervisory personnel.
2. If the subcontractor elects to use two-way radios for communication between field personnel and supervisory personnel for emergency use, two radios shall be supplied by the subcontractor for the Contractor’s use.

C. Electric Service

If the subcontractor elects to use generators to supply temporary electrical power for facilities, the generators shall be of adequate power to operate the facilities and equipment specified in this section. The generators shall be quiet and not produce noise levels above 85 dBA as defined in 29 CFR 1910.95, Appendix A.

1.9 Weather Protection

The subcontractor shall be briefed by Contractor to site emergency management procedures.

1.10 Trash and Debris Control

The subcontractor shall provide and maintain trash receptacles at all times during the execution of this subcontract. The subcontractor shall inspect the work site daily and remove trash/debris that has accumulated daily and properly dispose of it in a subcontractor provided receptacle.

1.11 Delivery and Storage of Construction Materials

- A. The subcontractor shall schedule deliveries and unloading to the staging area in a manner that will prevent congestion, blocking of access to the project site, or interference with the work in progress by both the Contractor and subcontractor.
- B. The subcontractor shall provide for continuity of supply and shall avoid any change of supplier or manufacturer or change in brands of material during work.
- C. The subcontractor shall deliver packaged materials to the site in the manufacturer’s original, unopened, labeled containers. Containers shall not be opened until the approximate time of use or as agreed to by the Contractor for the purposes of inspecting and testing.

1.12 Temporary Facilities Maintenance and Removal

- A. Maintain temporary facilities and controls as long as needed for safe and proper completion of the project.
- B. Remove temporary facilities and controls as soon as the progress of the project permits or as directed by the Contractor in accordance with Article 1.13D of this section.

1.13 Mobilization/Demobilization

- A. The subcontractor shall furnish, install, and construct facilities and mobilize all construction equipment, materials, supplies, and incidentals so they are ready to commence and perform the work.
- B. The subcontractor shall assemble and deliver to the project site any equipment, materials, and supplies necessary for the performance of the work, but which are not intended to be incorporated in the work; provide for preparation of the subcontractor's work area; complete assembly, in safe working order, of equipment necessary to perform the required work; provide for personnel services required prior to commencing actual work; and provide all other preparatory work required to permit commencement of the actual work. A representative of the Contractor shall be present whenever unloading/loading heavy equipment and materials at the work area; this includes deliveries by lower-tier subcontractors and equipment vendors.
- C. The subcontractor shall demobilize from the site all construction equipment, materials, supplies, and appurtenances upon completion of the work.
- D. The subcontractor shall maintain, operate, and subsequently remove and dispose of construction facilities as required by the Contractor, clean the site, and regrade as necessary to restore to preconstruction grades indicated by existing contours on the drawings. At completion of this subcontract, all remaining temporary facilities and utilities installed under this subcontract shall be dismantled, demolished, removed, or otherwise disposed as appropriate and removed from the project site. Any buried temporary utilities shall be removed and not abandoned in place. At project completion, demobilize the subcontractor's staging areas and reclaim areas installed under this subcontract. Regrade areas to match existing contours and promote drainage without erosion.

1.14 General Equipment Requirements

- A. Fuel, fluids, lubricants, maintenance, parts, and repairs required for the safe, efficient operation of the specified equipment complying with manufacturer specifications shall be provided by the subcontractor. Inoperable equipment shall be repaired or replaced within 1 workday.
- B. Equipment List/Operators
Prior to commencing the applicable work, the subcontractor shall submit a list of equipment that will be used on the project. The list shall include the types of equipment, size/model, equipment rental rates, and whether owned or rented. The subcontractor shall demonstrate that all equipment operators are proficient with each

piece of equipment they will be operating either through experience (resume, letter from subcontractor) or on-site demonstration.

- C. All equipment shall be delivered clean and free of oil, fuel, and fluid leaks, and shall be maintained in a manner to avoid any leaks. If the subcontractor spills any hydrocarbon-based fluid, antifreeze, or other material, the subcontractor shall immediately notify the Contractor and control in accordance with Section 01200: Environmental Compliance, Article 3.2C. If a piece of equipment is leaking, the equipment shall be “red-tagged” (taken out of service), diapered to prevent ground surface contamination, and repairs made at the subcontractor’s expense.
- D. Tools and Equipment: It is the subcontractor’s responsibility to ensure that equipment is OSHA compliant and meets manufactures operating specifications, parameters, and includes all safety appurtenances prior to mobilization to the site. The Contractor shall inspect tools and equipment mobilized to the site for obvious defects and for OSHA compliance. Heavy equipment and vehicles shall have the correct type of fire extinguisher. All heavy equipment shall not be over 10 years old from date of manufacture unless approved by the Contractor before mobilizing to the site. Tools and equipment that do not conform to OSHA regulations, or heavy equipment and vehicles that have obvious fuel, oil, hydraulic, coolant, etc. leaks, will not be allowed on the site. All power operated tools and equipment shall be operated and used only per manufacturer’s recommendations and in the manner for which it is manufactured and designed.
- E. Equipment Fueling: On-site equipment fueling shall comply with Title 29 *Code of Federal Regulations* (CFR) Part 1926.152 and Part 1910.106 “Flammable and Combustible Liquids,” to include an electrical interconnection (bonded) between the fuel truck and the equipment/vehicle being fueled and a correct type of fire extinguisher, charged and inspected. The fuel truck operator is bound by all requirements of this subcontract and will require an Initial Site Briefing and orientation the first time the equipment requires fueling. If on-site fueling of any kind is required, to include heavy equipment, generators, gas powered tools, etc., the subcontractor shall submit the attached Contractor’s Fueling Plan (form LMS 2623CON). Equipment fueling shall be conducted at the Contractor’s direction and will take place during the work hours specified in Article 3.3 of Section 01010: Statement of Work. If equipment fueling is conducted with individual fuel cans, the cans shall comply with 29 CFR 1926.152 and 1910.106, and shall be steel cans with pour spouts, spark/flame-arresting devices, and snap-close lids that cannot be locked back.
- F. Forklift: If the subcontractor elects to use a powered industrial truck (e.g., forklift, telehandler) during the performance of work under this subcontract, the subcontractor shall provide, in writing, certification of training and qualification for each subcontractor employee who may operate the powered industrial truck. The certification shall document that the employee has successfully completed training as required by 29 CFR 1910.178 (OSHA, Powered Industrial Trucks).

Part 2—Products

(Not Used)

Part 3—Execution

(Not Used)

End of Section 01500

U.S. Department of Energy Office of Legacy Management

Site: _____ Project: _____

Fueling Plan

- On-site equipment fueling shall comply with Title 29 OSHA *Code of Federal Regulations* Part 1926.152 and Part 1910.106, "Flammable and Combustible Liquids."
- Fuel can be provided by direct fueling of equipment from fuel tanks located in the rear of the subcontractor's pickup trucks.
- Fuel may be stored in portable tanks on site with approval of the Contractor representative.
- Fuel can also be provided by a fuel service provider.

Name of provider: _____

The fuel truck operator will receive an Initial Site Briefing and orientation the first time the fuel truck arrives on site and a safety briefing each time thereafter.

- Equipment fueling shall be conducted with the Contractor representative's approval and will take place during work hours.
- If practical do not do fueling in a radiologically contaminated area.
- Fueling operations shall be attended at all times.
- Turn off all engines and allow equipment to cool before fueling.
- Fueling equipment shall be kept in a safe working condition per manufacture's specifications.
- Inspect all hoses and equipment for leaks and repair/replace if necessary prior to any fueling operation.
- Bond (electrically interconnect) fuel tanks during fuel transfer activity.
- A fire extinguisher of appropriate type and size, properly charged and inspected, and other appropriate firefighting equipment shall be placed within easy reach of the fueling operation, but where it will be safe from a fire.
- No smoking, open flames, electrical tools, etc., shall be used within 100 feet during fueling operations.
- A face shield with safety glasses and fuel-resistant gloves shall be worn during fueling operations.
- Nylon clothing shall not be worn when handling petroleum due to static charge.
- Do not re-enter the vehicle or equipment during fueling.
- Ensure that tanks and containers being stored on site are grounded.
- To avoid fuel spills and exposure to fuel vapors, do not overfill or top off tanks.
- If practical, use a plastic tub or other secondary containment, such as a drop cloth, to contain spills when fueling.
- A spill kit and sorbent material shall be at the location of fueling operations in case of spills.
- Material Safety Data Sheets shall be available on site during fueling operations.
- Individual fuel cans shall be steel cans with pour spouts, spark/flame-arresting devices, and snap-close lids that cannot be locked back. Close and remove fuel container from work area when not in use, store in appropriate area.
- Minimize volume of fuel onsite to job requirements.
- If fuel spill or leak occurs: Stop leak, warn others in area, and prevent from spreading or contaminating the ground surface or water. See Contractor for cleanup and proper disposal of affected materials in accordance with applicable regulations.

On-site fueling is required. Subcontractor concurs with the Fueling Plan. Yes No
All fueling will be conducted offsite. Yes No
No fueling will be required. Yes No

Print Name Signature Date

Section 02100: Sediment and Erosion Control

(Rev-1)

Part 1—General

1.1 Scope

Work under this section includes the work necessary for the installation of any structures and measures for the prevention and control of soil erosion and sedimentation. The subcontractor shall furnish all material, labor and equipment necessary for the proper installation, maintenance, inspection, and subsequent removal of sediment and erosion control measures.

1.2 Related Work

- A. Section 02200—Earthwork
- B. Section 02205—Regrade, Fabric & Plant Bank Treatment
- C. Section 02215—Soil Encapsulated Lifts
- D. Section 02275—Rock Toe Bank Treatment
- E. Section 02934—Rock Cross Vane

1.3 Submittal

- A. Submittals shall be made in accordance with Section 01300: Submittals.
- B. Submittals shall be made for proposed substitutions.
- C. Submittals shall be made as required on the Project Submittal List, Table 01300-1.
- D. Seven (7) calendar days prior to commencement of work, the subcontractor shall submit an Erosion and Sediment Control Plan (ESC Plan) in writing and receive written approval of the Plan from the Contractor. A copy of the approved ESC Plan shall be on site at all times during construction. The Plan shall meet the substantive requirements of Section 402 of the Clean Water Act. Construction shall not commence until the Plan, schedule of work and methods of operations have been reviewed and approved by the Contractor.
- E. Seven (7) calendar days prior to commencement of work in the stream bed, the subcontractor shall submit construction plans for construction of the coffer dam and diversion channel meeting the requirements of Article 1.4C. Approval of the plan by the Contractor does not relieve the subcontractor of liability in assuring that the work is adequately protected from storm runoff.
- F. Seven (7) calendar days prior to commencement of work, the subcontractor shall submit for approval, product data for any manufactured sediment and erosion controls proposed in the ESC Plan.

1.4 Requirement

- A. Runoff from all disturbed areas and sediment-laden water from trenching, boring or excavation must be routed through an approved erosion control structure or sediment

trapping device, prior to discharge from the construction area and prior to entering a receiving stream or other water body.

- B. Acceptable sediment trapping devices include, but are not limited to silt fence, filter sock, diversion berms and swales, inlet protection, check dams, silt basins, silt traps, stabilized construction entrances, and vegetative cover.
-
- C. A temporary coffer dam and low flow diversion channel shall be used when construction activity is required within the stream. Subcontractor shall prepare a plan for the coffer dam and channel that meets the requirements as specified on the drawings. Alignment of the temporary diversion swale may be altered based on the subcontractor's work sequence. The coffer dam must be constructed at the approximate location shown on the final design plans to protect the stream work area and the low flow channel to a minimum depth of 3 feet. All material stockpiles shall be located away from streams, ponds, swales, and catch basins. Soil stockpiles shall be seeded, mulched and contained through the use of silt fence. Temporary seeding of stockpiles should occur if the stockpile is not in use for more than seven consecutive days. **The coffer dam and channel shall not be removed until the work has been accepted by the Contractor. Upon contractor approval, remove the coffer dam and backfill and regrade the channel to pre-construction conditions and grades.**
- D. Temporary construction entrances, such as rock ingress/egress, must be used at any access point where construction traffic will enter onto public roadways or streets. These are used to reduce silt and mud tracking onto pavement. Construction entrances must be kept in good condition and may require cleaning, additional rock, timber mats, or replacement liner materials. Any mud and silt tracked onto public roads must be removed immediately. **Temporary construction entrances shall be removed and restored upon project completion.**
- E. Erosion and sediment controls shall be removed at the completion of construction, as required by the Contractor.

Rev-1

Part 2—Products

2.1 Materials

- A. Materials for use in erosion and sedimentation control devices shall be in accordance with Ohio Department of Natural Resources Rainwater and Land Development Manual (Third Edition, 2006).
- B. Acceptable sediment control materials include, but are not limited to, silt fence, erosion control blanket, seed and straw, rock dams, etc. The sediment control methods and materials shall be approved, in writing by the Contractor, prior to commencement of work. **Erosion blankets shall be 100% biodegradable.**
-

Part 3—Execution

3.1 Installation and Maintenance

- A. Erosion and sedimentation control devices shall be installed prior to any clearing, grubbing, or ground disturbing activities occurring on site.
- B. Erosion and sediment control measures shall be applied to all disturbed areas. In addition, subcontractor shall identify all site access, staging and stockpile areas and apply appropriate erosion and sediment control measures.
- C. During the course of construction, the subcontractor shall conduct his operation in such a manner as to prevent damage to the stream from pollution by debris, sediment or any other foreign material, or from the operation of equipment or materials in or near the stream. The subcontractor shall protect all exposed slopes from erosion during construction.
- D. The subcontractor shall furnish the labor, materials and equipment required for routine maintenance of all erosion and sedimentation control devices. Maintenance shall include but not be limited to:
 - 1. The removal and disposal of accumulated sediment from erosion and sediment control devices, and
 - 2. The replacement of silt fence or stone used in temporary sediment traps, filters, construction access, etc.

3.2 Inspections and Maintenance

- A. Erosion and Sediment Control devices shall be inspected daily and following each rainfall event greater than ½ inch or more of precipitation during a 24-hour period. During inspection, the subcontractor shall check for areas where runoff has breached, bypassed, or otherwise caused the device to fail or compromise its function. If a device becomes ineffective due to weathering, decomposition or damage, then the subcontractor shall replace the affected section immediately. **Notify Contractor when inspection is planned.**
- B. Accumulated sediment must be removed when it reaches approximately 1/3 of the height of a silt fence or check dam.
- C. The subcontractor shall take immediate action to correct deficiencies to erosion and sediment control devices. The Contractor reserves the right to stop all construction activities, until such deficiencies are repaired.
- D. In areas that have been permanently stabilized, inspections and maintenance by the subcontractor will occur at least once per month for the duration of the contract or project, whichever is longer.
- ~~D~~.E. **Increased water turbidity in Paddys Run shall be minimized. Turbid water from construction areas will not be pumped directly into Paddys Run, but rather redirected over land. Turbidity will be observed by the Contractor at a point 200 feet downstream of the project area. Immediate action will be required if increased turbidity is observed.**

Rev-1

3.3 Removal of Temporary Sediment Control Structures

- A. At such time that temporary erosion and sediment control structures are no longer required under this item, the subcontractor shall notify the Contractor of their intent, schedule for the removal of the temporary structures, and obtain the Contractor's approval in writing prior to removal.
 - B. Once the subcontractor has received written approval from the Contractor, the subcontractor shall remove the temporary structures and all accumulated sediments.

 - C. Final permanent stabilization will include finished grading **and permanent seeding** per plan contours or the Contractor's approval.
-

Rev-1

End of Section 02100

Section 02200: Earthwork

(Rev-1)

Part 1—General

1.1 Scope

Work under this section includes the excavating, handling and placing earth of acceptable quality above or below the natural ground, existing stream channel fill, or other surface.

1.2 Related Work

- A. Section 02205—Regrade, Fabric & Plant Bank Treatment
- B. Section 02100—Sediment and Erosion Control
- C. Section 02215—Soil Encapsulated Lifts
- D. Section 02275—Rock Toe Bank Treatment

1.3 Submittal

- A. Submittals shall be made in accordance with Section 01300: Submittals.
- B. Submittals shall be made for proposed substitutions.
- C. Submittals shall be made as required on the Project Submittal List, Table 01300-1.
- D. Submit the name and address of the independent testing laboratory 5 days prior to utilization of services. Include qualifications and certifications of both laboratory or field personnel to provide the testing required in this section and showing conformance with Article 7 of this section.
- E. Subcontractor shall submit all documentation associated with a radioactive source(s), such as nuclear density instruments 5 days prior bringing the source onto the job site per Article 1.8 of this section.
- F. Subcontractor shall submit to Contractor material sources and analyses for salvaged excavation material 5 days prior to use of the material as common borrow backfill per Article 2.1C. Analyses for all backfill materials shall indicate compliance with these specifications.
- G. Subcontractor shall submit to Contractor material sources and analyses for imported common borrow material 5 days prior to delivery of the material to the site per Article 2.1C. Analyses for all imported backfill materials shall indicate compliance with these specifications.
- H. Subcontractor shall submit to Contractor material sources and analyses for imported topsoil material 5 days prior to delivery of the material to the site per Article 2.1D. Analyses for all imported backfill materials shall indicate compliance with these specifications.
- I. Soil Compaction Test Reports
 - 1. Subcontractor shall submit to Contractor the soil compaction test reports indicating test results from the testing laboratory in accordance with Article 3.6

1.7 Soils Testing Laboratory

Subcontractor shall provide results of compaction tests as indicated on the drawings or as required within other related sections of these specifications. The lack of required testing does not relieve subcontractor of responsibility to install materials as specified herein. Contractor may have additional testing performed at its discretion. The cost of re-work associated with tests not meeting these specifications will become the responsibility of subcontractor.

Testing Laboratory

- A. All soils tests shall be performed by an independent testing laboratory accepted by Contractor and shall meet the requirements of ASTM E 329 with respect to soil and rock.
- B. Subcontractor shall provide personal qualifications of field testing personnel prior to performing field quality assurance activities.
- C. The testing laboratory provided by subcontractor shall be responsible for taking soil samples and performing moisture-density, gradation, and other tests to ascertain that the completed work is in compliance with these specifications. The testing laboratory shall conduct density and other tests on the fill material as specified.

1.8 Radioactive Sources

- A. The subcontractor shall prepare and submit a “Request to Bring Radioactive Sources onto a LM-Controlled Site” (Form LMS 2038) which shall be submitted with documentation. The form is located at the end of this section. The documentation shall include:
 - 1. Company name and phone number.
 - 2. Responsible individual’s name and qualifications (including certifications).
 - 3. Isotope and activity.
 - 4. Instrument (equipment) identification number (if it contains a source).
 - 5. Classification (i.e., sealed or unsealed).
 - 6. Copy of the current source integrity test data (within 6 months).
 - 7. Intended use of the source on the LM-controlled site.
 - 8. Expected duration of use of the source on the LM-controlled site.
 - 9. Source Identification (serial) number and description.
 - 10. Nuclear Regulatory Commission license.

1.9 Earthwork Definitions

- A. Excavation: Excavation is defined as material removal to reach the lines, grades, and depths shown on the drawings or determined by Contractor.
- B. Intrusive Work: Intrusive work is defined as any work that breaks the existing ground surface. This shall include machine and or hand excavation, any scarifying work to any depth, and any demolition work. Ground surface shall include native soils and hard surfaces such as asphalt or concrete.
- C. Salvaged Excavation Materials: Salvaged excavation materials include onsite soil or rock materials from designated areas of the job site that are suitable as common borrow, fine aggregate or sand that are not otherwise classified as unsatisfactory fill material in accordance with Article 1.9E of this section. Acceptable native materials shall not have rocks greater than 6 inches in diameter.
- D. Overexcavation: Overexcavation is defined as excavation of any type of material in excess of the lines, grades, or depths indicated on the drawings.
- E. Unsatisfactory Fill Materials: Unsatisfactory materials for fills or backfills include, but are not limited to: 1) those materials containing roots and other organic matter, trash, debris, frozen materials; and 2) materials that do not meet the specifications of this section. Materials that are unsuitable due to excessive moisture or incorrect gradation shall be reclaimed by screening, manipulation, aerating, or blending with other suitable materials. Should native material not be considered satisfactory, it will be considered a differing site condition and handled under that clause of the Terms and Conditions for Construction Subcontracts.
- F. Percent Maximum Density and Moisture Content: Percent maximum density and moisture content is a percentage of the maximum density at optimum moisture obtained by the specified test procedure (example: ASTM D 698).
- G. Hard Material: Weathered rock, cemented deposits, or conglomeratic materials not defined as “rock” but which usually require the use of heavy excavation equipment, ripper teeth, or jack hammers for removal. Hard material is characterized by the ability to be loosened or broken down by ripping in a single pass with a current-model, tractor-mounted, hydraulic ripper equipped with one digging point of standard manufacturer’s design, adequately sized for use with, and propelled by, a crawler-type tractor rated at 500 net flywheel horsepower (minimum), operating in low gear.
- H. Rock: Solid, homogeneous, interlocking, crystalline material, with firmly cemented, laminated or foliated masses, or conglomerate deposits, neither of which can be removed without systematic drilling and blasting, drilling and using expansion jacks or feather wedges, or using backhoe-mounted, pneumatic hole-punchers or rock-breakers. “Hard material” will not be considered rock because of intermittent drilling and blasting that is performed merely to increase production. Boulders of any size in non-bedrock formations will not be considered rock.

- I. Topsoil: Soil formed within 6 inches deep of the ground surface and in which organic matter accumulates, free of admixed subsoil, foreign matter, toxic substances, and substances that may be harmful to plant growth.
- J. Stockpile Construction: Stockpile construction is defined as construction of a stable fill that will serve as a temporary storage stockpile.
- K. Subgrade Preparation: Subgrade preparation includes scarifying, grading, and compacting existing ground upon which additional materials other than topsoil will be placed.
- L. Clearing: The felling of all designated trees and other vegetation within the defined limits by cutting not higher than two feet above ground level and removal of all artificial constructions including rubbish, fences, and existing buildings.
- M. Grubbing: The removal from the ground of trees stumps and roots greater than 0.5 inch diameter to the required depth below existing ground surface.

1.10 Sequencing and Scheduling

- A. Subcontractor shall obtain the following clearances from Contractor at the following indicated HOLD POINTS before proceeding:
 - 1. Field Measurements - Before commencing work, locate all baselines required for control of the work and establish required grade staking for control of excavation and embankment construction.
 - 2. Authorization for intrusive work - Before commencing any intrusive work, Contractor shall verify that all control layout have been completed.
 - 3. Erosion control measures - Before any excavation or backfilling occurs, or other land disturbance, Contractor shall verify that all erosion control measures are in place.
 - 4. Authorization for overexcavation - Before beginning overexcavation.
 - 5. Investigation of rock or suspected rock encountered in excavation - Before continuing with excavation.
 - 6. Approval of prepared subgrades, including keying and benching - Before placing fill on the subgrade surface.
 - 7. Approval of filled surface - Before covering the surface with the next soil lift, a different fill type, or other material that buries or conceals the surface. Contractor shall review compaction test results and as-built grade information.

Part 2—Products

2.1 Backfill Materials

- A. Do not use unsatisfactory fill material for any backfill.
- B. Obtain common borrow fill materials from excavated areas at the site. In the event that on-site materials do not naturally meet specified requirements for common

borrow fill material, subcontractor shall import conforming common borrow fill materials or process onsite materials to meet specification requirements.

- C. Do not obtain common borrow fill from anywhere on the site, except from required excavation without Contractor's written approval. Borrow areas shall be smooth-graded after borrow areas are completed.
- D. Common borrow, either from on site or imported for use as fill, shall not contain rocks greater than 6 inches on any plane. Common borrow shall classify as SC, SM, SC-SM, in accordance with ASTM D 2487.
- E. Imported Topsoil shall contain sufficient organic matter (at least 3% by weight of fibrous organic material) well-suited for growing vegetation in the topmost layer of fill. Material shall contain loose friable loam, free of heavy clay, refuse, stumps and large roots, rocks over two (2) inches in diameter, brush, weeds and weed seeds, or other material which would be detrimental to the proper development of vegetative growth.

2.2 Common Borrow Fill

Suitable soil material excavated from the new stream channel, and approved by the Contractor, shall be stockpiled and used as common borrow fill for the existing channel, backfilling, and bank restoration.

Part 3—Execution

3.1 General

- A. Prior to beginning excavation or demolition work in an area, subcontractor shall construct temporary site drainage facilities as needed to control surface runoff and initiate dust control measures as required in Section 01200: Environmental Compliance and Section 02100: Sediment and Erosion Control of these specifications.
- B. Excavate to the contours, elevations, and dimensions indicated on the drawings.
- C. Reuse excavated materials that meet the specified requirements for fill materials to be used in the work.
- D. Keep excavations free from water. Management of groundwater and storm water encountered in excavations shall be the responsibility of subcontractor. When groundwater is encountered, notify Contractor and allow Contractor access to gather groundwater data as needed. Remove standing water in excavation and backfill areas by pumping or by any other Contractor-accepted method for removing standing water. Water may be discharged to surface provided positive drainage away from the excavation occurs. Turbidity into receiving streams shall be minimized pursuant to specification Section 02100.
- E. Notify Contractor at once of springs, seeps, or wet zones found in excavations.
- F. Excavations and excavated materials shall follow current Occupational Safety and Health Administration (OSHA) requirements. Shoring, overexcavation, or other

work may be required to comply with OSHA safety and health requirements. Cost for complying with OSHA requirements shall be incidental to subcontractor's work.

- G. Overexcavate unsuitable materials, such as frozen soil, soil disturbed or weakened by subcontractor operations, or soil made unsuitable for subsequent construction by exposure to weather at no extra cost to Contractor.
 - 1. Unless specified otherwise, backfill overexcavated areas and other areas cut beyond the indicated lines and grades with fill of the type indicated for adjoining earthwork. Place and compact the backfill as specified for the fill type used.
 - 2. Backfill overexcavation made without Contractor authorization and overexcavation resulting from subcontractor operations or weather exposure, at no extra cost to Contractor.
- H. Storage and Disposal: Dispose of unsatisfactory materials and surplus material from excavations in Contractor-designated waste areas located at the North Triangle Area as shown on Sht. 1 of the drawings.
 - 1. Construct and operate surplus-material storage areas and waste areas as stockpiles.
 - 2. Do not store or dispose of excavated material in a manner that obstructs the flow of any stream, ditch, or drainageway, except in the case of sediment control areas; endangers partly finished work; or impairs the efficiency or appearance of a structure or facility or is detrimental to the completed work.

3.2 Protection of Sensitive Areas

- A. Cultural sites, wetlands, and other sensitive areas shall be protected as required. The Subcontractor shall be responsible for locating, flagging, marking and erecting protective fencing and signs as necessary to clearly identify areas to be protected, as shown on the Final Design Plans. Proceed with site clearing and grading work in the protected areas only after the cultural sites and other areas of concern have been removed or mitigated in accordance with all applicable regulations. Subcontractor shall not encroach into any area designated to be preserved.
- B. If any additional cultural sites, other areas of concern, or evidence of threatened or endangered species are encountered, Subcontractor shall immediately stop work in the area and notify the Contractor.
- C. Areas of trees and other vegetation that are to be saved (including trees within and outside of the indicated limits of clearing) will be identified by the Contractor prior to the start of work. The Subcontractor shall protect these areas from damage by placement of bright orange barrier fencing, or other suitable protective measures, to the dripline of any tree shown on the Final Design Plans. Subcontractor assumes responsibility for "in kind" replacement of anything damaged within the protected areas. The subcontractor shall make every reasonable effort to minimize impacts to flora and fauna.
- D. Initial erosion and sediment control measures (including sediment barriers) shall be installed prior to commencement of site clearing work.

3.3 Preparation and Layout

- A. Subcontractor shall establish extent of excavated areas by area and elevation.
- B. Subcontractor shall designate and identify data elevation.
- C. Subcontractor shall set specified lines and levels.
- D. Subcontractor shall maintain bench marks, monuments and other reference points.

3.4 Topographic Survey (not used)

Refer to Section 01050: Field Engineering for survey requirements.

3.5 Site Preparation

3.5.1 Existing Structures and Utilities

Site clearing shall be performed in a manner that does not disturb existing structures, utilities, monitoring wells, or other facilities not indicated to be removed.

3.5.2 Clearing and Grubbing

Selectively clear and grub existing trees, brush, logs, shrubs, all other vegetation, and all obstructions and rubbish within the limits indicated on the Final Design Plans. Remove logs and downed timber resting on or protruding from the ground surface. Branches and any excess trunk material shall be disposed of in a manner approved by Contractor. The depth of grubbing below existing ground surface shall be determined based on the existing conditions and in accordance with the definition for grubbing. The access roads along the edge of the project work area will be cleared and grubbed without removing topsoil in order to allow for revegetation at the completion of the project.

3.5.3 Topsoil Removal

- A. Excavate and remove topsoil from within the limits defined on the Final Design Plans. All grass, root fiber, decayed vegetative matter and any other organic or deleterious material shall be removed such that a sound surface which provides a stable base for construction is exposed.
- B. Stripped topsoil shall be stockpiled. Apply temporary Interim Seed Mix on and around stockpile.
- C. Stockpile excess topsoil in locations directed by the Contractor which are clear of any temporary or permanent construction. Stockpiles shall be maintained in a neat, well-shaped state capable of shedding water.
- D. Apply temporary seeding on and install silt fence or approved erosion control measures around the stockpiles.
- E. Under no circumstances shall topsoil be removed from the Site without the written consent of the Contractor

3.5.4 Backfilling of Depressions

Large depressions resulting from grubbing operations such as removal of deep root masses of mature trees shall be backfilled with compacted soil fill.

3.6 Excavation

- A. Subcontractor shall excavate subsoil in accordance with lines and levels established for the work, including adequate space to allow installation of materials and inspection.
- B. Subcontractor shall perform additional excavation only by Contractor's written authorization.
- C. Unsuitable material as defined in Article 1.8E of these specifications and that does not meet the requirements of Common Borrow material as defined in Article 2.1C shall be disposed of northeast of the On Site Disposal Facility (OSDF) at the North Triangle Area as shown on Sht. 1 of the drawings. Surplus excavated material shall be disposed of in the same manner.
- D. Subcontractor shall place common borrow backfill in one foot layers to not exceed a compaction of 250 psi.
- E. Compaction must be measured and corrected at the following stages:
 - 1. Each lift of common borrow backfill.
 - 2. Once in the subsoil before application of topsoil.
 - 3. In the topsoil itself after application of the full twelve (12) inches.
- F. Measure compaction with a soil compaction tester, to a depth of twelve (12) inches. One sample should be taken per four hundred (400) square feet.
- G. If readings of final grades average greater than 250 psi, the soil must be ripped, disced, or otherwise loosened to a depth of at least twelve (12) inches until compaction readings average below 250 psi to provide proper conditions for plant root growth.
- H. Minimize compaction during all operations by utilizing equipment having low unit pressure ground contact and by limiting repeat passes over the same areas.

3.7 Earthwork Finish Grading

- A. General Finish Grading
 - 1. Uniformly smooth-grade earthwork, including excavated and filled sections and adjacent transition areas.
 - 2. Make finished surfaces reasonably smooth, compacted, and free from irregular surface changes. The degree of finish shall be that ordinarily obtainable from blade-grader operations.
 - 3. Finish ditches and swales to permit adequate drainage.
- B. Finish Tolerances: Conform to the indicated grades and cross-sections within ± 0.1 foot vertically and horizontally.

3.8 Placing of Topsoil

- A. All proposed planted areas, including stream banks, are to be covered with a minimum of twelve (12) inches of topsoil prior to seeding or planting. Do not place topsoil within the stream channel.
- B. Topsoil shall be evenly placed and spread over the graded area to a depth of 12 inches.
- C. Minimize compaction during all operations by utilizing equipment having low unit pressure ground contact and by limiting repeat passes over the same areas.

3.9 Watering for Moisture Control

- A. Watering for moisture control during compaction and dust suppression shall consist of furnishing equipment, accessories, and incidentals necessary to apply water.
- B. Water for compacting common borrow material shall be applied by means that ensures a uniform application.
- C. All equipment used for the application of water shall be equipped with a positive means of shutoff.
- D. Water shall be free of oils, acids, alkalis, salts, or any substance injurious to human, animal, or plant life. Imported water sources are considered as a proposed material substitution and shall be reviewed for acceptance by Contractor prior to use on the Project.
- E. Subcontractor shall not use surfactants with water unless approved in writing by Contractor.

3.10 Field Quality Control

- A. General: Subcontractor shall conduct compaction measurements in the presence of the Contractor. Subcontractor may choose to conduct additional testing as needed to meet the requirements of these specifications at no additional cost to Contractor.
- B. Observation by Contractor: Do not perform earthwork unless Contractor is onsite and aware of work being performed.
- C. Sampling: Take the number and size of samples required to perform the specified measurements.
- D. Testing by Contractor: Contractor may observe field testing of earthwork, collect samples, and conduct tests at Contractor's sole discretion. Cooperate with Contractor during observation, sampling, and testing. Shut down or modify operations as needed to maintain safe and convenient working conditions.

3.11 Soil and Debris Management at the Fernald Preserve

- A. The Fernald Site has been remediated pursuant to CERCLA. The Record of Decision (ROD) for Operable Unit 5 (environmental media including soil) established final remediation levels for the site that are protective of human health and the environment, based on final land use as an undeveloped park. The OU5 ROD designates the site as restricted use, and requires an Institutional Control Plan that prohibits residential and agricultural activities and unauthorized use of the site. The Fernald Preserve Legacy Management and Institutional Controls Plan establishes site

institutional controls to ensure remedy protection. Excavated soil must remain on property. Therefore, the subcontractor shall relocate all soils that are not re-used as backfill to an on-property staging area. The Contractor has designated an area northeast of the OSDF at the North Triangle Area; see Sht. 1 of the drawings for location. This will be the area to store unused soils materials including gravel and other sub-surface materials disturbed during excavation, construction or maintenance activities. All equipment and tools used by the subcontractor when performing subsurface work shall have any clinging or attached soil material removed prior to demobilizing from the Fernald Preserve.

- B. Additionally, when construction or maintenance activities require subsurface work there is a possibility that debris (i.e., metal, bricks) may be unearthed during excavation, activities. If debris material is found during any excavation/earth moving activity, the subcontractor shall notify the Contractor immediately so that the material can be inspected and removed to a designated area as directed by the Contractor. Subcontractor personnel shall be briefed to the Fernald Procedure for Suspect Material or Debris Discoveries (LMS/FER/S02767-3.0). A Radiological Control Technician will be available to investigate debris or other suspect material discoveries. Should debris be encountered that requires assessment and/or special handling and relocation, above and beyond the Fernald Site Suspect Debris Management Procedure, it will be considered a differing site condition and handled under that clause of the Terms and Conditions for *Construction Subcontracts*.

End of Section 02200

Request To Bring Radioactive Sources Onto an LM-Controlled Site

Company Information

Company Name _____ Telephone _____

Responsible Individual's Name _____

Source Description

Isotope _____ Activity _____

Instrument (equipment) Identification Number (if it contains a source) _____

Classification ~ Accountable ~ Nonaccountable **Type** ~ Sealed ~ Unsealed

A Source Integrity Test was performed _____ (Attach a copy of test to this form; test should be current within the last 6 months)

Intended use of the source on the LM-controlled site

Expected duration of use of the source on the LM-controlled site

Requester _____ Date _____
(print and sign name)

To Be Completed by the Radiation Protection Group	
Permission is given to bring the source on site	~ Yes ~ No
Restrictions or requirements:	
Radiological Control Manager _____	Date _____
(print and sign name)	

File Index No. _____

Section 02203: Geotextiles

Part 1—General

1.1 Scope

The Subcontractor shall furnish and install all geotextile, including necessary labor, equipment, and incidentals required to complete the installation in accordance with the drawings.

1.2 Related Work

- A. Section 02200—Earthwork
- B. Section 02215—Soil Encapsulated Lifts
- C. Section 02275—Rock Toe Bank Treatment
- D. Section 02934—Rock Cross Vane

1.3 Submittals

- A. Submittals shall be made in accordance with Section 01300: Submittals.
- B. Submittals shall be made for proposed substitutions.
- C. Submittals shall be made as required on the Project Submittal List, Table 01300-1.
- D. Submit the following for the geotextile fourteen (14) days prior to order.
 - 1. Manufacturer's certifications that the geotextile will comply with specification requirements per Articles 2.1 and 2.2 of this section.
 - 2. Manufacturer's quality control test data for the geotextile.
 - 3. Manufacturer's instructions for handling, storing, installing, seaming, and repairing the geotextile.
- E. The Contractor shall be furnished copies of the delivery tickets or other acceptable receipts as evidence for materials received that will be incorporated into construction.

Note: If Subcontractor wishes to use a manufacturer other than the recommended manufacturer, a request must be made in writing from the Subcontractor to the Contractor. This request must be accompanied by two (2) samples of the material, along with a manufacturer's specification sheet.

1.4 Delivery, Storage and Handling

- A. Packaging, Shipping, and Unloading
 - 1. Deliver products in accordance with *Terms and Conditions for Construction Subcontracts* (Terms and Conditions).
 - 2. Package and ship rolls of materials so they are not damaged during shipment. Mark each roll with an indelible label bearing the product identification; thickness of material; length and width of the roll; batch and roll numbers;

manufacturer's name and plant location or lot number; and date of manufacture.

3. Upon delivery, check shipping ticket and roll labels to confirm that the type, lot number, thickness, physical properties, and dimensions are as in the manufacturer's product data submittals. If differences exist, do not use the products unless approved by Contractor.
4. Unload and store geotextile products only when Contractor is present to observe.
5. Separate damaged from undamaged rolls when unloading. Contractor is the final authority as to whether a roll is damaged.
6. Handling, storage and care of the geotextile prior to following incorporation in the work is the responsibility of the subcontractor. The subcontractor shall be liable for all damage to the material incurred prior to final acceptance of the installation by the Contractor. The subcontractor shall repair any damage in accordance with this section at no additional cost to Contractor.
7. The subcontractor shall be responsible for storage of the geotextile at the site. The geotextile shall be protected from water, dirt, puncture, cutting, or other damaging or deleterious conditions. The geotextile shall also be stored in accordance with any additional requirements of the geotextile manufacturer.
 - a. Geotextile should be stored no higher than three to four rolls high or limited to the height at which the handling apparatus may be safely handled by installation personnel. Stacks or tiers of rolls should be situated in a manner that prevents sliding or rolling by chocking the bottom layer of rolls.
 - b. Rolls shall not be stacked on uneven or discontinuous surfaces as this may cause bending or deformation of the rolls and in turn damage the geotextile or cause difficulty inserting the core pipe.
 - c. An additional tarpaulin or plastic sheet shall be used over the stacked rolls to provide extra protection for geotextile material stored outdoors.

B. Acceptance

Geotextile must be supported during handling to ensure worker safety and to prevent damage to the geotextile. Under no circumstances should the rolls be dragged, lifted from one end, lifted with only the forks of a lift truck or pushed to the ground from the delivery vehicle. Contractor may inspect, sample, and independently test geotextile products for acceptance.

1.5 Sequencing and Scheduling

Obtain the following clearances from Contractor at the designated HOLD POINTS:

- A. Approval of geotextile installer and personnel; before mobilizing installer and personnel to site.
- B. Approval of product data and shop drawings; before delivering products to site.

- C. Approval of the subgrade; before installing geotextile.
- D. Approval geotextile before placing overlying material.

1.6 Warranty

The geotextile material shall be free of defects in material and workmanship upon receipt of delivery at the project site.

Part 2—Products

2.1 Materials—General

- A. In addition to the property values listed in Table 02203-1, the geotextile material shall:
 - 1. Retain its structure during handling, placement, and long-term service.
 - 2. Be capable of withstanding outdoor (i.e., ultra-violet) light for a minimum of 30 days with no measurable degradation in the specified physical properties.
 - 3. The manufactured geotextile shall have good appearance qualities. It shall be free from such defects that would affect the specified properties and integrity of the product.

2.2 Material

Geotextile shall be Mirafi 180N or equivalent. A nonwoven synthetic fabric consisting of polypropylene manufactured in a manner accepted by the Contractor. The following table shows the minimum requirements:

Table 02203-1. Required Geotextile Properties

PROPERTY	TEST METHOD	Mirafi 180N	
		MD	CD
Grab Tensile Strength (lbs)	ASTM D 4632	205	205
Grab Tensile Elongation (%)	ASTM D 4632	50	50
Trapezoidal Tear Strength (lbs)	ASTM D 4533	80	80
Mullen Burst Strength (psi)	ASTM D 3786	380	
Puncture Strength (lbs)	ASTM D 4833	130	
Apparent Opening Size (U.S. Sieve)	ASTM D 4751	80	
Permittivity (1/sec)	ASTM D 4491	1.2	
Permeability (cm/sec)	ASTM D 4491	0.21	

Part 3—Execution

3.1 Installation

- A. Soil and Fill Subgrades: Prepare a relatively smooth subgrade, free of obstructions, depressions or humps, debris, and deposits of soft or loose soil.
- B. Geotextiles shall be placed to the lines and grades shown on the drawings. At the time of installation, the Geotextile shall be rejected by the Contractor if it has defects, rips, holes, flaws, evidence of deterioration, or other damage.
- C. Geotextiles shall be placed smooth and free of excessive wrinkles.
- D. When the Geotextiles are placed on slopes, the upslope fabric portion shall be lapped such that it is the upper or exposed Geotextile.
- E. Geotextiles shall be temporarily secured in a manner accepted by the Contractor prior to placement of overlying materials.
- F. Any Geotextile that is torn or punctured shall be repaired or replaced as directed by the Contractor by the subcontractor at no additional cost to the Contractor. The repair shall consist of a patch of the same type of Geotextile placed over the failed areas and shall overlap the existing Geotextile a minimum of twelve (12) inches from any point of the damaged area.

End of Section 02203

Section 02205: Regrade, Fabric & Plant Bank Treatment (Rev-1)

Part 1—General

1.1 Scope

The work included in this section applies to furnishing and installing bioengineering techniques and re-contoured embankments, designated as Regrade, Fabric and Plant Bank Treatment on the design drawings.

1.2 Related Work

- A. Section 02100—Sediment and Erosion Control
- B. Section 02200—Earthwork
- C. Section 02920—Revegetation
- D. Section 02925—Container Tree and Shrub Planting

1.3 Submittals

- A. Submittals shall be made in accordance with Section 01300: Submittals.
- B. Submittals shall be made for proposed substitutions.
- C. Submittals shall be made as required on the Project Submittal List, Table 01300-1.
- D. The Contractor shall be furnished copies of the delivery tickets or other acceptable receipts as evidence for materials received that will be incorporated into construction.



Note

If subcontractor wishes to use a manufacturer other than the recommended manufacturer, a request must be made in writing from the subcontractor to the Contractor. This request must be accompanied by two (2) samples of the material, along with a manufacturer's specification sheet.

~~E. If subcontractor wishes to use a manufacturer other than the recommended manufacturer, a request must be made in writing from the subcontractor to the Contractor. This request must be accompanied by two (2) samples of the material, along with a manufacturer's specification sheet.~~

E. Subcontractor shall submit the brand and type of coir fabric, along with the product's specifications, 7 calendar days prior to ordering per Article 2.1 of this section.

1.4 Quality

The subcontractor shall be responsible for and shall repair at its expense any damage to foundations, structures, or any part of the work caused by floods, water, or failure of any part of the diversion or protective works until final acceptance.

Part 2—Products

2.1 Material

- A. The coir fabric shall consist of Rolanka BioD-Mat 90 or equivalent. The coir fabric shall be woven from machine twisted coir twines made of bristle coir. The following table shows the minimum requirements:

PROPERTY	TEST METHOD	BioD-Mat 90
Mass/Unit Area (oz/yd ²)	ASTM D6566	8.5
Thickness (in.)	ASTM D1777	0.25
Tensile Strength (Machine Direction) (lbs./in)	ASTM D6818	12.5
Tensile Strength (Transverse Directions) (lbs./in)	ASTM D6818	12.5
Elongation (Machine Direction) (%)	ASTM D6818	5
Elongation (Transverse Direction) (%)	ASTM D6818	5
Water Absorption (%)	ASTM D 1117	250

- B. Wooden stakes to fasten coir fabric to the soil shall be hardwood stakes that are solid and free of rot, with the following approximate dimensions: 1 inch × 2 inch × 18 inch (tapered to a point).
- C. Sod staples for anchoring void spaces of the coir matting shall be eight (8) inch long, eight (8) gauge steel staples.

2.2 Topsoil

[Topsoil shall meet the requirements of Section 02200: Earthwork, Article 2.1D.](#)

Rev-1

Part 3—Execution

3.1 Installation

- A. The surface of the soil should be prepared to be smooth and free of rocks, roots and other obstructions.
- B. Seed the prepared soil areas in accordance with Section 02920: Revegetation, prior to the installation of the coir fabric.
- C. Fabric shall be trenched-in according to the detail shown on the drawings.
- D. Place fabric panels in a shingle-like fashion along the slopes, either parallel or perpendicular to the toe of slope. Fabric must overlap seams a minimum of six (6) inches upstream or upslope over downstream or downslope placement. Stitch the fabric panels together with coir rope using a pattern of knot, three loops, knot for

each stitching increment; typical length of coir rope is 4 feet to support each stitching increment.

- E. Stake each panel using 1-inch × 2-inch × 18-inch wood stakes. Each stake shall be inserted on an angle facing upstream. Refer to the staking pattern on the drawings.
- F. Steel sod staples shall be inserted where void spaces and areas with puckers are found in the fabric.
- G. The edge of the fabric panel on top of bank, at the toe of slope, and at the upstream and downstream ends of the bank treatment shall be trenched in, a minimum of 2 feet, and secured in place with steel sod staples, inserted into the fabric at 1 foot intervals along the length of the trench, prior to backfilling and tamping.
- H. After installation of coir fabric is complete, containerized plantings shall be installed into the Regrade, Fabric & Plant areas in accordance with Section 02925:Container Tree and Shrub Planting.

End of Section 02205

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Section 02215: Soil Encapsulated Lifts (Rev-1)

Part 1—General

1.1 Scope

The work included in this section applies to furnishing and installing bioengineering techniques, designated as Soil Encapsulated Lifts on the drawings.

1.2 Related Work

- A. Section 02200—Earthwork
- B. Section 02275—Rock Toe Bank Treatment
- C. Section 02920—Revegetation
- D. Section 02925—Container Tree and Shrub Planting

1.3 Submittals

- A. Submittals shall be made in accordance with Section 01300: Submittals.
- B. Submittals shall be made for proposed substitutions.
- C. Submittals shall be made as required on the Project Submittal List, Table 01300-1.
- D. Subcontractor shall submit to Contractor materials cut sheets for geogrid material meeting requirements of Article 2.1 at least 7 calendar days prior to ordering.
- E. Subcontractor shall submit to Contractor soils test data for topsoil meeting requirements of Article 2.2 at least 7 calendar days prior to delivery.

- F. Subcontractor shall submit to Contractor materials cut sheets for Coir Fabric, Rolanka BioD-OCF material **at least 7 calendar days prior to ordering.**
- G. Subcontractor shall submit to Contractor materials cut sheets for Coir Fabric, Rolanka BioD-Mat90, material at least 7 calendar days prior to ordering.
- ~~G~~.H. Subcontractor shall submit to Contractor material sources and analyses for drainage material 5 days prior to delivery of the material to the site per Article 2.3. Analyses for all imported backfill materials shall indicate compliance with these specifications.

Rev-1

1.4 Quality

The subcontractor shall be responsible for and shall repair at its expense any damage to foundations, structures, or any part of the work caused by floods, water, or failure of any part of the diversion or protective works until final acceptance.

Part 2—Products

2.1 Geogrid Material

Polyester fiber geogrid shall be Synteen SF 20 or equivalent. The following table shows the minimum requirements:

PROPERTY	TEST METHOD	Synteen SF 20	
		MD	CD
Ultimate Strength (lbs/ft)	ASTM D 6637	2025	2025
Creep Limited Strength (lbs/ft)	ASTM D 5262	1282	1282
Long Term Design Strength (lbs/ft)	NCMA 97	1059	1059
Aperture Size (in.)	Measured	2.80 × 1.00	

2.2 Fill Material

~~Topsoil material shall contain 3% to 5% organic matter and comprised of loose friable loam, free of heavy clay, refuse, stumps and large roots, rocks over two (2) inches in diameter, brush, weeds and weed seeds, or other material which would be detrimental to the proper development of vegetative growth. Shredded and screened topsoil (free of sticks, rocks, roots) shall be placed within the soil layers to comprise the soil encapsulated lifts.~~

Refer to Section 02200: Earthwork, Article 2.1D.

Rev-1

2.3 Drainage Material

Gravel filter shall consist of river run gravel (1/2–1 1/2 inch (13–38 mm). No crushed concrete or limestone aggregate allowed.

2.4 Coir Fabric

The inner fabric shall consist of Rolanka BioD-OCF or equivalent. The outer fabric shall consist of Rolanka BioD-Mat 90 or equivalent. The minimum roll width for inner and outer fabric shall be 9.5 feet. ~~The following tables~~ Table 02215-1 and Table 02215-2 show the minimum requirements.

2.5 Stakes

Stakes used for pinning down the fabrics shall be a minimum of 1 inch × 1 inch × 12 inches long. Stakes shall be cut from hardwood and pointed at one end.

Table 02215-1. Rolanka BioD-OCFMat90

PROPERTY	TEST METHOD	BioD-OCFMat90
Mass/Unit Area (oz/yd ²)	ASTM D6566	8.5
Thickness (in.)	ASTM D1777	0.25
Tensile Strength (Machine Direction) (lbs./in)	ASTM D6818	12.5
Tensile Strength (Transverse Directions) (lbs./in)	ASTM D6818	12.5
Elongation (Machine Direction) (%)	ASTM D6818	5
Elongation (Transverse Direction) (%)	ASTM D6818	5
Water Absorption (%)	ASTM D 1117	250

Table 02215-2. Rolanka BioD-Mat90OCF

Rev-1

PROPERTY	TEST METHOD	BioD-Mat90OCF
Mass/Unit Area (oz/yd ²)	ASTM D 3776	29
Tensile Strength Wet (Machine Direction) (Cross Direction) (lbs./ft)	ASTM D 4595	1776 936
Tensile Strength Dry (Machine Direction) (Cross Direction) (lbs./ft)	ASTM D 4595	2024 1160
Elongation Wet (Machine Direction) (Cross Direction) (%)	ASTM D 4595	52 24
Thickness (in.)	ASTM D 1777	0.35
Recommended Shear Stress (lbs./ft. ²)	N/A	5
Recommended Velocity (ft/s)	N/A	16

Part 3—Execution

3.1 Installation

1. Prior to placement of the encapsulated lifts, the top of the rock toe must be inspected and approved by the Contractor.
2. A gravel filter as specified in Article 2.3, shall be installed to a depth of six inches along the back of the regraded slope and shall extend up to and within 2 ft of the final slope surface.

3. A layer of containerized plants shall be placed so that 1/3 of the top of the tree or shrub extends over the edge of rock or previous lift. The plant material shall be placed every 3 feet along each soil lift and oriented at right angles facing downstream. Containerized plantings shall conform to Section 02925: Container Tree and Shrub Planting.

4. One and a half foot (1.5 ft **minimum**) high temporary forms are used to define the front face of the embankment and to provide support during filling and compaction.
5. The outer fabric shall be unrolled, parallel with the slope, and loosely laid (not stretched) so that the width of the roll is perpendicular to the slope.
6. The inner filter fabric shall also be unrolled, parallel with the slope, and placed on top of the outer fabric so that the width of the roll is perpendicular to the slope.
7. Each coir blanket is placed over the forms so that 1/3 of the matting (**4 ft minimum**) will be buried by fill material behind the forms. Folds and wrinkles should be avoided.
8. Adjacent rolls of fabric shall be overlapped a minimum of 6 inches in the downstream direction.
9. The two layers of fabric shall not be overlapped such that the joints are aligned.
10. To install each lift, the two fabric layers shall be securely staked or pinned into the stream bank soil or the lower lift with tapered wood stakes or steel staples at 2 foot spacings.
11. **The lifts shall be filled with the specified topsoil fill material and shall be compacted in 6 to 9 inch lifts to a final height of 18 inches maximum. Compact with a minimum of two passes of a manually directed tamper or vibratory plate; no moisture conditioning is necessary. Front and back lift thickness shall be constructed in order to provide a drainage slope from back to front. ~~The lifts shall be filled with the specified fill material and shall be compacted in 6 to 9 inch lifts to a final height of 12 inches to 18 inches, with a minimum of two passes of a manually directed tamper or vibratory plate.~~**
12. One layer of geogrid shall be placed in each lift at a 6 to 9-inch interval.
 - 12.A **Seed the top of the lift with seed mix shown on Sht. 9 and per Section 02920 of these specifications prior to wrapping with Coir Fabric.**
13. The two fabric layers shall be pulled over the top of the fill material and staked or pinned into the underlying fill with tapered wood stakes or steel staples at 2 foot spacing.
14. Another layer of shrubs and forms is added, stepping back the forms 1 to 2 feet from the streamside edge of the lower lift.
15. Fabric is placed over the forms as before and soil added behind the lift.
16. At the ends of the lifts, 3-feet of fabric shall be placed and staked into the vertical trench. Fill material shall be placed over the top lift to blend with the top of the slope.
17. The soil-encapsulated lift treatment continues to the top of the embankment and the last layer of coir matting is keyed into a trench at the top of the bank.
18. The fabric is placed into a 2 foot trench with steel sod staples (8 inch, 8 gauge) **or wood stakes, or a combination of the two**, inserted into the fabric every 1 foot. The trench is then backfilled and tamped.

Rev-1

Note: If the fabric is punctured or torn, it shall be repaired with a patch of the same type of fabric being used, overlaying the existing fabric. The patch shall extend a minimum of 2 feet from the edges of any damaged area.

End of Section 02215

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Section 02275: Rock Toe Bank Treatment

(Rev-1)

Part 1—General

1.1 Scope

This section applies to furnishing and installing rock toe bank treatment at the locations designated on the drawings.

1.2 Related Work

- A. Section 02200—Earthwork
- B. Section 02203—Geotextiles
- C. Section 02215—Soil Encapsulated Lifts
- D. Section 02921—Woody Pole Installation

1.3 Submittals

- A. Submittals shall be made in accordance with Section 01300: Submittals.
- B. Submittals shall be made for proposed substitutions.
- C. Submittals shall be made as required on the Project Submittal List, Table 01300-1.
- D. The Contractor shall be furnished copies of the delivery tickets or other acceptable receipts as evidence for materials received that will be incorporated into construction.

1.4 Quality

- A. The subcontractor shall be responsible for and shall repair at its expense any damage to foundations, structures, or any part of the work caused by floods, water, or failure of any part of the diversion or protective works until final acceptance.
- B. Rock and gravel backfill material will be required where over-excavation has occurred or where necessary to secure contact between the irregular rock shapes and the existing substrate. Backfill material necessary to secure contact between irregular rock shapes and existing earth material shall be mechanically compacted, consistent with adjacent existing substrate, using two passes with an excavator bucket, or similar implement.
- C. Foundations or sub grade surfaces on which rock is to be placed shall be stripped to remove vegetation and other unsuitable materials and shall be excavated to the lines and grades shown on the drawings. All surplus and/or unsuitable material will be designated as waste and shall be disposed of at locations shown on the drawings or at a location acceptable to the Contractor.
- D. Rock backfill material shall not be placed until the required foundation/sub grade surface preparation is complete, inspected, and accepted for placement by the Contractor.

Part 2—Products

2.1 Material

- A. All rock shall consist of clean limestone of the specified size; hard, durable, and angular in shape, and resistant to weathering. Rock shall not contain deleterious amounts of shale, as determined by the Contractor. Porous or friable rock shall not be acceptable.
- B. Rock toe shall consist of ODOT Type B riprap with gravel and fines in sufficient quantities to fill voids, while still allowing point to point contact between placed Type B rocks.
- C. Geotextile shall comply with Section 02203: Geotextiles of these specifications.

Part 3—Execution

3.1 Installation

- A. Excavate trench in the locations specified on the drawings to the length depth, and width specified. Where soil encapsulated lifts are installed, the top of the rock toe base shall be inclined back towards the existing bank at an angle of 10 to 20 degrees to minimize lateral earth forces.

~~B. If coir fabric is proposed on adjacent bank, the coir fabric shall be in anchored into bottom of trench prior to placement of rock.~~

~~C.~~B. Install geotextile, per specifications, on face of cut slopes and base of rock toe excavation prior to placement of rock.

~~D.~~C. Install rock to the depth, width, length, and material size as shown on the drawings.

~~E.~~D. Backfill with the material specified on the drawings and in Article 2.1B of this section.

Rev-1

End of Section 02275

Section 02920: Revegetation

(Rev-1)

Part 1—General

1.1 Scope

Work under this section includes furnishing, handling, storing and planting the seed mixes shown on the Planting Plan in the drawings.

1.2 Related Work

- A. Section 02205—Regrade, Fabric & Plant Bank Treatment
- B. Section 02215—Soil Encapsulated Lifts

1.3 Submittals

- A. Submittals shall be made in accordance with Section 01300: Submittals.
- B. Submittals shall be made for proposed substitutions.
- C. Submittals shall be made as required on the Project Submittal List, Table 01300-1.
- D. Certifications for the endomycorrhizal inoculum shall be submitted 7 calendar days prior to application per Articles 2.1A and 2.1.1B of this section.
- E. Approved seed mixes, supplier, and analysis certificates shall be submitted at least fourteen (14) calendar days prior to seeding per Article 2.2 of this section.
- F. Seed labels shall be on the bags, or intact, when seed is delivered to the site and shall be submitted after use.

1.4 Requirement

- A. The Subcontractor shall maintain the seeded areas until final acceptance. Any damage caused to seeded areas shall be repaired by and at the expense of the Subcontractor.
- B. At the end of the first full growing season, at least 50% of seeded areas shall consist of native vegetation. At least 90% of the seeded area shall be vegetated.
- C. Areas not meeting these standards shall be scarified and re-seeded in accordance with this specification. Subcontractor shall be responsible for reseeded any bare spots four (4) square feet or greater. Subcontractor shall reseed any bare spots within seven (7) days of notification by the Contractor.

Part 2—Products

2.1 Soil Amendments

A. Quality

1. The soil shall be amended with endomycorrhizal inoculum consisting of spores, mycelium, and mycorrhizal root fragments in a solid carrier suitable for handling by hydro-seeding or dry seeding equipment. The carrier shall be the material in which the inoculum was originally produced, and may include organic materials, vermiculite, perlite, calcined clay, or other approved materials consistent with mechanical application and with good plant growth. The inoculum shall be a mix of arbuscular endomycorrhizal fungi including one or both of the following species: *Glomus intradices* and *Glomus mosseae*.
2. The endomycorrhizal inoculum used shall carry a supplier's guarantee of a number of propagules per unit weight or volume of bulk material. If more than one fungal species is claimed by the supplier, the label shall include a guarantee for each species of mycorrhizal fungus claimed.
3. Endomycorrhizal inoculum is a live material and shall be transported and stored in vehicles, containers, and application equipment with a temperature of less than 32 °C (90 °F).

B. Quantity

Inoculum shall be applied at the rate of 3,600,000 live propagules per acre based on the guarantee of the supplier or an analysis by an independent laboratory.

2.2 Seed Material

- A. Seed, seed mixtures, and application rates shall be as specified on the drawings. All seed shall be clean and free of weeds.
- B. Furnish seed labeled in accordance with U.S. Department of Agriculture (USDA) Rules and Regulations under the Federal Seed Act and applicable State seed laws. Furnish seed in sealed bags or containers bearing the date of expiration. Do not use seed after its date of expiration. Each variety of seed shall have a purity of not less than 90 percent by weight, a percentage of germination not less than 80 percent by weight, and a weed to seed content of not more than 0.75 percent by weight and contain no noxious weeds.
- C. See seed mixes as specified on Sht. 9 of the drawings.

Part 3—Execution

In performing this work, subcontractor shall avoid as much as possible disturbance to adjacent natural or undisturbed areas that are outside the work area limits shown on the drawings. If any such additional areas are disturbed, including existing wetlands, they shall be reclaimed following the specifications in this contract.

3.1 Soil Preparation

Till applied topsoil in areas are to be seeded to a minimum depth of three (3) inches. To avoid soil compaction equipment access and travel should be routed around all planting areas, and repeat passes over the same area should be limited during all grading, topsoil application, and de-compaction work. Equipment having low unit pressure ground contact should be utilized whenever possible.

3.2 Soil Amendment

Immediately following soil preparation, not to exceed 2 consecutive days, the endomycorrhizal inoculum shall be applied by dry broadcasting at the rate specified in Article 2.1 B.

~~Furnish seed labeled in accordance with U.S. Department of Agriculture (USDA) Rules and Regulations under the Federal Seed Act and applicable State seed laws. Furnish seed in sealed bags or containers bearing the date of expiration. Do not use seed after its date of expiration. Each variety of seed shall have a purity of not less than 90 percent by weight, a percentage of germination not less than 80 percent by weight, and a weed to seed content of not more than 0.75 percent by weight and contain no noxious weeds.~~

Rev-1

3.3 Shipping and Storage

- A. Seed shall not be delivered until the project site has been prepared for planting. All seed shall be shipped in the original, sealed container with the label information intact and legible.
- B. Seed shall be kept in its original container with the label information intact and legible. The seed shall be stored away from moisture, excessive heat and direct sunlight. The seed shall be protected from rodents, insects and other vermin.

3.4 Seeding

Seed shall be hand-broadcast using the following method:

- A. Broadcasting
 - 1. Seeding
 - a. Place a portion of the seed in a clean, dry five (5) gallon bucket or wheelbarrow.
 - b. Place two parts coarse sand with one part seed and thoroughly mix sand and seed.
 - c. Hand-broadcast the sand/seed mixture across the area to be seeded. Apply half of the mixture over the entire area.
 - d. Apply the second half over the same area utilizing the same procedure.
 - e. Press the seed into the surface using a cultipacker or roller.

- f. Seeding operations should not occur if the soil is wet and muddy and should be postponed until soil moisture is appropriate for the seeding operation.
- g. The seedbed should be well prepared and free of clods greater than two (2) inches diameter. If crusting from rainfall has occurred, re-scarification is required.
- h. No additional fertilizers or soil conditioners will be required or allowed.

3.5 Seeding and Planting Dates

- A. November 1 Thru February 28. Seeding during this time should be protected from displacement due to water and wind erosion. Seeding on bare, graded surfaces must be protected with appropriate erosion control blankets on slopes steeper than 3H:1V, and crimped straw mulch at one ton per acre on lesser slopes.
- B. March 1 Thru May 29. Seeding during this period is appropriate, but germination of a portion of the seed may not occur until the following season due to lack of cold stratification to break seed dormancy. Erosion control blankets and crimped straw mulch is required. Straw mulch to be applied at one ton per acre on bare soils.
- C. May 30 Thru August 30. Installation of native seed mix should be suspended during this time.
- D. September 1 Thru October 31. Seeding on graded, bare-soil surfaces must be protected with appropriate erosion control blankets on slopes steeper than 3H:1V, and crimped straw mulch at one ton per acre on lesser slopes.

These are general guidelines only and may be modified with the approval of the Contractor according to site conditions, local weather patterns and seed type.

End of Section 02920

Section 02921: Woody Pole Installation (Rev-1)

Part 1—General

1.1 Scope

Work under this section includes furnishing, handling, storing, and planting woody poles.

1.2 Related Work

Section 02275—Rock Toe Bank Treatment

1.3 Submittals

- A. Submittals shall be made in accordance with Section 01300: Submittals.
- B. Submittals shall be made for proposed substitutions.
- C. Submittals shall be made as required on the Project Submittal List, Table 01300-1.
- D. Approved species, quantities, supplier, and delivery schedule shall be submitted at least fourteen (14) calendar days prior to delivery to the project site.
- E. Woody poles shall be obtained from a regional nursery supplier. Plants of mid-western genotype shall be used to ensure adaptation to southwest Ohio soil and climate. Submit supporting information fourteen (14) calendar days prior to ordering.
- F. Submittals for proposed substitutions shall be made at least fourteen (14) calendar days prior to ordering.

Part 2—Products

2.1 Woody Poles

- A. Woody poles shall be of the species and quantities shown on the Planting Plan in the drawings.

- B. Woody poles shall arrive in good condition, live but dormant, with side branches removed and bark intact.

- C. Woody poles shall be 2 to 4-inch diameter stock and at least 5 feet in length.
- D. The basal ends of the cuttings shall be cut on an angle to facilitate insertion into the soil.
- E. No species shall be substituted without prior approval from the Contractor.

Rev-1

2.2 Plant Species

The plant species shown on Sht. 9 of the plan set shall be installed based on nursery availability and according to the densities specified in the Planting Plan.

Part 3—Execution

3.1 Delivery and Inspection

- A. Approved species, quantities, supplier, and delivery schedule shall be submitted at least fourteen (14) calendar days prior to delivery to the project site.
- B. Woody poles shall be bagged and/or bundled by species and shall be identified with durable and waterproof labeling and/or weatherproof ink. Labels shall state the scientific name of the plant species grouping. Common names are not acceptable. Scientific names must match those shown in the Planting Plan and this specification. Plants that are unlabeled or improperly labeled will not be accepted.
- C. Plant material that is damaged or desiccated, or does not meet the material specifications will not be accepted. All rejected plant material shall be removed from the project site by the subcontractor by the close of the working day.
- D. If woody poles are not planted on the day of delivery, they shall be stored onsite by the subcontractor in a shaded location during which time the material shall be kept moist and cool.

3.2 Installation

- A. Installation of woody poles shall be performed by the subcontractor while the woody poles are dormant, during the fall and/or winter season.

- B. Each pole shall extend at least 6 inches into the ground below rock or riprap fill with a minimum of six inches of the pole above ground. At least two buds or bud scars shall be present above ground. At least $\frac{3}{4}$ of the pole length shall be below ground.

- C. Create a pilot hole that is perpendicular to the slope. The diameter of the pilot hole should not exceed the diameter of the woody pole to ensure adequate soil to stem contact. Formation of the pilot hole is at the subcontractors discretion. Some installation options include using rebar or a stinger. The stinger is a steel attachment fitted to the end of a backhoe arm. Each woody pole shall be planted upright.
- D. Woody poles shall be installed in a random configuration, spaced 6 feet on center.
- E. Woody poles that become split or “mushroomed” during installation shall be replaced at the subcontractor’s expense.

Rev-1 |

End of Section 02921

Section 02925: Container Tree and Shrub Planting (Rev-1)

Part 1—General

1.1 Scope

Work under this section includes furnishing, handling, storing, and planting container sized trees and shrubs.

1.2 Related Work

- A. Section 02200—Earthwork
- B. Section 02205—Regrade, Fabric & Plant Bank Treatment
- C. Section 02215—Soil Encapsulated Lifts

1.3 Submittals

- A. Submittals shall be made in accordance with Section 01300: Submittals.
- B. Submittals shall be made for proposed substitutions.
- C. Submittals shall be made as required on the Project Submittal List, Table 01300-1.
- D. Approved species, quantities, supplier, and delivery schedule shall be submitted at least fourteen (14) calendar days prior to delivery to the project site.

Part 2—Products

2.1 Container Plants

- A. Container plants shall be of the species and quantities shown on the Planting Plan in the drawings.
- B. All trees and shrubs shall be in containers grown with air-root pruned technique, spin-out containers or equivalent. Plants shall exhibit a fully-developed, fibrous root system that allows the root ball to remain intact after removal from the container. Roots shall not be pot-bound or spiraling in the container.
- C. Trees for the Regrade, Fabric and Buffer Areas shall be a minimum size of 3-gallon container and 4 feet (ft) to 6 ft in height.
- D. Shrubs for the Regrade, Fabric and Buffer Areas shall be a minimum size of 1-gallon container and 2 ft to 3 ft in height.
- E. Trees for the Swale Area shall be a minimum size of 15-gallon container and 8 feet (ft) to 10 ft in height.
- F. Container plants shall be obtained from a regional nursery supplier. Plants of mid-western genotype shall be used to ensure adaptation to southwest Ohio soil and climate.

2.2 Plant Species

Plant species shall be installed as called out on Sht. 9 of the drawings, based on nursery availability, and according to the densities specified on the drawings.

2.3 Tree Protectors

Subcontractor shall install vented translucent tree protectors (Tree-Pro® shelters or equivalent) around each container plant, secured with zip ties to a hardwood stake. Tree protectors shall be a minimum of 48 inches high, as an herbivory deterrent measure.

2.4 Mulch

Woodchip mulch or mulch mats shall be placed around all planted trees and shrubs that are installed throughout the restoration corridor, but not otherwise included within the Soil Encapsulated Lift or Regrade, Fabric & Plant areas. The woodchip layer shall be 4 inches thick and 3 feet in diameter. Mulch mats shall be interlocked coir fiber by needle punch, a 0.4 inch thickness and unit weight of 2.6 lbs/sy. Mulch mat size shall be at least 20 inches × 20 inches. [Mulch shall be an aged hardwood mulch, free of clay, stone, foreign substances, and free of weeds.](#)

Rev-1

2.5 Fertilizer

All trees and shrubs shall be fertilized with Mycotabs 20-10-5 or equivalent. The number of tablets for each tree and shrub shall be based on manufacturer recommendations.

2.6 Water

The subcontractor shall water each container tree and shrub immediately after planting. Water shall not contain elements toxic to plant life. A water source is available on property, but not at the project site (it would require transport).

Part 3—Execution

3.1 Delivery and Inspection

- A. Approved species, quantities, supplier, and delivery schedule shall be submitted at least fourteen (14) calendar days prior to delivery to the project site.
- B. Each container plant shall be identified with attached, durable and waterproof labels and weatherproof ink. Labels shall state the scientific name of each plant. Common names are not acceptable. Scientific names must match those shown in the Planting Plan and this specification. Plants that are unlabeled or improperly labeled will not be accepted.
- C. Plant material shall be protected during delivery to prevent desiccation and damage to branches, trunk, root system, or earth ball.

- D. Plant material shall be well shaped, vigorous and healthy, with a well branched root system, free from disease, harmful insects and insect eggs, sun-scald injury, disfigurement or abrasion.
- E. Plant material shall be checked for any damage, unauthorized substitution and to establish nursery-grown status. Plant material showing desiccation, abrasion, sun-scald injury, disfigurement, or unauthorized substitution shall be rejected. Plant material that measures less than specified, or has been poled, topped off or headed back, shall be rejected.
- F. All rejected plant material shall be removed from the project site by the subcontractor by the close of each working day.
- G. If plants are not planted on the day of delivery, the plants shall be stored onsite in a shaded location and kept moist and cool.

3.2 Planting Conditions

- A. Container plant installation shall only be performed during periods conducive to plant survival. When drought, excessive moisture, frozen ground, or other unsatisfactory conditions prevail, the work shall be stopped at the discretion of the Contractor.
- B. When conditions warrant a variance to planting operations, alternate planting times shall be submitted in writing to the Contractor for approval.

3.3 Plant Installation

- A. All planting activities shall be supervised by the Contractor.
- B. Plants shall be carefully removed from their containers without damaging the root system or plant.
- C. Container plants shall be planted in a hole at least two times the diameter of the root ball.
- D. Container plants shall be placed in the center of the hole with top of root ball 1 inch above finished grade.
- E. Following planting, each hole shall be backfilled with the soil removed from the hole when the hole was dug.
- F. If native soil or fill is determined to be unsuitable for planting by the Contractor, amended topsoil shall be required.
- G. Soil shall be tamped firm around each container plant following installation.

End of Section 02925

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Section 02934: Rock Cross Vane (Rev-1)

Part 1—General

1.1 Scope

This section applies to furnishing and installing rock cross vanes at the locations designated on the drawings.

1.2 Related Work

- A. Section 02100—Sediment and Erosion Control
- B. Section 02200—Earthwork
- C. Section 02215—Soil Encapsulated Lifts
- D. Section 02275—Rock Toe Bank Treatment

1.3 Submittals

- A. Submittals shall be made in accordance with Section 01300: Submittals.
- B. Submittals shall be made for proposed substitutions.
- C. Submittals shall be made as required on the Project Submittal List, Table 01300-1.

~~D. The Contractor shall be furnished copies of the delivery tickets or other acceptable receipts as evidence for materials received that will be incorporated into construction.~~

- D. Subcontractor shall submit to Contractor material source for boulders two weeks prior to delivery of the material to the site per Article 2.1A&B of this section. Subcontractor shall coordinate a site inspection of the boulder source by the Contractor to occur within the two week period.
- E. Subcontractor shall submit to Contractor material sources and analyses for channel lining and native stream gravel 5 days prior to delivery of the material to the site per Article 2.1C of this section. Analyses for all imported bedding materials shall indicate compliance with these specifications.

1.4 Quality

- A. The subcontractor shall be responsible for and shall repair at its expense any damage to foundations, structures, or any part of the work caused by floods, water, or failure of any part of the diversion or protective works until final acceptance.
- B. Rock and gravel backfill material will be required where over-excavation has occurred or where necessary to secure contact between the irregular rock shapes and the existing substrate. Backfill material necessary to secure contact between irregular rock shapes and existing earth material shall be mechanically compacted, consistent with adjacent existing substrate, using two passes with an excavator bucket, or similar implement.

- C. Foundations or sub grade surfaces on which rock is to be placed shall be stripped to remove vegetation and other unsuitable materials and shall be excavated to the lines and grades shown on the drawings. All surplus and/or unsuitable material will be designated as waste and shall be disposed of at locations shown on the drawings or at a location acceptable to the Contractor.
- D. Rock backfill material shall not be placed until the required foundation/sub grade surface preparation is complete, inspected, and accepted for placement by the Contractor.

Part 2—Products

2.1 Material

- A. All rock shall consist of clean limestone of the specified size; hard, durable, and angular in shape, and resistant to weathering. Rock shall not contain deleterious amounts of shale, as determined by the Contractor. Porous or friable rock shall not be acceptable.
- B. ~~Header-Crest~~ and footer stone shall consist of thirty-six (36) inch minimum diameter boulders.
- C. Backfill material shall consist of ~~ODOT Type D channel lining and~~ native stream gravel.

Part 3—Execution

Rev-1 3.1 Installation

- A. The rock cross vane shall be comprised of two courses of rock. The rocks shall be trenched and placed in a manner that will allow the crest stones to meet the final grades shown on the drawings.
- B. An excavator with a hydraulic thumb shall be used for installation of this structure.
- C. The ~~header-crest~~ rock shall meet the elevations indicated on the drawings or as directed by the Contractor.
- D. Rock shall be selected and positioned such that they fit tightly together and there are multiple contact points between all rocks.
- E. ~~CrestHeader~~ rocks shall be offset one (1) foot to the upstream side of the footer rocks as indicated on the drawings.
- F. Any gaps between rocks shall be filled with backfill material until the gaps are completely plugged.
- G. In the center of the channel, the ~~crestheader~~ rocks shall be placed such that the top of the ~~crestheader~~ rock meets the ~~invert-footer~~ elevation specified on the drawings.
- H. The ~~crestheader~~ rocks on both sides of the ~~invert-footer~~ rock shall be placed in a manner that they slope up in elevation to the top of the stream bank at a 5% to 10% slope as shown in the plan details.

- I. Both courses shall extend into the banks and up to bankfull elevation, perpendicular to flow, as shown in plans, and in such a manner as to prevent the structure from being flanked.
- J. Backfill material shall be placed and compacted in the area immediately upstream of the perpendicular rock trench.

End of Section 02934

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