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Specifications

for:

**Coldstream Park Stream Corridor Restoration and
Preservation Consent Decree SEP
Lexington, Kentucky**

**LFUCG
Division of Water Quality
125 Lisle Industrial Lane, Suite 180
Lexington, Kentucky 40511**

October 2012

By:

**CDP Engineers
3250 Blazer Parkway
Lexington, Kentucky 40509**



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Division 1 – General Requirements

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SECTION 01010 – SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
1. Work covered by the Contract Documents.
 2. Use of premises.
 3. Landowner's occupancy requirements.
 4. Specification formats and conventions.
 5. Other special conditions
 6. Definitions

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Identification: **Coldstream Park Stream Corridor Restoration and Preservation Consent Decree SEP**
1. Project Location: Lexington, Kentucky
- B. Owner: **Lexington Fayette Urban County Government (LFUCG)**, Division of Water Quality, 125 Lisle Industrial Avenue, Suite 180, Lexington, Kentucky 40511
1. Project Manager: Susan Plueger, (502) 564-3155
- C. Engineer: **CDP Engineers, Inc**, 3250 Blazer Parkway, Lexington Kentucky 40507, (859) 264-7500
1. Project Manager: Liz Bullock
- D. The Work consists of the following:
The work shall consist of furnishing all labor, materials, and equipment and performing all work necessary and incidental to the construction of this project including the following: channel bank grading, floodplain excavation, wetland construction, installation of in-stream structures, live tree placement, live stake placement, erosion and sediment control, seeding and mulching, fertilizing and fabric placement on the banks and over banks of Cane Run Creek, in accordance with these documents and on-site instructions by the Engineer.
- E. Project will be constructed under a single prime contract.

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1.3 USE OF PREMISES

- A. General: Contractor shall have limited use of premises for construction operations as indicated on Drawings by the construction limits.
- B. Use of Site: Limit use of premises to areas within the construction limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 - 1. Limits: Confine constructions operations to those areas indicated in the Construction Drawings
 - 2. Roads and Entrances: Keep roads and entrances serving premises clear and available to Landowner, Landowner's employees, community, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of entrances.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C. Limit site access to those construction entrances as indicated in the Construction Drawings, or allowed by Agency or Landowner.
- D. Cleaning and Trash Removal: The contractor shall provide adequate trash containers of proper size and shall remove all trash from the project on a daily basis. The Contractors shall be responsible for daily cleaning of spillages and debris resulting from his/her and his/her subcontractor's operations, for removal and disposition of hazardous or toxic wastes, and for providing closed waste receptacles. The Contractor shall empty such receptacles into the trash container, when full or when directed to be emptied by the Engineer and/or Owner's representative, but not less than weekly.

1.4 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 16-division format and CSI/CSC's "Master Format" numbering system.
 - 1. Division 1: Sections in Division 1 govern the execution of the Work of all Sections in the Specifications.
- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.

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2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
 - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

1.5 OTHER SPECIAL CONDITIONS

- A. Pre bid meeting: There will be a Pre-Bid meeting held for this project on _____, 2012 at _____E.S.T. at the Project Site. All contractors or their representatives interested in bidding on this project shall attend this meeting and will be required to sign-in.
- B. The CONTRACTOR and each subcontractor shall be responsible for the verification of all measurements at the site before ordering any materials or doing any work. No extra charge or compensation shall be allowed due to differences between actual dimensions and dimensions indicated on the drawings. Any such discrepancy in dimensions which may be found shall be submitted to the ENGINEER for his consideration before the contractor proceeds with the affected area.
- C. The ENGINEER shall provide horizontal and vertical control staking prior to the beginning of construction. The CONTRACTOR shall be responsible for maintaining and replacing the control staking and staking actual lines, basins, etc.
- D. The CONTRACTOR is responsible for safety per the General Conditions. The CONTRACTOR must comply with OSHA and other regulations applicable to this project.
- E. The CONTRACTOR shall have prior experience and knowledge in stream construction and restoration. The successful bidder shall provide specific background information to verify this experience. This experience may be either direct prior experience as a company or experience gained by the prime supervisory personnel and crew personnel designated to work on this project. The contractor shall have appropriate equipment to properly complete the project in a timely manner.

1.6 DEFINITIONS

The following definitions clarify, supplement and/or amend those provided in the Instruction to Bidders and the General Conditions

1. The terms "Architect" or "Engineer" as used herein shall be CDP Engineers, Inc. or any designated representative thereof.

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2. The terms “Design Drawings,” Drawings,” and “Plans” are synonymous and all refer to the Drawing List outlined on the cover sheet of project drawings attachments included in the bid package.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TIMES OF COMPLETION

- A. Substantial Completion: Subject to the provisions in the General Conditions pertaining to delays and extensions of time, the Work to be done under this construction contract shall be commenced at the time stipulated in the Work Order for the Contractor, and shall be substantially completed within 240 consecutive calendar days thereafter. The date of beginning and the time for completion of the Work are essential conditions of the Contract.
 1. The Date for Substantial Completion shall be the date certified by the Engineer when the work is sufficiently complete, in accordance with the Contract Documents, so the Owner may conditionally accept, and beneficially occupy and use all of the facilities provided under this construction contract.
- B. Final Completion: Subject to the provisions in the General Conditions pertaining to delays and extensions of time, the Work to be done under this construction contract shall be fully and finally completed within 30 consecutive calendar days after the Date for Substantial Completion.
 1. The Date for Final Completion shall be the date certified by the Engineer when the Work is 100% complete, in accordance with the Contract Documents, and all Contract requirements have been fulfilled by the Contractor.
 2. Time extensions may be granted upon proper justification by the Contractor. Any claim for time extensions under these provisions shall be submitted in writing to the Engineer not more than twenty (20) consecutive calendar days following commencement of the delay; otherwise claim will be waived. With submission of claim, Contractor shall provide an estimate of the probable effect of such delay on the progress of the work
 3. In arriving at any credit due the Contractor for an extension of time on the Contract, the OWNER, upon the recommendation of the Engineer, may allow such credit as in his judgment is deemed equitable and just for all delays occasioned by any act, or failure to act, on the part of the Contractor or caused by forces beyond the Contractor's control. Additional time will also be allowed the Contractor to cover approved over-runs or additions to the Contract in the same proportion that the said over-runs or additions in monetary value bears to the

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original Contract amount. Delays caused by normal and ordinary weather conditions foreseeable at the time the work is Bid will not be the basis for an extension of the Contract time.

3.2 LIQUIDATED DAMAGES

The Owner expressly states to the Contractor that **time is of the essence** in the Contractor's performance of their obligations and duties required by this Contract.

- A. Should the Contractor fail or refuse to complete the work within the time specified in his Proposal and/or Contract (or extension of time granted by the OWNER), the Contractor shall pay liquidated damages in an amount set out in said Proposal and/or Contract. The amount of liquidated damages shall in no event be considered as a penalty, nor other than an amount agreed upon by the Contractor and the OWNER for damages, losses, additional engineering, additional resident representation and other costs that will be sustained by the OWNER, if the Contractor fails to complete the work within the specified time. Liquidated damages will be applied on a rate per day for each and every calendar day (Sundays and holidays included) beyond the Contract expiration date stipulated in the Contract Documents, considering all time extensions granted.
1. In the event that the Contractor fails to achieve Substantial Completion of the Work for this Contract by the date indicated in the Contract Documents, including any extension of time granted under the General Conditions, the Contractor shall pay to the Owner set liquidated damages in the amount of one hundred fifty dollars (**\$150**) per calendar day because of any delay in substantially completing such Work, and for Liquidated Damages, such as the Owner's increased overhead and cost of additional administration of the Contract, and not as a penalty, for each and every calendar day that the Contractor shall be in default.
 2. Upon reaching Substantial Completion as defined in the General and Special Conditions and as certified by the Engineer, Liquidated Damages for Substantial Completion shall end.
 3. In the event that the Contractor fails to achieve Final Completion of the Work for this Contract by the date indicated in the Contract Documents, including any extension of time granted under the General Conditions, the contractor shall pay to the Owner set Liquidated Damages in the amount of one hundred fifty dollars (**\$150**) per calendar day until Final Completion has been reached.
- B. Owner shall have the right to deduct Liquidated Damages from money otherwise due or to become due to Contractor, or to sue for and recover compensation for damages for nonperformance of this contract within the time stipulated herein.

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4.0 LUMP SUM BID

Payment for construction will be “LUMP SUM”. Any reference to material quantity is for informational purposes only. The Contractor is responsible for performing quantity take offs for cost estimating.

5.0 HAZARDOUS MATERIALS

- A. If hazardous materials are encountered, including but not limited to asbestos, polychlorinated biphenyl, lead, mercury or other similar materials on site, which has not been abated or rendered harmless, the Contractor shall immediately stop work in the area affected, and report the condition to the Owner.
- B. The Contractor shall comply with the terms of the Owners Hazardous Materials Guidelines attached to the end of this section.

END OF SECTION 01010

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SECTION 01015 - WORK SEQUENCE

PART 1 - GENERAL

1.01 WORK INCLUDED

The Contractor shall conform to all miscellaneous requirements as contained in the Contract.

1.02 RELATED REQUIREMENTS

- A. Section 00700 - General Conditions.
- B. Section 01010 – Summary of Work.
- C. Section 01040 - Coordination.

PART 2 - PRODUCTS

2.01 MATERIALS

The Contractor shall comply with the Specifications for type of work to be done.

PART 3 - EXECUTION

3.01 SEQUENCE OF CONSTRUCTION OPERATIONS

The Contractor shall submit to the Engineer for review and acceptance a complete schedule (progress chart) of his proposed sequence of construction operations prior to commencement of work. However, the Engineer shall not accept a construction schedule that fails to utilize the entire time allocated for the construction of the Project. The Contractor shall schedule the various construction activities to complete the Project throughout the entire allotted time period. This schedule requirement in no way prevents the Contractor from completing the Project in a shorter time frame than scheduled. The construction schedule along with a cost breakdown schedule shall be submitted and approved by the Owner prior to the submittal of the first partial payment request in accordance with the General Conditions. A revised construction schedule shall be submitted to the Owner with each pay request. This revised schedule must be approved by the Owner prior to payment.

END OF SECTION 01015

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SECTION 01025 - MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 WORK INCLUDED

The Contractor shall furnish all necessary labor, machinery, tools, apparatus, equipment, materials, services and other necessary supplies and perform all work shown on the Drawings and/or described in the Specifications and Contract Documents at the lump sum price provided in the Agreement. Should it become necessary to adjust the project scope, the unit prices provided in the Contractor's Bid shall be used as appropriate. The methodology used to calculate adjustments shall be as provided in this section and as approved by the Engineer.

1.02 COMPUTATION OF QUANTITIES

- A. For estimating quantities in which the computation of areas by geometric methods would be comparatively laborious, it is agreed that the planimeter shall be considered an instrument of precision adapted to the measurement of such areas.
- B. It is further agreed that the computation of the volume of prismsoids shall be by the method of average end area.

1.03 PROGRESS AND PAYMENT SCHEDULES

- A. Within fifteen (15) days after the date of formal execution of the Agreement, the Contractor shall prepare and submit to the Engineer, for approval, a construction schedule which depicts the Contractor's plan for completing the Contract requirements and show work placement in dollars versus Contract time. The Engineer must approve the Contractor's construction schedule before any payments will be made on this Contract.
- B. Within fifteen (15) days after the date of formal execution of the Agreement, the Contractor shall prepare and submit to the Engineer, for approval, a periodic estimate which depicts the Contractor's cost for completing the Contract requirements and shows by major unit of the project work the Contractor's dollar value for the material and the labor (two separate amounts) to be used as a basis for the periodic payments. The Engineer must approve the Contractor's periodic estimate before any payments will be made on this Contract.
- C. The Engineer's decision as to sufficiency and completeness of the Contractor's construction schedule and periodic estimate will be final.

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- D. The Contractor must make current, to the satisfaction of the Engineer, the construction schedule and periodic estimate each time he requests a payment on this Contract.
- E. The Contractor's construction schedule and periodic estimate must be maintained at the construction site available for inspection and shall be revised to incorporate approved change orders as they occur.
- F. When the Contractor requests a payment on this Contract, it must be on the approved periodic estimate and be current. Further, the current periodic estimate and construction schedule (both updated and revised) shall be submitted for review and approval by the Engineer before monthly payments will be made by the Owner. The Contractor shall submit five (5) current copies of each (periodic estimate and construction schedule) when requesting payment.

1.04 CONDITIONS FOR PAYMENT

- A. The Owner will make payments for acceptable work in place and materials properly stored on-site. The value of payment shall be as established on the approved construction schedule and periodic estimate, EXCEPT the Owner will retain ten percent (10%) of the work in place and a percentage as hereinafter listed for items properly stored or untested.
- B. No payment will be made for stored materials unless a proper invoice from the supplier is attached to the pay request. Furthermore, no item whose value is less than \$1,000.00 will be considered as stored materials for pay purposes.
- C. No payment will be made for the labor portion of items until items have been tested and accepted by the Engineer.
- D. Payment for equipment items shall be limited to ninety percent (90%) of their scheduled value (materials portion only) until they are set in place. Ninety percent (90%) payment for stored materials and equipment shall be contingent on proper on-site storage as recommended by the manufacturer or required by the Engineer.
- E. Payment for equipment items set in-place shall be limited to ninety percent (90%) of their scheduled value until they are ready for operation and have been certified by the manufacturer. Ninety percent (90%) payment for installed equipment shall be contingent on proper routine maintenance of the equipment in accordance with the manufacturer's recommendations.
- F. Payment for the labor portion of equipment items will be subject only to the degree of completeness and the appropriate retainage.
- G. The Owner may reduce the percent of retainage once the Project has achieved satisfactory progress and is at the fifty percent (50%) construction status. The dollar

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amount of retainage for work-in-place will not be reduced but will remain constant following the fifty percent (50%) constructed status. The retainage on the equipment items shall be determined as defined herein before.

- H. Additionally, the Owner may reinstate the retainage to a full ten percent (10%) of the scheduled value of work-in-place and material items should the Owner, at its discretion, determine that the Contractor is not making satisfactory progress or there is other specific cause for such withholding.

1.05 CLAIMS FOR EXTRA WORK

- A. If the Contractor claims that any instructions by Drawings or otherwise involve extra cost, he shall give the Engineer written notice of said claim within ten (10) days after the receipt of such instructions, and in any event before proceeding to execute the work, stating clearly and in detail the basis of his claim or claims. No such claim shall be valid unless so made.
- B. Claims for additional compensation for extra work, due to alleged errors in spot elevations, contour lines or bench marks, will not be recognized unless accompanied by certified survey data, made prior to the time the original ground was disturbed, clearly showing that errors exist which resulted, or would result, in handling more material or performing more work than would be reasonably estimated from the Drawings and topographical maps issued.
- C. Any discrepancies which may be discovered between actual conditions and those represented by the topographical maps and Drawings shall at once be reported to the Engineer, and work shall not proceed, except at the Contractor's risk, until written instructions have been received by him from the Engineer.
- D. If, on the basis of the available evidence, the Engineer determines that an adjustment of the Contract Price or time is justifiable, the procedure shall then be as provided herein for "Changes in Work".
- E. By execution of this Contract, the Contractor warrants that he has visited the site of the proposed work and fully acquainted himself with the conditions there existing relating to construction and labor, and that he fully understands the facilities, difficulties and restrictions attending the execution of the work under this Contract. The Contractor further warrants that he has thoroughly examined and is familiar with the Drawings, Specifications and all other documents comprising the Contract. The Contractor further warrants that by execution of this Contract his failure when he was bidding on this Contract to receive or examine any form, instrument or document or to visit the site and acquaint himself with conditions there existing, in no way relieves him from any obligation under the Contract, and the Contractor based on facts regarding which he should have been on notice as a result thereof.

1.06 DETERMINATION OF THE VALUE OF EXTRA (ADDITIONAL) OR OMITTED

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WORK

- A. The value of extra (additional) or omitted work shall be determined in one or more of the following ways:
1. On the basis of the actual cost of all the items of labor (including on-the-job supervision), materials and use of equipment plus a maximum of fifteen percent (15%) which shall cover the Contractor's general supervision, overhead and profit. In case of subcontracts, the fifteen percent (15%) is interpreted to mean the subcontractor's supervision, overhead and profit, and an additional five percent (5%) may then be added to such costs to cover the General Contractor's supervision, overhead and profit. The cost of labor shall include required insurance, taxes and fringe benefits. Equipment costs shall be based on current rental rates in the areas where the work is being performed, but in no case shall such costs be greater than the current rates published by the Associated Equipment Distributors, Chicago, Illinois.
 2. By estimate and acceptance in a lump sum.
 3. By unit prices named in the Contract or subsequently agreed upon.
- B. Provided, however, that the cost or estimated cost of all extra (additional) work shall be determined in advance of authorization by the Engineer and approved by the Owner.
- C. All extra (additional) work shall be executed under the conditions of the original Contract. Any claim for extension of time shall be adjusted according to the proportionate increase or decrease in the final total cost of the work unless negotiated on another basis.
- D. Except for over-runs in Contract unit price items, no extra (additional) work shall be done except upon a written Change Order from the Engineer, and no claim on the part of the Contractor for pay for extra (additional) work shall be recognized unless so ordered in writing by the Engineer.

PART 2 – PRODUCTS

Lump Sum Project – Not Applicable.

PART 3 - EXECUTION

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3.01 PAY ITEMS

Any and all items of Work listed in the Specifications or shown on the Drawings for this Contract shall be considered part of the project and, therefore, are assumed to be included in the lump sum figure provided in the Agreement.

3.02 QUANTITIES OF ESTIMATE

Wherever the estimated quantities of work to be done and materials to be furnished under this Contract are shown in any of the documents, including the Bid Proposal, they are given for use in comparing bids and the right is especially reserved except as herein otherwise specifically limited, to increase or diminish them as may be deemed reasonably necessary or desirable by the Owner to complete the Work contemplated by this Contract, and such increase or diminution shall not give cause for claims or liability for damages. The Engineer will not be financially responsible for any omissions from the Contract Documents and therefore not included by the Contractor in his proposal.

END OF SECTION 01025

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SECTION 01040 - COORDINATION

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. The Contractor shall coordinate the Work of all crafts, trades and subcontractors engaged on the Work, and he shall have final responsibility in regards to the schedule, workmanship and completeness of each and all parts of the Work.
- B. All crafts, trades and subcontractors shall be made to cooperate with each other and with others as they may be involved in the installation of work which adjoins, incorporates, precedes or follows the work of another. It shall be the Contractor's responsibility to point out areas of cooperation prior to execution of subcontract agreements and the assignment of the parts of the Work. Each craft, trade and subcontractor shall be made responsible to the Owner, for furnishing embedded items, giving directions for doing all cutting and fitting, making all provisions for accommodating the Work, and for protecting, patching, repairing and cleaning as required to satisfactorily perform the Work.
- C. The Contractor shall be responsible for all cutting, digging and other action of his subcontractors and workmen. Where such action impairs the safety or function of any structure or component of the Project, the Contractor shall make such repairs, alterations and additions as will, in the opinion of the Engineer, bring said structure or component back to its original design condition at no additional cost to the Owner.
- D. Each subcontractor is expected to be familiar with the General Requirements and all Sections of the Detailed Specifications for all other trades and to study all Drawings applicable to his work to the end that complete coordination between the trades will be affected. Each Contractor shall consult with the Engineer if conflicts exist on the Drawings.
- E. No extra compensation will be allowed to cover the cost of removing piping, conduits, etc., or equipment found encroaching on space required by others.

END OF SECTION 01040

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SECTION 01300 - SUBMITTALS

PART 1 - GENERAL

1.01 WORK INCLUDED

Shop drawing, descriptive literature, project data and samples (when samples are specifically requested) for all manufactured or fabricated items shall be submitted by the Contractor to the Engineer for examination and review in the form and in the manner required by the Engineer. All submittals shall be furnished in at least three (3) copies to be retained by the Engineer and shall be checked and reviewed by the Contractor before submission to the Engineer. The review of the submittal by the Engineer shall not be construed as a complete check, but will indicate only that the general method of construction and detailing is satisfactory. Review of such submittal will not relieve the Contractor of the responsibility for any errors which may exist as the Contractor shall be responsible for the dimensions and design of adequate connections, details, and satisfactory construction of all work.

1.02 RELATED REQUIREMENTS

- A. Section 00700 - General Conditions.
- B. Section 01720 - Project Record Documents (As-Built Drawings).

1.03 DEFINITIONS

The term "submittals" shall mean shop drawings, manufacturer's drawings, catalog sheets, brochures, descriptive literature, diagrams, schedules, calculations, material lists, performance charts, test reports, office and field samples, and items of similar nature which are normally submitted for the Engineer's review for conformance with the design concept and compliance with the Contract Documents.

1.04 GENERAL CONDITIONS

Review by the Engineer of shop drawings or submittals of material and equipment shall not relieve the Contractor from the responsibilities of furnishing same of proper dimension, size, quantity, materials and all performance characteristics to efficiently perform the requirements and intent of the Contract Documents. Review shall not relieve the Contractor from responsibility for errors of any kind on the shop drawings. Review is intended only to assure conformance with the design concept of the Project and compliance with the information given in the Contract Documents. Review of shop drawings shall not be construed as releasing the Contractor from the responsibility of complying with the Specifications.

1.05 GENERAL REQUIREMENTS FOR SUBMITTALS

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- A. Shop drawings shall be prepared by a qualified detailer. Details shall be identified by reference to sheet and detail numbers shown on Contract Documents. Where applicable, show fabrication, layout, setting and erection details. Shop drawings are defined as original drawings prepared by the Contractor, subcontractors, suppliers, or distributors performing work under this Contract. Shop drawings illustrate some portion of the work and show fabrication, layout, setting or erection details of equipment, materials and components. The Contractor shall, except as otherwise noted, have prepared the number of reviewed copies required for his distribution plus three (3) which will be retained by the Engineer and Owner. Shop drawings shall be folded to an approximate size of 8-1/2 inch x 11 inch and in such manner that the title block will be located in the lower right-hand corner of the exposed surface.
- B. Project data shall include manufacturer's standard schematic drawings modified to delete information which is not applicable to the Project, and shall be supplemented to provide additional information applicable to the Project. Each copy of descriptive literature shall be clearly marked to identify pertinent information as it applies to the Project.
- C. Where samples are required, they shall be adequate to illustrate materials, equipment or workmanship, and to establish standards by which completed work is judged. Provide sufficient size and quantity to clearly illustrate functional characteristics of product and material, with integrally related parts and attachment devices, along with a full range of color samples.
- D. All submittals shall be referenced to the applicable item, section and division of the Specifications, and to the applicable Drawing(s) or Drawing schedule(s) and shall be with transmittal forms and format provided by the Engineer.
- E. The Contractor shall review and check submittals, and indicate his review by initials and date.
- F. If the submittals deviate from the Contract Drawings and/or Specifications, the Contractor shall advise the Engineer, in letter of transmittal of the deviation and the reasons therefore. All changes shall be clearly marked on the submittal with a bold mark other than red. Any additional costs for modifications shall be borne by the Contractor.
- G. In the event the Engineer does not specifically reject the use of material or equipment at variance to that which is shown on the Drawings or specified, the Contractor shall, at no additional expense to the Owner, and using methods reviewed by the Engineer, make any changes to structures, piping, controls, electrical work, mechanical work, etc., that may be necessary to accommodate this equipment or material. Should equipment other than that on which design drawings are based be accepted by the Engineer, shop drawings shall be submitted detailing all modification work and equipment changes made necessary by the substituted item.

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- H. Additional information on particular items, such as special drawings, schedules, calculations, performance curves, and material details, shall be provided when specifically requested in the technical Specifications.
- I. Submittals for all electrically operated items (including instrumentation and controls) shall include complete wiring diagrams showing lead, runs, number of wires, wire size, color coding, all terminations and connections, and coordination with related equipment.
- J. Equipment shop drawings shall indicate all factory or shop paint coatings applied by suppliers, manufacturers and fabricators; the Contractor shall be responsible for insuring the compatibility of such coatings with the field-applied paint products and systems.
- K. Fastener specifications of manufacturer shall be indicated on equipment shop drawings.
- L. Where manufacturer's brand names are given in the Specifications for building and construction materials and products, such as grout, bonding compounds, curing compounds, masonry cleaners, waterproofing solutions and similar products, the Contractor shall submit names and descriptive literature of such materials and products he proposes to use in this Contract.
- M. No material shall be fabricated or shipped unless the applicable drawings or submittals have been reviewed by the Engineer and returned to the Contractor.
- N. All bulletins, brochures, instructions, parts lists, and warranties packaged with and accompanying materials and products delivered to and installed in the Project shall be saved and transmitted to the Owner through the Engineer.
- O. All submittals shall be made by the use of a multi-copy transmittal form supplied by the Engineer. All applicable blanks on the form shall be filled in with the appropriate data.

1.06 CONTRACTOR RESPONSIBILITIES

- A. Verify field measurements, field construction criteria, catalog numbers and similar data.
- B. Coordinate each submittal with requirements of Work and Contact Documents.

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- C. Notify Engineer, in writing at time of submission, of deviations in submittals from requirements of Contract Documents.
- D. Begin no work, and have no material or products fabricated or shipped which required submittals until return of submittals with Engineer's stamp and initials or signature indicating review.

END OF SECTION 01300

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SECTION 01310 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on the Project including, but not limited to, the following:

1. Coordination Drawings.
2. Project meetings.

1.02 COORDINATION

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.

3. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
4. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
5. Make adequate provisions to accommodate items scheduled for later installation.
6. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.

- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at .

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's Construction Schedule.

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conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's Construction Schedule.
2. Preparation of the Schedule of Values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.
9. Project closeout activities.

1.01 SUBMITTALS

Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.

1. Content: Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:
 - a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - b. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
2. Sheet Size: At least 8-1/2 by 11 inches but no larger than 30 by 40 inches.
3. Number of Copies: Submit six copies of each submittal. Owner shall get three copies and the Engineer will return one copy.
4. Refer to individual Sections for Coordination Drawing requirements for Work in those Sections.

1.04 PROJECT MEETINGS

- A. General: The scheduling of meetings and conferences will be performed by the Engineer, unless otherwise noted. The Engineer will notify Contractor, Owner, and other individuals whose presence is required of the date, time and location of each meeting. Minutes will be recorded at each meeting and distributed among meeting participants.

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- B. Preconstruction Conference: There shall be a preconstruction conference before starting construction. The meeting shall review responsibilities and personnel assignments.
1. Attendees: Authorized representatives of Owner, Engineer, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and related Work.
 2. Agenda: Items of discussion shall be of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing and long-lead items.
 - d. Designation of key personnel and their duties.
 - e. Procedures for processing field decisions and Change Orders.
 - f. Procedures for requests for interpretations (RFIs).
 - g. Procedures for testing and inspecting.
 - h. Procedures for processing Applications for Payment.
 - i. Distribution of the Contract Documents.
 - j. Submittal procedures.
 - k. LEED requirements.
 - l. Preparation of Record Documents.
 - m. Use of the premises.
 - n. Work restrictions.
 - o. Owner's occupancy requirements.
 - p. Responsibility for temporary facilities and controls.
 - q. Construction waste management and recycling.
 - r. Parking availability.
 - s. Storage areas.
 - t. Equipment deliveries and priorities.
 - u. First aid.
 - v. Security.
 - w. Progress cleaning.
 - x. Working hours.
- C. Pre-installation Conferences: Contractor shall schedule a pre-installation meeting, held at Project site, before each construction activity that requires coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Engineer of scheduled meeting dates.
 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

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- a. The Contract Documents.
 - b. Options.
 - c. Related requests for interpretations (RFIs).
 - d. Related Change Orders.
 - e. Purchases.
 - f. Deliveries.
 - g. Submittals.
 - h. Review of mockups.
 - i. Possible conflicts.
 - j. Compatibility problems.
 - k. Time schedules.
 - l. Weather limitations.
 - m. Manufacturer's written recommendations.
 - n. Warranty requirements.
 - o. Compatibility of materials.
 - p. Acceptability of substrates.
 - q. Temporary facilities and controls.
 - r. Space and access limitations.
 - s. Regulations of authorities having jurisdiction.
 - t. Testing and inspecting requirements.
 - u. Installation procedures.
 - v. Coordination with other work.
 - w. Required performance results.
 - x. Protection of adjacent work.
 - y. Protection of construction and personnel.
3. Engineer shall record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 4. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Progress meetings shall be conducted at regular intervals and as deemed necessary by Engineer.
1. Attendees: In addition to representatives of Owner and Engineer, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule.

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Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time. Review schedule for next period.

- b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Work hours.
 - 10) Hazards and risks.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Status of correction of deficient items.
 - 14) Field observations.
 - 15) Requests for interpretations (RFIs).
 - 16) Status of proposal requests.
 - 17) Pending changes.
 - 18) Status of Change Orders.
 - 19) Pending claims and disputes.
 - 20) Documentation of information for payment requests.

- c. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01310

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SECTION 01322 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for the following:
 - 1. Preconstruction photographs.
 - 2. Periodic construction photographs.
- B. See Division 1 Section "Closeout Procedures" for submitting digital media as Project Record Documents at Project closeout.
- C. See Division 1 Section "Demonstration and Training" for submitting videotapes of demonstration of equipment and training of Owner's personnel.

1.2 SUBMITTALS

- A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same label information as corresponding set of photographs.
- B. Construction Photographs: Submit two prints of each photographic view within seven days of taking photographs.
 - 1. Format: 4-by-6-inch smooth-surface matte prints on single-weight commercial-grade photographic paper, enclosed back to back in clear plastic sleeves that are punched for standard 3-ring binder.
 - 2. Identification: On back of each print, provide an applied label or rubber-stamped impression with the following information:
 - a. Name of Project.
 - b. Name and address of photographer.
 - c. Name of Engineer.
 - d. Name of Contractor.
 - e. Date photograph was taken if not date stamped by camera.
 - f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
 - g. Unique sequential identifier.
 - 3. Digital Images: Submit a complete set of digital image electronic files with each submittal of prints on CD-ROM. Identify electronic media with date photographs were taken. Submit images that have same aspect ratio as the sensor, uncropped.

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1.3 QUALITY ASSURANCE

- A. Photographer Qualifications: An individual who has been regularly engaged as a professional photographer of construction projects for not less than three years.

1.4 COORDINATION

- A. Auxiliary Services: Cooperate with photographer and provide auxiliary services requested, including access to Project site and use of temporary facilities, including temporary lighting required to produce clear, well-lit photographs without obscuring shadows.

1.5 USAGE RIGHTS

- A. Obtain and transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.

1.6 EXTRA PRINTS

- A. Photographer shall retain digital images for three years after date of Substantial Completion. During this period, photographer shall fill orders by Engineer or Owner for extra prints. Photographer shall price extra prints at prevailing local commercial prices.

PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC MEDIA

- A. Digital Images: Provide images in uncompressed JPEG format, produced by a digital camera with minimum sensor size of 4.0 megapixels, and at an image resolution of not less than 1024 by 768 pixels.

PART 3 - EXECUTION

3.1 CONSTRUCTION PHOTOGRAPHS

- A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
 - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.

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- B. Film Images:
1. Date Stamp: Unless otherwise indicated, date and time stamp each photograph as it is being taken so stamp is integral to photograph.
 2. Field Office Prints: Retain one set of prints of progress photographs in the field office at Project site, available at all times for reference. Identify photographs same as for those submitted to Engineer.
- C. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
1. Date and Time: Include date and time in filename for each image.
 2. Field Office Images: Maintain one set of images on CD-ROM in the field office at Project site, available at all times for reference. Identify images same as for those submitted to Engineer.
- D. Preconstruction Photographs: Before starting construction, take color, digital photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Engineer.
1. Flag excavation areas construction limits before taking construction photographs.
 2. Take 24 photographs to show existing conditions adjacent to property before starting the Work.
 3. Take eight photographs of existing structures either on or adjoining property to accurately record physical conditions at start of construction.
- E. Periodic Construction Photographs: Take 12 color, digital photographs weekly, with timing each month adjusted to coincide with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.
- F. Additional Photographs: Engineer may issue requests for additional photographs, in addition to periodic photographs specified. Additional photographs will be paid for by Change Order and are not included in the Contract Sum.
1. Three days' notice will be given, where feasible.
 2. In emergency situations, take additional photographs within 24 hours of request.
 3. Circumstances that could require additional photographs include, but are not limited to, the following:
 - a. Special events planned at Project site.
 - b. Immediate follow-up when on-site events result in construction damage or losses.
 - c. Photographs to be taken at fabrication locations away from Project site. These photographs are not subject to unit prices or unit-cost allowances.

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- d. Substantial Completion of a major phase or component of the Work.
- e. Extra record photographs at time of final acceptance.
- f. Owner's request for special publicity photographs.

END OF SECTION 01322

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SECTION 01550 - ACCESS ROADS AND PARKING AREAS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Access roads.
- B. Temporary parking.
- C. Existing pavements and parking areas.
- D. Permanent pavements and parking areas.
- E. Maintenance.
- F. Removal and repair.

1.02 RELATED REQUIREMENTS (not used)

PART 2 - PRODUCTS

2.01 MATERIALS

For temporary construction: Contractor's option but must be approved by the Owner.

PART 3 - EXECUTION

3.01 PREPARATION

Clear areas, provide proper surface and storm drainage of premises and adjacent areas.
Install erosion protection.

3.02 ACCESS ROADS

- A. Construct temporary all-weather access roads from public thoroughfares to serve construction area, of a width and load-bearing capacity to provide unimpeded traffic for construction purposes.
- B. Construct temporary bridges and/or culverts to span low areas and allow unimpeded drainage.
- C. Extend and relocate as work progress requires, and provide detours as necessary for

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SECTION 01535 - PROTECTION OF INSTALLED WORK

PART 1 - GENERAL

1.01 WORK INCLUDED

Protection for products, including Owner-provided products, after installation.

1.02 RELATED REQUIREMENTS

Division 1 - General Requirements.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 PROTECTION AFTER INSTALLATION

- A. Protect installed products and control traffic in immediate area to prevent damage from subsequent operations.
- B. Restrict traffic of any kind across planted lawn and landscape areas.

END OF SECTION 01535

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unimpeded traffic flow.

- D. Locate temporary access roads as approved by the Owner and/or the Engineer.
- E. Provide and maintain access to all Owner and Public facilities.

3.03 TEMPORARY PARKING

Construct temporary parking areas to accommodate use of construction personnel in an area acceptable to the Owner and/or the Engineer. Pay all costs relating to temporary parking.

3.04 MAINTENANCE

- A. Maintain traffic and parking areas in a sound condition, free of excavated material, construction equipment, products, mud, snow and ice. Use whatever dust control measures required to prevent airborne particles.
- B. Maintain existing paved areas used for construction; promptly repair breaks, potholes, low areas, standing water and other deficiencies to maintain paving and drainage in original and/or specified condition.

3.05 REMOVAL AND REPAIR

- A. Remove temporary materials and construction when permanent facilities are usable as directed by the Engineer.
- B. Remove underground work and compacted materials to a depth of two (2) feet; fill and grade site as specified.
- C. The Contractor shall repair and/or replace, at no expense to the Owner, any sections of existing roads, drives, streets, sidewalks, curbs, utilities, buildings, trees and landscape plantings and other structures damaged by reason or work performed under this contract or incidental thereto, whether by his own forces or by his subcontractors or by his material suppliers..

END OF SECTION 01550

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SECTION 01560 - TEMPORARY CONTROLS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Dust control.
- B. Erosion and sediment control.

1.02 RELATED REQUIREMENTS

- A. Section 01565 - Erosion and Sediment Control.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 DUST CONTROL

Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere. Provide spraying of dust with water so no dust leaves the site.

3.02 EROSION AND SEDIMENT CONTROL

- A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
- B. Minimize amount of bare soil exposed at one time.
- C. Provide temporary measures such as berms, dikes, drains, fiber rolls, gabions, etc., as directed by the Engineer so as to minimize siltation due to runoff.
- D. Construct fill and waste areas by selective placement to avoid erosive exposed surface of silts or clays.
- E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- F. See Drawings for additional Erosion Control details and requirements.

END OF SECTION 01560

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SECTION 01565 - EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. The Contractor shall do all Work and take all measures necessary to control soil erosion resulting from construction operations, shall prevent the flow of sediment from the construction site, and shall contain construction materials (including excavation and backfill) within the protected working area so as to prevent damage to the adjacent wetlands and/or water courses. Permanent Erosion Control has been clearly identified in the Construction Drawings and Notes.
- B. The Contractor shall not employ any construction method that violates a rule, regulation, guideline or procedure established by Federal, State or local agencies having jurisdiction over the environmental effects of construction.
- C. Pollutants such as chemicals, fuels, lubricants, bitumen, raw sewage and other harmful waste shall not be discharged into or alongside of any body of water or into natural or man-made channels leading thereto.

1.02 STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

Contractor is responsible to carry out SWPPP and all associated inspection and maintenance requirements. A copy of the SWPPP shall be kept on site during construction. The SWPPP is included in Appendix A.

1.03 NOTICE OF INTENT

Contractor is responsible for submitting the KPDES Storm Water Notice of Intent (NOI) prior to construction as required by the Kentucky Division of Water. A copy of such application is attached immediately following this section.

1.04 NOTICE OF TERMINATION

Contractor is responsible for submitting the KPDES Storm Water Notice of Termination (NOT) upon Final Completion of construction as required by the Kentucky Division of Water. A copy of such application is attached immediately following this section.

PART 2 - PRODUCTS

2.01 MATERIALS

Fiber rolls shall be reasonably clean and free of noxious weeds and deleterious materials. Filter fabric for sediment traps shall be of suitable materials acceptable to

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the Engineer. Erosion Control Blanket for permanent bank stabilization is clearly delineated in the Construction Drawings. The Contractor shall install any additional means or methods needed to control site erosion during construction.

PART 3 - EXECUTION

3.01 METHODS OF CONSTRUCTION

- A. The Contractor shall use any of the acceptable methods necessary to control soil erosion and prevent the flow of sediment to the maximum extent possible. These methods shall include, but not be limited to, the use of water diversion structures, diversion ditches and settling basins. It is recommended that excavated trench material be placed on opposite side of trench from adjacent water courses.
- B. Construction operations shall be restricted to the areas of work indicated on the Drawings and to the area which must be entered for the construction of temporary or permanent facilities. The Engineer has the authority to limit the surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow and fill operations and to direct the Contractor to provide immediate permanent or temporary pollution control measures to prevent contamination of the wetlands and adjacent watercourses. Such work may involve the construction of temporary berms, dikes, dams, sediment basins, slope drains, and use of temporary mulches, mats, or other control devices or methods as necessary to control erosion.
- C. Excavated soil material shall not be placed adjacent to the wetlands or watercourses in a manner that will cause it to be washed away by high water or runoff. Earth berms or diversions shall be constructed to intercept and divert runoff water away from critical areas. Diversion outlets shall be stable or shall be stabilized by means acceptable to the Engineer. If for any reason construction materials are washed away during the course of construction, the Contractor shall remove those materials from the fouled areas as directed by the Engineer.
- D. For Work within easements or rights-of-way, all materials used in construction such as excavation, backfill, roadway, and pipe bedding and equipment shall be kept within the limits of these easements or rights-of-way.
- E. The Contractor shall not pump silt-laden water from trenches or other excavation into the wetlands, or adjacent watercourses. Instead, silt-laden water from his excavations shall be discharged within areas surrounded by baled hay or into sediment traps or ensure that only sediment-free water is returned to the watercourses. Damage to vegetation by excessive watering or silt accumulation in the discharge area shall be avoided.
- F. Prohibited construction procedures include, but are not limited to the following:

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1. Dumping of spoil material into any streams, wetlands, surface waters, or unspecified locations.
 2. Indiscriminate, arbitrary, or capricious operation of equipment in wetlands or surface waters.
 3. Pumping of silt-laden water from trenches or excavations into surface waters, or wetlands.
 4. Damaging vegetation adjacent to or outside of the construction area limits.
 5. Disposal of trees, brush, debris, paints, chemicals, asphalt products, concrete curing compounds, fuels, lubricants, insecticides, washwater from concrete trucks or hydroseeders, or any other pollutant in wetlands, surface waters, or unspecified locations.
 6. Unauthorized alteration of the flow line of any stream.
- G. Any temporary working roadways required shall be clean fill approved by the Engineer. In the event fill is used, the Contractor shall take every precaution to prevent the fill from mixing with native materials of the site. All such foreign fill materials shall be removed from the site following construction.

3.02 EROSION CHECKS

The Contractor shall furnish and install silt fence, mulch berm, or fiber roll erosion checks surrounding the base of all deposits of stored excavated material outside of the disturbed area, and where indicated by the Engineer. Checks located surrounding stored material shall be located approximately 6 feet from that material. Rolls shall be held in place with 2 inch by 2 inch by 3 feet wooden stakes. Checks shall be tied into the banks of a drainage channel to prevent short circuiting and scouring around the erosion check.

END OF SECTION 01565

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SECTION 01570 - TRAFFIC REGULATION

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Construction parking control.
- B. Flagmen.
- C. Flares and lights.
- D. Haul routes.
- E. Removal.

1.02 RELATED REQUIREMENTS

- A. Section 01500 – Temporary Facilities and Controls
- B. Section 01580 - Project Identification and Signs.

PART 2 - PRODUCTS

2.01 SIGNS AND DEVICES

- A. Traffic Cones and Drums, Flares and Lights: As approved by local jurisdictions.
- B. Flagman Equipment: As required by local jurisdictions.

PART 3 - EXECUTION

3.01 CONSTRUCTION PARKING CONTROL

- A. Control vehicular parking to prevent interference with public traffic and parking, access by emergency vehicles and Owner's operations.
- B. Monitor parking of construction personnel's vehicles in existing facilities. Maintain vehicular access to and through parking areas.
- C. Prevent parking on or adjacent to access roads or in non-designated areas.

3.02 TRAFFIC CONTROL

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- A. Whenever and wherever, in the Engineer's opinion, traffic is sufficiently congested or public safety is endangered, Contractor shall furnish uniformed officers to direct traffic and to keep traffic off the highway area affected by construction operations.
- B. Contractor shall abide by county and state regulations governing utility construction work.
- C. Traffic control shall be provided according to the Kentucky Department of Highways Manual on Uniform Traffic Control Devices for Streets and Highways.

3.03 FLAGMEN

Provide trained and equipped flagmen to regulate traffic when construction operations or traffic encroach on public traffic lanes.

3.04 FLARES AND LIGHTS

Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

3.05 HAUL ROUTES

- A. Consult with authorities, establish public thoroughfares to be used for haul routes and site access.
- B. Confine construction traffic to designated haul routes.
- C. Provide traffic control at critical areas of haul routes to regulate traffic and minimize interference with public traffic.

3.06 REMOVAL

Remove equipment and devices when no longer required.

END OF SECTION 01570

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SECTION 01700 - PROJECT CLOSEOUT

PART 1 - GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 00700 - General Conditions.
- B. Section 01720 - Project Record Documents.

1.02 SUBSTANTIAL COMPLETION

- A. Contractor:
 - 1. Submit written certification to Engineer that project is substantially complete.
 - 2. Submit list of major items to be completed or corrected.
- B. Engineer will make an inspection within seven days after receipt of certification, together with the Owner's representative.
- C. Should Engineer consider that work is substantially complete:
 - 1. Contractor shall prepare, and submit to Engineer, a list of the items to be completed or corrected, as determined by on-site observation.
 - 2. Engineer will prepare and issue a Certificate of Substantial Completion, containing:
 - a. Date of Substantial Completion.
 - b. Contractor's list of items to be completed or corrected, verified and amended by Engineer.
 - c. The time within which Contractor shall complete or correct work of listed items.
 - d. Time and date Owner will assume possession of work or designated portion thereof.
 - e. Responsibilities of Owner and Contractor for:
 - (1) Insurance.
 - (2) Utilities.
 - (3) Maintenance and cleaning.
 - (4) Security.

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f. Signatures of:

- (1) Engineer.
- (2) Contractor.
- (3) Owner.

3. Contractor: Complete work listed for completion or correction, within designated time.

D. Should Engineer consider that work is not substantially complete:

1. He shall immediately notify Contractor, in writing, stating reasons.
2. Contractor: Complete work, and send second written notice to Engineer, certifying that Project, or designated portion of project is substantially complete.
3. Engineer will re-review work.

1.03 FINAL INSPECTION

A. Contractor shall submit written certification that:

1. Contract Documents have been reviewed.
2. Project has been inspected for compliance with Contract Documents.
3. Work has been completed in accordance with Contract Documents.
4. Equipment and systems have been tested in presence of Owner's representative and are operational.
5. Project is completed and ready for final inspection.

B. Engineer will make final on-site observation/review within seven (7) days after receipt of certification.

C. Should Engineer consider that work is finally complete in accordance with requirements of Contract Documents, he shall request Contractor to make Project Closeout submittals.

D. Should Engineer consider that work is not finally complete:

1. He shall notify Contractor, in writing, stating reasons.
2. Contractor shall take immediate steps to remedy the stated deficiencies, and send second written notice to Engineer certifying that work is complete.
3. Engineer will re-review the work.

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1.04 FINAL CLEANING UP

The work will not be considered as completed and final payment made until all final cleaning up has been done by the Contractor in a manner satisfactory to the Engineer.

1.05 CLOSEOUT SUBMITTALS

- A. Project Record Documents: to requirements of Section 01720.
- B. Operation and Maintenance Data: to requirements of particular technical specifications.
- C. Warranties and Bonds: to requirements of particular technical specifications.

1.06 INSTRUCTION

Instruct Owner's personnel in operation of all systems, mechanical, electrical and other equipment.

1.07 FINAL APPLICATION FOR PAYMENT

Contractor shall submit final applications in accordance with requirements of General Conditions.

1.08 FINAL CERTIFICATE FOR PAYMENT

- A. Engineer will issue final certificate in accordance with provisions of General Conditions.
- B. Should final completion be materially delayed through no fault of Contractor, Engineer may issue a Semi-final Certificate for payment.

END OF SECTION 01700

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SECTION 01710 – FINAL CLEANING

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. On a continuous basis, maintain premises free from accumulations of waste, debris, and rubbish, caused by operations.
- B. At completion of Work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials, and clean all sight-exposed surfaces; leave Project clean and ready for occupancy.

1.02 RELATED REQUIREMENTS

- A. Section 01700 - Project Closeout.
- B. Cleaning for Specific Products or Work: Specification Section for that work.

1.03 SAFETY REQUIREMENTS

- A. Hazards control:
 - 1. Store volatile wastes in covered metal containers, and remove from premises daily.
 - 2. Prevent accumulation of wastes which create hazardous conditions.
 - 3. Provide adequate ventilation during use of volatile or noxious substances.
- B. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
 - 1. Do not burn or bury rubbish and waste materials on Project site without written permission from the Owner.
 - 2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
 - 3. Do not dispose of wastes into streams or waterways.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
- B. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

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PART 3 - EXECUTION

3.01 DURING CONSTRUCTION

- A. Execute cleaning to ensure that building, grounds and public properties are maintained free from accumulations of waste materials and rubbish.
- B. Wet down dry materials and rubbish to lay dust and prevent blowing dust.
- C. At reasonable intervals during progress of Work, clean site and public properties, and dispose of waste materials, debris and rubbish.
- D. Provide on-site containers for collection of waste materials, debris and rubbish.
- E. Remove waste materials, debris and rubbish from site and legally dispose of at public or private dumping areas off Owner's property.
- F. Handle materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights.
- G. The Contractor shall thoroughly clean all materials and equipment installed.

3.02 FINAL CLEANING

- A. Employ experienced workmen, or professional cleaners, for final cleaning.
- B. In preparation for substantial completion, conduct final inspection of sight-exposed interior and exterior surface, and of concealed spaces.
- C. Repair, patch and touch up marred surfaces to specified finish, to match adjacent surfaces.
- D. Broom clean paved surfaces; rake clean other surfaces of grounds.
- E. Maintain cleaning until Project, or portion thereof, is occupied by Owner.
- F. The Contractor shall restore or replace existing property or structures as promptly and practicable as work progresses.

END OF SECTION 01710

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SECTION 01720 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 00700 - General Conditions.

1.02 MAINTENANCE OF DOCUMENTS

- A. Maintain at job site, one copy of:
 - 1. Contract Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Reviewed Shop Drawings.
 - 5. Change Orders.
 - 6. Other Modifications to Contract.
 - 7. All Permits.
- B. Store documents in approved location, apart from documents used for construction.
- C. Provide files and racks for storage of documents.
- D. Maintain documents in clean, dry legible condition.
- E. Do not use record documents for construction purposes.
- F. Make documents available at all times for inspection by Engineer and Owner.

1.03 MARKING DEVICES

Provide colored pencil or felt-tip marking pen for all marking.

1.04 RECORDING

- A. Label each document "RECORD DRAWING" in 2-inch high printed letters.
- B. Keep record documents current.
- C. Do not permanently conceal any work until required information has been recorded.

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D. Contract Drawings: Legibly mark to record actual construction:

1. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements.
2. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.
3. Field changes of dimension and detail.
4. Changes made by Change Order or Field Order.
5. Details not on original Contract Drawings.

E. Specifications and Addenda: Legibly mark up each Section to record:

1. Manufacturer, trade name, catalog number, and Supplier of each product and item of equipment actually installed.
2. Changes made by Change Order or Field Order.
3. Other matters not originally specified.

F. Shop Drawings: Maintain as record documents; legibly annotate Shop Drawings to record changes made after review.

1.05 SUBMITTAL

A. At completion of project, deliver record documents to Engineer.

B. Accompany submittal with transmittal letter, in duplicate, containing:

1. Date.
2. Project title and number.
3. Contractor's name and address.
4. Title and number of each record document.
5. Certification that each document as submitted is complete and accurate.
6. Signature of Contractor or his authorized representative.

END OF SECTION 01720

Division 2 – Site Work

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02110 - SITE CLEARING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. The work under this specification shall consist of the clearing, grubbing, and disposal of trees, snags, logs, brush, stumps, shrubs, and rubbish from the designated areas. In some instances, clearing and grubbing may include removal of concrete, wood or steel structures.

1.02 REGULATORY REQUIREMENTS

Conform to applicable local codes and ordinances for disposal of debris.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 EXISTING TREES AND OTHER VEGETATION

- A. Tress, shrubs, sod and other vegetation designated to remain undisturbed shall be protected from damage throughout the construction period. The Contractor shall be responsible for the repair or replacement of vegetation damaged by the Contractor's operations.
 - 1. Earth fill, stockpiling of materials or vehicle parking shall not be allowed within the area of the drip line of the protected vegetation. Vegetation damaged due to disturbances under the drip line shall be replaced by the Contractor. Replacement vegetation must be of the same species, size and condition unless a substitution is approved by the Engineer.
 - 2. Any superficial damage such as cuts, skins, scrapes or bruises to the bark of protected vegetation shall be carefully trimmed and treated using locally acceptable procedures.
 - 3. Limbs or branches, one (1") inch or greater, which are broken or otherwise severed during construction, shall be cut flush at the base of the limb/branch.
 - 4. Roots, one inch (1") or greater, which are broken or otherwise severed during construction, shall have their ends cut smoothly and perpendicular to the root.
 - 5. Roots exposed during excavation or other operations shall be covered with moist soil as soon as possible to prevent the roots from drying out.
- B. The Contractor shall not cut or injure any trees or other vegetation outside right-of-way or easement lines and outside areas to be cleared, as indicated on the

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Drawings, without written permission from the Engineer. The Contractor shall be responsible for all damage done outside these lines.

- C. The Engineer shall designate which trees are to be removed within permanent and temporary easement lines or right-of-way lines.
- D. The limits of the areas to be cleared and grubbed will be marked by flags, stakes, tree markings or other suitable method. Trees and other vegetation to be removed will be designated by a different color flag, ribbon or stake.

3.02 CLEARING

- A. From areas to be cleared, the Contractor shall cut or otherwise remove all trees, brush, and other vegetable matter such as snags, bark and refuse. The ground shall be cleared to the width of the permanent easement or right-of-way unless otherwise directed by the Engineer.
- B. Except where clearing is done by uprooting with machinery, trees, stumps, and stubs to be cleared shall be cut as close to the ground surface as practicable, but no more than 6 inches above the ground surface for small trees and 12 inches for larger trees.
- C. Elm bark shall be either buried at least 1 foot deep or burned in suitable incinerators off site with satisfactory antipollution controls and fire prevention controls, to prevent the spread of Dutch Elm disease and as required by applicable laws.

3.04 STRIPPING OF TOPSOIL

Prior to starting general excavation, strip topsoil to a minimum depth of 6 inches or to depths required by the Engineer. Do not strip topsoil in a muddy condition and avoid mixture of subsoil. Stockpile the stripped topsoil within easement or right-of-way lines for use in finish grading and site restoration. Topsoil stockpiled shall be free from trash, brush, stones over 2 inches in diameter, and other extraneous material. **Topsoil may not be removed from the site without written permission from the Engineer.**

3.05 PROTECTION

- A. Protect plant growth and features remaining as final landscaping.
- B. Protect bench marks and existing work from damage or displacement.
- C. Maintain designated site access for vehicle and pedestrian traffic.

3.06 REMOVAL

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- A. All material resulting from clearing and grubbing and not scheduled for reuse shall become the property of the Contractor and shall be suitably disposed of off-site, unless otherwise directed by the Engineer, in accordance with all applicable laws, ordinances, rules and regulations.
- B. Such disposal shall be performed as soon as possible after removal of the material and shall not be left until the final period of cleaning up.
- C. All topsoil shall be reused on-site unless specifically authorized in writing by the Engineer.

END OF SECTION 02110

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02240 - STREAM DE-WATERING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. To meet the requirements of various regulatory agencies, stream channel construction requires that sediment disturbing work be completed in conditions where water does not flow through the disturbed area. During the construction phase, various techniques ranging from passive bypass channels to pumps are used to divert stream flows around the work area.
- B. The work conducted under this specification shall consist of the diversion of surface water and ground water, as necessary to perform the construction required by the contract. The work shall include but is not limited to: (1) constructing, installing, building, and maintaining all the necessary temporary diversions, (2) furnishing, installing, and operating necessary pumps, piping and other facilities and equipment and (3) removing all such temporary works and equipment after their intended function is no longer required.
- C. No separate payment shall be made for this work, as it is considered incidental to other stream construction items.

PART 2 - METHODS

2.01 DIVERTING WATER FLOW

The Contractor shall install, maintain, and operate all sediment traps, coffer dams, channels, flumes, sumps and all other temporary diversions and protective works needed to divert stream flow and other surface water through, or around the project site.

- A. Diversion of surface water shall be continuous during the period that damage to the construction work could occur. Unless otherwise specified, diverted surface water shall be diverted to the same drainage way that the water would have reached before being diverted.
- B. The Contractor is responsible to determine the number and sizes of pumps necessary for dewatering needs.
- C. The Contractor shall inform the Engineer of a plan for diverting the surface water as set forth in the contract documents. The de-watering plan must be approved by the Engineer prior to the start of work, and it shall include information on the type, sizes of pumps, dam construction techniques, discharge outfall protection, and other relevant information.
- D. Contractors must plan their de-watering activities such that they account for

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increases in water flow due to storms or other events. Contractors must plan for such events. In some instances, water flows may exceed those reasonably expected to be dewatered and the Contractor may be required to suspend work until such time that the water flows return to a manageable level. In the event the work is suspended due to high water, the Contractor will not be compensated for repairs to dewatering measures, but additional days may be added to the schedule at no additional cost to offset the days lost to high water.

2.02 DE-WATERING THE STREAM CHANNEL

Work within the streambed area shall be performed in low flow or a de-watered channel. The Contractor shall de-water the main stream channel if construction is required within water flow above low flow conditions, as well as provide for diversion of water flows around the work area that are from secondary channels or drainage ways if flowing water is present within the current work area.

- A. To capture or divert stream flows, cofferdams are used across the stream channel and secondary drainage ways above (up-slope from) the work site.
 - 1. Cofferdams shall be constructed of materials that will have a minimal impact on the stream system. Cofferdams constructed of soil or material from the stream shall not be used unless specifically directed by the Engineer.
 - 2. Acceptable materials shall include water structures, concrete jersey barriers, corrugated steel, plastic barriers, clean sand bags, and other comparable items.
 - 3. The Contractor is responsible to install all cofferdams/diversion structures in a safe and correct manner. Cofferdams must be installed so as to withstand the pressures exerted by the stream flow or ponded water against the cofferdam.
 - 4. Commercial products used as cofferdams (i.e. water structures, temporary dams) shall be installed in accordance with the manufacturer's instructions.
 - 5. The Contractor is permitted to make minor disturbances to the streambed or banks as may be required to properly install the cofferdam.
 - 6. If the Contract conditions call for the use of sand bags, or if the Contractor shall use sand bags to assist with de-watering, the Contractor shall fill the sand bags with clean, washed sand. Soils with fine particles are prohibited.

- B. In instances where topography and/or space does not allow for the passive diversion of water, the Contractor shall be required to use pumps and/or

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pipes to divert the water flow. The Contractor shall be responsible for providing all pumps, hoses, pipelines, fuel tanks and other items required to pump the stream flow around the work site, and for providing supervision of the pumping operation during all hours the pumps are running.

1. The Contractor shall be responsible for calculating the required pump capacity to handle the average stream flow in the area of the work.
 2. The Contractor shall provide pumps that are in good operating order and free of leaks. Pumps that are leaking fuel, lubricants, or other material, shall be immediately repaired or replaced as necessary. All pump equipment shall be properly equipped with mufflers and other noise suppression equipment to minimize noise impacts on the surrounding residences.
 3. Discharge hoses shall be reasonably free of leaks at either the fittings or the discharge hose casing. No leaks from discharge lines shall be allowed to cause erosion.
 4. The Contractor shall provide adequate suction hose length to allow the pumps to be placed back from the immediate edge of the stream. Electric sump type pumps are exempt from this requirement.
 5. In regards to treatment of turbid water, the work site has opportunities for natural filtration. If given permission by the Owner, the primary turbidity treatment pump can pump to the vegetated fields adjacent to the stream for treatment. The pumping required for deep excavation de-watering may require the Contractor to provide filtration equipment (i.e. DirtBags, constructed silt basin) for treatment of turbid water pumped from the site.
- C. During the de-watering operations, the Contractor must provide adequate protection from erosion at the discharge area. The discharge of water from the pumping operations shall be undertaken so as to prevent erosion of soils and the downstream introduction of sediment.
1. When discharges from the de-watering operation involve large volumes of water at high velocities, the discharge area will require a stone structure to provide for dispersion of the discharge energy. The Contractor shall use geotextiles as appropriate to provide erosion protection. Discharge structures must be capable of dispersing the energy of the expected discharge from the pumps.
 2. All materials placed for the protection of discharge outfalls are temporary in nature, and shall be removed from the project area upon completion of the de-watering process.
- D. In situations where de-watering is to be accomplished by the use of a passive, non-pumped diversion channel, the following conditions must be met:

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1. Cofferdam installation shall be completed in accordance with Section A above. Typically, the cofferdam is not installed until such time that the diversion path or pipe is prepared or in the proper place.
2. Due to the nature of the site, passive de-watering through excavated diversion channels may not be possible; however, passive de-watering is recommended through the existing stream channel during construction of realigned portions of the proposed stream channel.
3. Excavation of the realigned portions of the proposed stream channel shall commence at the downstream limit, and shall proceed upstream to the point of diversion from the existing channel into the proposed stream section. Connection of the new proposed section to the main stream channel shall be done so as to minimize sediment production and release.

- E. When in-stream construction requires deep excavation for the placement of footer rocks, or the over excavation and backfilling of clay deposits, the Contractor shall keep the excavation reasonably clear of water to allow observation of the work.

The Contractor shall provide a pump(s) of adequate size to de-water the excavations with the water pumped to the stream channel or other drainage way in a downstream direction. In the event the discharge water is turbid, or if excessive turbidity is produced in the channel, the discharge shall be pumped to a suitable filtration area. The Contractor shall dewater excavation areas to the satisfaction of the Engineer.

- F. When the project area has secondary drainage ways entering the work site, the Contractor shall be responsible for diverting the flow of the drainage way(s) away from the work area. Secondary drainage ways shall be diverted by cofferdams, pumps or by a passive by-pass channel.

2.03 MAINTENANCE, REMOVAL, AND RESTORATION

- A. The Contractor shall maintain all de-watering measures in good operating form until such time that the measures are no longer required.
- B. In the event that high flows damage or remove de-watering measures, the Contractor shall repair or replace the measures as soon as the water flows recede.
- C. Upon completion of the work, and approval of the Engineer, the Contractor shall remove all de-watering measures. The Contractor shall remove pumps and hoses from the site, as well as cofferdams from the stream channel.
- D. Any fill placed in the active channel during the de-watering process, shall be removed from the channel upon completion of the work. In the event sand-bags are used in the de-watering process, the sand bags shall be removed

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and emptied outside of the active channel area.

- E. Upon removal of the de-watering measures, the Contractor shall re-grade all disturbed surfaces, remove any contaminated soils, and restore all areas consistent with the stabilization of the project site as set forth in the Contract Documents.

END OF SECTION 02240

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SECTION 02245 – GEOTEXTILE FILTRATION MATERIAL

PART 1 - GENERAL

1.01 SUMMARY

The Contractor shall furnish all labor, materials, and equipment necessary for the installation of the non-woven geotextiles in accordance with the Drawings and Specifications.

1.02 SYSTEM DESCRIPTION

The non-woven geotextile is intended to act as a separation geotextile between soil and stone.

1.03 SUBMITTALS

The Contractor shall furnish the following information to the Engineer.

- A. Geotextile Manufacturer's affidavit providing assurance that the qualifications of the Geotextile Manufacturer have been achieved.
- B. Geotextile Manufacturer's Quality Assurance/Quality Control (*QA/QC*) certifications for each shipment of geotextile to verify that the materials supplied for the project are in accordance with the requirements of this specification. The certificates shall show the following:
 - 1. Unit weight per ASTM D-5261
 - 2. Grab tensile strength per ASTM D-4632
 - 3. Trapezoidal tear strength per ASTM D-4533
 - 4. Burst Strength per ASTM D-3786
 - 5. Puncture strength per ASTM D-4833
 - 6. Apparent opening size per STM D-4751
 - 7. Permittivity per ASTM D-4491
 - 8. Ultraviolet light resistance per ASTM D-4355
- C. Manufacturer's warranty covering materials and workmanship of the geotextile.

1.04 QUALIFICATIONS

Geotextile Contractor must provide to the Engineer satisfactory evidence, through similar experience in the installation of other types of geosynthetics, that the non-woven geotextile will be installed in a competent, professional manner.

PART 2 - PRODUCTS

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2.01 NON-WOVEN GEOTEXTILE

A. Non-Woven Geotextile

The non-woven geotextile shall meet the physical requirements below. The geotextile shall be free of holes, tears, defects, and patch-repairs of defects. The geotextile shall be composed of a non-woven needle-punched, discontinuous fiber. Fibers used in manufacture of the geotextile, and threads used in joining the geotextiles by sewing, shall consist of long chain synthetic polymers composed of at least 95 percent of weight polyolefin, polyesters, or polyamides.

B. Materials

The non-woven geotextile shall be Type 1 Fabric and meet the Specifications set forth in Section 843 of the Kentucky Transportation Cabinet/Department of Highways *Standard Specifications for Road and Bridge Construction*, latest edition.

C. Product Documentation

The Contractor shall provide the Engineer with the *QA/QC* certifications for each shipment of non-woven geotextile. The certification shall be signed by a responsible party employed by the manufacturer such as the *QA/QC* Manager, Production Manager, or Technical Services Manager. The *QA/QC* certifications shall include:

1. Geotextile lot and roll numbers (with corresponding shipping information.)
2. Manufacturer test data for raw materials used in the non-woven geotextile production, including those items listed in Article 1.03B.
3. Manufacturer's test data for finished non-woven geotextile production, including those items listed in Article 1.03B.

D. Product Labeling

Each roll identifying the following characteristics:

1. Product identification information (manufacturer name and address, brand name, product code).
2. Lot and roll number.
3. Roll length and width.
4. Total roll weight.

E. Packaging

1. The non-woven geotextile shall be wound around a cardboard core four (4) inches in diameter to facilitate handling. The core is not intended to support the roll for lifting, but shall be sufficiently strong to prevent collapse during transit.

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2. All rolls shall be labeled and bagged in packaging that is resistant to photo degradation by ultraviolet light.

PART 3 - EXECUTION

3.01 SHIPPING AND HANDLING

- A. The manufacturer assumes responsibility for initial loading and shipping of the non-woven geotextile. Unloading, on-site handling, and storage are the responsibility of the Contractor.
- B. Handling of rolls of non-woven geotextiles shall be done in a competent manner, such that damage does not occur to the non-woven geotextile nor to its protective wrapping.
- C. The party responsible for unloading the non-woven geotextile shall contact the manufacturer prior to shipment to ascertain the appropriateness of the proposed unloading methods and equipment to be utilized.
- D. A visual inspection of each roll shall be made as it is unloaded to identify if any packaging has been damaged. Rolls with damaged packaging shall be marked and set aside for further inspection. The packaging shall be repaired prior to being placed in storage.

3.02 SITE STORAGE

- A. The location of field storage shall not be in areas where water can accumulate. The rolls shall be elevated off of the ground so as not to form a dam creating the ponding of water. A dedicated area shall be selected at the job site that is away from the high traffic areas and well-drained.
- B. Unloading of rolls or pallets at the job site's temporary storage location shall be such that no damage to the geotextile occurs.
- C. Pushing, sliding or dragging of rolls of non-woven geotextiles shall not be permitted.
- D. The rolls shall be stacked in such a manner as to prevent crushing of the cores, sliding or rolling from the stacks, or damage to the non-woven geotextile.
- E. Outdoor storage of rolls shall not exceed manufacturer's recommendations or longer than six (6) months, whichever is less. For storage periods longer than six (6) months a temporary enclosure shall be placed over the rolls, or they shall be moved within an enclosed facility.

3.03 PLACEMENT

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- A. The non-woven geotextile shall be placed at the locations shown in the Drawings.
- B. Geotextiles shall be deployed free of wrinkles and folds.
- C. During installation on slopes, the geotextiles shall be anchored at the top and rolled down the slope.
- D. All geotextiles shall be weighted with sandbags or other material that will not damage the geotextile during the presence of wind. Geotextiles uplifted by wind may be reused upon approval by the Engineer.
- E. The Contractor shall take the necessary precautions to protect the underlying layers upon which the geotextile will be placed.
- F. Trimming of the geotextiles shall be performed in a manner that will not damage underlying materials.
- G. A visual examination shall be carried out over the installed non-woven geotextile to ensure that no potentially harmful objects are present such as small tools, sharp objects, or protruding stones.

3.04 SEAMING AND JOINING

- A. The non-woven geotextile shall be overlapped and sewn together per the manufacturer's recommendations. The minimum overlap shall be one (1) inch.
- B. All seams shall be continuously sewn. On slopes greater than 10:1, all seams shall be oriented parallel to the slope.
- C. On slopes less than or equal to 10:1, damaged areas of a size exceeding 10 percent of the roll width shall be removed and replaced across the entire roll width with new material. Damaged areas of a size less than 10 percent of the roll width may be patched.
- D. On slopes greater than 10:1, geotextile panels which require repair shall be removed and replaced with new material.
- E. The thread used shall consist of high strength polypropylene or polyester. The sewn thread shall be of contrasting color to the non-woven geotextile and of chemical and ultraviolet properties equal to or greater than that of the geotextile.

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3.05 DAMAGE REPAIR

- A. Damaged non-woven geotextiles and non-woven geotextiles contaminated with dirt shall be repaired immediately at no additional cost to the Owner.
- B. The patch material used for the repair of a hole or tear shall be the same type of material as the damaged non-woven geotextile.
- C. All patches shall extend at least 12 inches in all directions beyond any portion of the damaged geotextile.
- D. The repair patch shall be sewn in place by hand or machine so as not to accidentally shift out of position or be moved during backfilling or covering operation.
- E. The sewn thread shall be of contrasting color to the geotextile and of chemical and ultraviolet light resistance properties equal to greater than that of the geotextile.
- F. The repair shall be reviewed by the Engineer.

3.06 BACKFILLING OR COVERING

- A. Covering of the non-woven geotextile shall be done in a controlled manner as to not shift the geotextile from its intended position.
- B. Covering material shall not be dropped on the non-woven geotextile in a manner that may puncture or damage the geotextile.

END OF SECTION 02245

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SECTION 02300 - EARTHWORK

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

- A. The extent of Work covered under this Section is that necessary for general earth moving activities. "Excavation" consists of removal of all material encountered to subgrade elevations and subsequent disposal of materials removed.

1.2 RELATED WORK (NOT USED)

1.3 QUALITY ASSURANCE

- A. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548.
- B. Licensed Surveyor Qualifications: An independent licensed surveyor qualified to conduct a survey to confirm the required grades.
- C. Preexcavation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.4 DEFINITIONS

- A. Backfill: Soil material or controlled low-strength material used to fill an excavation.
- B. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.
- C. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- D. Drainage Course: Course supporting the slab-on-grade that also minimizes upward capillary flow of pore water.
- E. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
 - 1. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be without additional compensation.
- F. Fill: Soil materials used to raise existing grades.

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- G. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material 3/4 cubic yard. or more in volume that exceed a standard penetration resistance of 100 blows/2 inches when tested by an independent geotechnical testing agency, according to ASTM D 1586.
- H. Structures: Storm drainage and or other man-made stationary features constructed above or below the ground surface.
- I. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below topsoil materials.
- J. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.5 SUBMITTALS

- A. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
 - 1. Classification according to ASTM D 2487 of each on-site and borrow soil material proposed for fill and backfill.
 - 2. Laboratory compaction curve according to ASTM D 698 for each on-site and borrow soil material proposed for fill and backfill.

1.6 JOB CONDITIONS

A. Site Information

- 1. Data on indicated surface and subsurface conditions are not intended as representations or warranties of accuracy. It is expressly understood that OWNER will not be responsible for interpretation or conclusions drawn therefrom by the Contractor. Data is made available for the convenience of the Contractor.

B. Existing Utilities

- 1. Prior to commencement of Work, the Contractor shall locate existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.

C. Use of Explosives

- 1. No blasting or the use of explosives is permitted on this project.

D. Protection of Persons and Property

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1. Barricade open excavations occurring as part of this work and post with warning lights.
 - a. Operate warning lights as recommended by authorities having jurisdiction.
 - b. Protect adjacent structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
 - c. Reasonable care shall be taken during construction to avoid damage to vegetation. Shrubbery and tree branches shall be temporarily tied back, where appropriate, to minimize damage. Tree trunks receiving damage from equipment shall be treated with a tree dressing. All disturbed areas shall be reseeded as noted on the drawings

PART 2 PRODUCTS

3.2 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: ASTM D 2487 Soil Classification Groups CL, GW, GP, GM, SW, SP, and SM, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
 1. Subject to the approval of the Geotechnical Testing Agency and the Engineer, on-site excavated soils may be utilized as fill.
- C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.
 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- E. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
- F. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

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- G. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

PART 3 EXECUTION

3.1 DEWATERING

- A. Prevent surface water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
 - 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
 - 2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

3.2 EXPLOSIVES

- A. Explosives: Do not use explosives.

3.3 STRIPPING AND TOPSOILING

- A. Before excavation and grading is commenced for structures or other work described hereinafter (except pipelines) or before material is removed from borrow pits, the topsoil shall be removed from the areas affected and stockpiled. When final grading is accomplished, particularly around the stream channel, the topsoil shall be spread evenly over the excavated area. Rough grading of excavated areas shall be carried approximately 6 inches below finished grade (except solid rock, where it shall be carried 12 inches below finished grade) and brought back up to grade with topsoil as set out herein.

3.4 EXCAVATION

- A. Excavation includes excavation to subgrade elevations indicated including excavation of earth, rock, bricks, wood, cinders, and other debris. All excavation of materials will be unclassified and no additional payment will be made regardless of type material encountered.
- B. Excavation Classifications
 - 1. All excavation, including solid rock, shall be unclassified excavation.

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- C. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of OWNER. Unauthorized excavation, as well as remedial work directed by OWNER, shall be at the Contractor's expense.
 - 1. Backfill and compact unauthorized excavations as specified for authorized excavations of same classification.

- D. Proof-roll subgrade below the footings, foundations, walks and pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
 - 1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
 - 2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Engineer, and replace with compacted backfill or fill as directed.

- E. Additional Excavation
 - 1. When excavation has reached required subgrade elevations, notify OWNER who will make an inspection of conditions.
 - a. If unsuitable bearing materials are encountered at required subgrade elevations, carry excavations deeper and replace excavated material as directed in writing by OWNER.
 - b. Removal of unsuitable material and its replacement as directed will be paid on basis of Contract conditions relative to changes in work.

- F. Stability of Excavations
 - 1. Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.
 - 2. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

- G. Material Storage
 - 1. Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade, and shape stockpiles for proper drainage.
 - a. Dispose of excess spoil material and waste materials as herein specified.

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H. Excavation for Structures

1. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.20 feet for unpaved areas and extending a sufficient distance from footer rocks, footings and foundations to permit placing and removal of rock form work, installation of services, other construction, and for inspection.

I. Cold Weather Protection

1. Protect excavation bottoms against freezing when atmospheric temperature is less than 35° F (1° C).

3.5 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
 1. Under grass and planted areas, use satisfactory soil material.
 2. Under walks and pavements, use satisfactory soil material.
- C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.6 COMPACTION

A. General

1. Control soil compaction during construction providing minimum percentage of density specified for each area classification indicated below.
 - a. Percentage of maximum density requirements: Compact soil to not less than the following percentages of maximum density for soils which exhibit a well defined moisture density relationship (cohesive soils) determined in accordance with ASTM D698; and not less than the following percentages of relative density, determined in accordance with ASTM D4253 and D4254, for soils which will not exhibit a well defined moisture density relationship (cohesion-less soils).
 - b. Lawn or unpaved areas: Compact top 6 inches of subgrade and each layer of backfill or fill material to a maximum of eighty five percent (85%) standard proctor density.

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B. Moisture Control

1. Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface or subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.
2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
3. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value.

3.7 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
1. Provide a smooth transition between adjacent existing grades and new grades.
 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
1. Lawn or Unpaved Areas: Plus or minus 1 inch.
 2. Walks: Plus or minus 1 inch.
 3. Pavements: Plus or minus 1/2 inch.

3.8 BACKFILL AND FILL

A. General

1. Place acceptable soil material in layers to required subgrade elevations, for each area classification listed below. Backfill material shall be no larger than the specified depth of the layer to be placed and/or compacted.
 - a. In excavations, use satisfactory excavated or borrow material.
 - b. Under grassed areas, use satisfactory excavated or borrow material.
 - c. Along the stream, use satisfactory excavated material with topsoil to cover.
- B. Backfill excavations as promptly as work permits, but not until completion of the following:

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1. Acceptance of construction below finish grade, where applicable damp proofing, waterproofing, and perimeter installation.
2. Inspection, testing, approval, and recording locations of underground utilities.
3. Removal of trash and debris.

C. Ground Surface Preparation

1. Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.
2. When existing ground surface has a density less than that specified under "Compaction" for particular area classification, break up ground surface, pulverize, moisture condition to optimum moisture content, and compact to required depth and percentage of maximum density.

D. Placement and Compaction

1. Place backfill and fill materials in layers not more than 8 inches in loose depth.
 - a. Before compaction, add moisture or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
 - b. Place backfill and fill materials evenly adjacent to structures, piping, or conduit to required elevations. Take care to prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping, or conduit to approximately same elevation in each lift.

E. Backfilling Trenches

1. Backfilling shall be accomplished as soon as practical after pipe has been laid and/or repaired and jointing and alignment approved. OWNER shall be given a maximum of 24 hours for inspection before backfilling.
2. Any special requirements of the Railroad Company or Highway Department in regard to backfilling will take precedence over the following general Specifications.

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3. The backfill over the pipe shall be in accordance with the standard details shown on the Drawings for bedding and backfilling pipe.
4. In case maximum permissible trench widths (as designated by the pipe manufacturer) are exceeded, the Contractor shall furnish the additional backfill to a minimum of 12 inches over the top of pipe at no extra cost to OWNER.
5. After the foregoing cover requirements over top of the pipe have been met, rock may be used in the backfill in pieces no larger than 12 inches in any dimension and to an extent not greater than one-half the backfill materials used. If additional earth is required for backfilling, it must be obtained and placed by the Contractor. Filling with rock and earth shall proceed simultaneously, such that no voids are left in the rock. After cover requirements over top of pipe have been met, backfilling may be employed without tamping, provided caution is used in quantity per dump and uniformity of level of backfilling. Surplus material shall be uniformly ridged over trench and excess rock hauled away, with no rock over 1 1/2-inch diameter in the top 6 inches. Ridged backfill shall be confined to the width of the trench and no higher than needed for replacement of settlement of backfill.
6. In the case of street, highway, railroad, sidewalk, and driveway crossings; or within any roadway paving; or about manholes, valve and meter boxes; the backfill must be mechanically tamped in not over 6-inch layers, measured loose. Alternate method of compacting backfill shall be used, if refill material is in large hard lumps (crushed rock excepted) which cannot be consolidated without leaving voids.
7. The Contractor shall protect all sewer, gas, electric, telephone, water, and drain pipes or conduits from damage while pipelines are being constructed and backfilled, and from danger due to settlement of trench backfill.
8. No extra payment shall be made for backfilling of any kind, except as specified hereinbefore. Backfilling shall be included as a part of the bid. No extra payment will be made to the Contractor for supplying outside materials for backfill.
9. On completion of the project, all backfills shall be dressed, holes filled, and surplus material hauled away. All permanent walks, street paving, roadway, etc., shall be restored and seeding and sodding performed as required.

3.9 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor to engage and pay for a qualified independent geotechnical engineering testing agency to perform field quality-control testing.
 1. Testing Agency to be acceptable to Owner and Engineer.

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- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- C. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
 - 1. Trench Backfill: At each compacted initial and final backfill layer, at least 1 test for each 150 feet or less of trench length, but no fewer than 2 tests.
 - 2. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.10 MAINTENANCE

A. Protection of Graded Areas

- 1. Protect newly graded areas from traffic and erosion. Keep free of trash and debris. Repair and reestablish grades in settled, eroded, and rutted areas to specified tolerances.

B. Settling

- 1. Where settling is measurable or observable at excavated areas during general project warranty period, restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.11 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. General

- 1. The Contractor shall remove all surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION 02300

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SECTION 02305 – STREAM EXCAVATION

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. In natural channel restoration projects, primary focus is placed on excavation and grading to produce a stream channel with correct geomorphic features. During the implementation of these projects, extensive excavation and fill may be required to restore a stream's planform (meanders) and cross sectional area. Excavation under this specification also focuses on the development of a stable streambed profile and may require the construction of a step-pool, riffle-pool, or cascade streambed complex.

1.02 RELATED REQUIREMENTS

- A. Section 02300 - Earthwork.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Typically, excavation of the channel form will be conducted using cuts and fills from the project site. In some instances, there may be material from the cut requirements that must be spread on-site on adjacent fields as shown on the drawings.
 - 1. In cases where additional spoil is accumulated, the Engineer will identify suitable fill areas in the project site area for placement. Otherwise, the spoil will have to be disposed of off site in a proper manner that complies with local regulations.
 - 2. When fill materials are stockpiled at the site by the Contractor, silt control is required by the Owner, Project Engineer and/or regulatory agencies. Contractors should be prepared to provide adequate silt control as provided for in the Specifications and on the Project Drawings.

PART 3 – EXECUTION

3.01 PREPARATION

Identify required lines, levels, contours, and datum.

3.02 EXCAVATION

- A. Excavation for the construction of the stream channel shall be as shown on the Project Drawings. Construction shall be as shown in the plan view, cross sections and the

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stream profile drawings.

1. Grades and elevations may have changed slightly since the original survey was completed due to erosion, sedimentation and fill. The Contractor is responsible for confirming existing grades and to adjust the excavation and fill quantities as necessary to produce the desired channel configuration.
 2. The Contractor, shall at all times, conduct their work in full compliance with all OSHA regulations and any other applicable local, state or federal regulations.
- B. Excavate subsoil as required for structure foundations, construction operations, and other work.
- C. Contractor is responsible to adequately brace open cuts and protect workmen and equipment during excavation.
- D. Correct unauthorized excavation at no cost to Owner.
- E. Fill over-excavated areas under structure bearing surfaces in accordance with direction by Engineer.
- F. Stockpile excavated material in areas designated on site.

3.03 EXCAVATION FOR STRUCTURES

- A. For structures, excavate to elevations and dimensions indicated, plus sufficient space for construction operations and inspection of foundations.
1. Structure foundations shall be installed immediately after excavation is completed. If this cannot be done, the last 4 to 6 inches of material should not be removed until preparations for installing the foundation are complete.
 2. Make no excavation to the full depth indicated when freezing temperatures may be expected unless foundations can be installed after the excavation has been completed. Protect the bottom of excavation from frost if foundation installation is delayed.

3.04 UNAUTHORIZED EXCAVATION

If the bottom of any excavation is taken out beyond the limits indicated or prescribed, the resulting void shall be backfilled at the Contractor's expense with earth material in accordance with Section 02300, Earthwork.

3.05 UNSUITABLE MATERIAL

- A. In some instances, pre-construction test pits, or excavation work after the contract is signed, may reveal the presence of clay deposits in the stream bottom. Clay exposures

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present a significant scour and water quality problem and must be mitigated by removal of the clay material and filling of the excavation with a clean, coarse gravel or cobble material.

1. In the event clay exposures are found in the project area, the Contractor shall mitigate such exposures by over excavating the area of exposure to a minimum depth of two feet (2'). The Engineer shall observe excavations for clay materials and will determine the final depth of the excavation.
 2. In the area of over excavation, the clay material will be removed from the stream channel, and disposed of in an area approved by the Engineer. Typically, disposal will be in a low lying area adjacent to the stream channel but out of the way of potential erosive flows.
 3. The excavation will then be back-filled to the design stream profile with cobble or gravel material obtained from the site, a borrow area, or trucked in from off-site sources.
- B. No excavated materials shall be removed from the site of the work or disposed of by the Contractor except as directed or permitted.
- C. Surplus excavated materials suitable for backfill shall be used to backfill normal excavations in rock or to replace other materials unacceptable for use as backfill. Materials shall be neatly deposited and graded so as to make or widen fills, flatten side slopes, or fill depressions. All work shall be as directed or permitted and without additional compensation.
- D. Surplus excavated materials not needed as specified above shall be hauled away and dumped by the Contractor, at his expense, at appropriate locations, and in accordance with arrangements made by him.

END OF SECTION 02305

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SECTION 02310 - ROUGH GRADING

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Remove topsoil and stockpile for later reuse.
- B. Excavate subsoil and stockpile for later reuse as directed in Section 02300, Earthwork.
- C. Grade and rough contour site.

1.02 RELATED REQUIREMENTS

- A. Section 02305 – Stream Excavation.
- B. Section 02300 - Earthwork.

1.03 PROJECT RECORD DOCUMENTS

- A. Submit documents under provisions of Section 01720.
- B. Accurately record location of utilities remaining, rerouted utilities, new utilities by horizontal dimensions, elevations or inverts, and slope gradients.

1.04 PROTECTION

- A. Protect trees and other features remaining as portion of final landscaping.
- B. Protect bench marks, existing structures, fences, roads, sidewalks and other features not designated for demolition.
- C. Protect above or below grade utilities which are to remain.
- D. Contractor shall be responsible for repairing any damage to those items not designated for demolition or removal in a manner satisfactory to the Owner at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Topsoil: Excavated material, graded free of rocks larger than 2 inches, subsoil, and debris.

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- B. Subsoil: Excavated material, graded free of lumps larger than 12 inches, rocks larger than 12 inches, and debris.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Identify known below grade utilities. Stake and flag locations.
- C. Identify and flag above grade utilities.
- D. Maintain and protect existing utilities remaining which pass through work area.
- E. Upon discovery of unknown utility or concealed conditions, discontinue affected work; notify Engineer.
- D. Maintain and protect existing vegetation and trees within the work area.

3.02 TOPSOIL EXCAVATION

- A. Excavate topsoil from areas to be further excavated, and stockpile in area designated on site by the Engineer.
- B. Do not excavate wet topsoil.

3.03 SUBSOIL EXCAVATION

- A. Excavate subsoil from indicated areas and stockpile in area designated on site. Excess subsoil may be reused according to Section 02300, Earthwork.
- B. Stockpile subsoil to depth not exceeding 8 feet.
- C. When excavation through roots is necessary, cut roots with a sharp axe.

3.02 TOLERANCES

Top Surface of Subgrade: Plus or minus 0.20 feet.

END OF SECTION 02310

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02320 - ROCK MATERIAL

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. This specification covers the quality of rock to be used in the construction of in-stream rock structures for stream restoration as well as rock for riprap. The use of rock in stream projects requires a dense, low porosity material that can withstand stream flows as well as freeze-thaw cycles.

1.2 RELATED WORK (NOT INCLUDED)

1.3 QUALITY ASSURANCE

- A. Individual rock fragments shall be dense, sound and free from cracks, seams and other defects conducive to accelerated weathering. Except as provided below, the rock shall meet the following parameters:
 - 1. Bulk specific gravity (saturated dry surface basis) not less than 2.5. Bulk specific gravity is to be determined by ASTM Method C127.
 - 2. Rock to be supplied for this project shall be subjected to a Slake Durability Index Test and must have a grade of 90% or greater. The Slake Durability Index Test must be made at an approved laboratory. Three to five samples or more may be required to obtain acceptable results.
 - 3. Rock that fails to meet the requirements in sub-sections 1 and 2 above, may be accepted if the rock has been pre-approved by KYDOT or if similar rock from the same source has been demonstrated to be sound after five (5) years or more of service under conditions of weather, wetting, drying and erosive forces similar to those conditions anticipated at the site.

1.4 ROCK SHAPE AND SIZE

- A. Rock for In-stream Structures
 - 1. Rock fragments shall be angular, flat or cubical in shape. Uniform, cubical rocks are best for top rocks while those rocks with more roundness can be used as footer rocks.
- B. Riprap
 - 1. Rock fragments shall be angular to sub-round in shape. The least dimension (c-axis) shall not be less than one third the greatest diameter (a-axis) of the fragment. Rock shall conform to the specified grading limits after it has been placed in the riprap.

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C. Rock Size

1. Rock shall be provided in the sizes set forth in the construction specifications or on the Plans for each in-stream structure and/or for rock riprap.

1.5 CERTIFICATION

- A. At the request of the Engineer, the Contractor shall provide acceptable documentation that the rock proposed for the project meets the specifications as set forth above. The Engineer may waive the need for certification of the rock if the quarry source is known to produce acceptable rock, or upon inspection of the proposed rock source by the Engineer.

END OF SECTION 02320

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SECTION 02900 - LANDSCAPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to work of this Section.

1.02 DESCRIPTION OF WORK

- A. This section includes furnishing labor, materials, equipment and related items required to complete all landscape plantings as indicated on the Drawings and Specifications as specified, including but not limited to the following:
 - 1. Spreading of topsoil.
 - 2. Lawn seeding of disturbed areas and areas that occur outside those planting areas to receive bare root and native seeding.
 - 3. Furnishing and planting of bare root trees and shrubs.
 - 4. Turf and planting maintenance.
 - 5. Multi-flora Rose and other undesirable species eradication.
- B. Refer to Division 2, Section 02300, Earthwork for topsoil stripping, excavation, fill and subgrade preparation.
- C. Refer to Division 2, Section 02950, Native Seeding for work involved in the soil preparation and sowing of native seed mixes.

1.03 QUALITY ASSURANCE

- A. Subcontract landscape work to a single firm specializing in landscape plantings and having completed at least four (4) similar projects in the past three (3) years. The landscape subcontractor shall furnish evidence of his experience upon request.
- B. General: Ship landscape materials with certificates of inspection required by governing authorities. Comply with regulations applicable to landscape materials.
- C. Substitutions: Substitutions will be permitted after Award of Contract only upon submission of proof in writing that a plant is not obtainable and authorization by the Owner for use of the nearest equivalent obtainable size or variety of plant having the same essential characteristics.
- D. Analysis and Standards: Packaged products shall bear manufacturer's certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists, wherever applicable.

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- E. Sources: Notice of sources of plant materials shall accompany the bid for this project and be listed on the Unit Price Sheet under Sources of Materials. All plant materials for this project must come from nurseries located in Zones 5a to 6a as established in the most recent United States Department of Agriculture (USDA) Plant Hardiness Zone Chart.
- F. Inspection of Plants: The Engineer may inspect bare root trees and shrubs either at place of growth or at landscape contractor's nursery before the plants are delivered to the site for compliance with requirements for genus, species, variety, size and quality. The Engineer retains right to further inspect trees and shrubs for size and condition of stems and root systems, insects, injuries and latent defects and to reject unsatisfactory or defective material at any time during progress of work.

1.04 SUBMITTALS

- A. Certification. Submit certificates of inspection as required by governmental authorities. Submit manufacturer's or vendors certified analysis for soil amendments and fertilizer materials. Submit other data substantiating that materials comply with specified requirements.
 - 1. Submit seed vendor's certified statement for each grass seed mixture required, stating botanical and common name, percentage by weight and percentages of purity, germination and weed seed for each grass seed species.
- B. Maintenance Instructions: Submit three (3) sets of typewritten instructions recommending procedures to be established by Owner for maintenance of landscape work for one (1) full year. Submit prior to final acceptance. Refer to Division 2, Section 02950, Native Seeding, for maintenance and warranty requirements of Native Seeding.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Packaged Materials: Deliver packaged materials in containers showing weight, analysis and name of manufacturer. Protect materials from deterioration during delivery and while stored at site.
- B. Burlap: No balled and burlap plant materials are used in this scope of work.
- C. Sod: Not in scope of work.
- D. Trees and Shrubs: Provide freshly dug bare root trees and shrubs. Do not prune any part of the plant unless directed by the Engineer. Do not bend or bind-tie trees or shrubs in such manner as to damage stems, roots, break branches or destroy natural shape. Provide protective covering during delivery. Each bare root plant must be protected from moisture loss by keeping roots moist and covered.
- E. Deliver trees and shrubs after preparations for planting have been completed and **plant immediately**. If planting is delayed more than 6 hours after delivery, set trees and shrubs in shade, protect from weather and mechanical damage and keep roots moist by some

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acceptable means of retaining moisture.

1.06 JOB CONDITIONS

- A. Proceed with and complete landscape work as rapidly as possible as portions of site become available, working within seasonal limitations for each kind of landscape work required.
- B. Utilities: Determine location of underground utilities and perform work in a manner which will avoid possible damage. Hand excavate as required. Maintain grade stakes set by others until removal is mutually agreed upon by parties concerned.
- C. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions or obstructions, notify Owner before planting. Refer to planting notes and Part 3, Execution for more restrictive requirements.
- D. Time of Bare Root Planting: Bare root planting operations shall be conducted under favorable weather conditions during the planting season extending from November to April. Planting shall not be conducted during freezing temperatures. At the option of and with full responsibility for the plantings, the Contractor may conduct limited planting operations under unseasonable weather conditions without additional compensation or any waiver of the guarantee if requested in writing by the Contractor and approved by the Owner.
- E. Time of Lawn seeding for disturbed areas and temporary cover seeding: Seeding operations shall be conducted under favorable weather conditions during the season extending from August 15 to October 15 or March 1 to May 1. At the option of and with full responsibility for the seeding, the Contractor may work under unseasonable weather conditions without additional compensation. Temporary cover seeding may be applied at any time of the year when there are temperatures above 50° Fahrenheit. Refer to Division 2, Section 02950 Native Seeding and manufacturer's recommendations for time of native seeding.
- F. If bare root plants can not be planted within 24 hours, separate plants, and prepare a temporary planting to hold the bare root plants until planting can be completed.
- G. Coordination with Lawns: Plant bare root trees and shrubs after final grades are established and prior to seeding of native seed mixes unless otherwise acceptable to the Owner. The temporary cover seeding as described in the construction document and drawings can occur prior to bare root tree and shrub planting.
- H. All undesirable species within the riparian zone shall be eradicated either by spray or mechanical methods prior to any installation of blanket materials, tree or seed plantings. This item shall be incidental to seeding and no additional cost will be allowed.

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1.07 PLANT GUARANTEE AND REPLACEMENT

- A. Guarantee: The Contractor shall guarantee that 60% of the bare root plantings are viable and alive for the duration of one (1) full year after the formal acceptance of the planting by the Owner and shall be alive and in satisfactory growth at the end of the guarantee period. The Contractor shall be responsible for all maintenance necessary to keep the plants alive and healthy between the time the plantings are accepted and the end of the guarantee period. The basic needs of the plants during this period are for adequate water and protection from insects and other similar pests.
- B. Lawn seeding of disturbed areas and the temporary cover seeding areas are not subject to a one (1) year guarantee, but newly seeded areas shall be alive, vigorous and healthy at time of final acceptance.
- C. The Contractor shall check the plantings regularly and maintain them, in a manner as described in the Construction Drawings and as described during the Pre-Bid Meeting, to the end of the guarantee period. The Owner will periodically inspect plantings and advise the Contractor, in writing, of any additional maintenance.
- D. Replacement: At the end of the guarantee period, inspection will be made by the Owner upon receipt of written or verbal notice requesting such inspection submitted by the Contractor at least ten (10) days prior to the anticipated date. These, and any plants missing due to the Contractor's negligence, shall be replaced as soon as conditions permit but during the normal planting season. Upon inspection, it is determined that less than 60% of the bare root plantings are alive and viable, the contractor will replant an amount as required by the owner to ensure the 60% viability during the next planting season.
- E. Material and Operations: All replacements shall be plants of the same kind and size as specified in the Plant List. They shall be furnished and planted as specified under "New Planting", the cost of which shall be borne by the Contractor.
- F. Replaced plants are not subject to a full one (1) year guarantee, but replacements must be alive and vigorous when inspected after planting and must leaf out fully in the spring if replacements are made while the plant is dormant.
- G. Cost of Plant Replacement: A sum sufficient to cover the estimated cost of possible replacements, including materials and labor, shall be retained by the Owner and paid to the Contractor at the end of the guarantee period after all replacements have been made and approved. The minimum retainage shall be ten (10) percent of the total cost of planting. A larger percentage shall be withheld if the condition of the plantings indicates the potential value of replacements will exceed the minimum retainage.

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PART 2 - PRODUCTS

2.01 MATERIALS

- A. Existing topsoil shall be stripped and stockpiled as specified in the Specifications and Project Drawings.
1. The Contractor shall furnish soil analyses and reports as performed by the Agricultural Extension Service or commercial testing laboratory for any areas from which topsoil is to be stripped or used for this project. The soil shall be tested for nutritional content, organic matter and texture. The Contractor shall incorporate necessary additives in proper quantities as recommended in the soil analyses, or as necessary to bring the soils up to acceptable standards.
 2. Topsoil shall be original surface loam obtained from well-drained areas from which topsoil has not been removed previously, either by erosion, clearing and removal of trees or mechanical means. It shall not contain subsoil material and shall be clean and free of clay lumps, roots, stones or similar substances more than 1 inch in diameter, debris, discarded fragments of building materials, weeds and weed seeds. Topsoil shall be classified as a loam, silt loam, clay loam or a combination thereof, as described in Section 2300, Sub-section 2.1. It shall be rich, friable loam containing not less than 3 percent, nor more than 10 percent (3% - 10%), by weight of organic matter as determined by loss on ignition of oven dried samples. The ignition test shall be performed on samples which have been thoroughly oven dried at a temperature of 221 degrees Fahrenheit. Locations and frequency of samples taken from site will be determined by the testing agency.
- B. Commercial fertilizer shall be complete fertilizer, 14-28-10, or as specified by Engineer and shall conform to the applicable state fertilizer laws. Fertilizer shall be uniform in composition, dry and free-flowing and shall be delivered to the site in the original, unopened containers, each bearing the manufacturer's guaranteed analysis. Any fertilizer which becomes caked or otherwise damaged will not be accepted. Fertilizer shall be applied at a rate of seven (7) pounds per 1,000 square feet.
- C. Herbicide shall be an approved commercial grade herbicide used in soil preparation. The particular type of herbicide shall be certified safe for the plants specified in the Plant List or for the plants around which the herbicide shall be used as specified in Division 2, Section 02950, Native Seeding.
- D. Lime shall be ground limestone (Dolomite) containing not less than 85 percent of total carbonates and shall be ground to a fineness that 50 percent will pass through a 100-mesh sieve and 90 percent will pass through a 20-mesh sieve. Coarser material shall be acceptable provided that specified rates of application are increased proportionally on the basis of quantities passing the 100-mesh sieve.
- E. Peat shall be a domestic product consisting of partially decomposed vegetable matter of natural occurrence. It shall be brown, clean, low in content of mineral and woody

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materials, mildly acid, and granulated or shredded.

- F. Aluminum sulfate shall be a commercially available agricultural chemical and shall be furnished under the manufacturer's guaranteed statement of analysis giving percentage of active ingredients.
- G. Ammonium nitrate shall be a commercially available agricultural chemical and shall be furnished under the manufacturer's guaranteed statement of analysis giving percentage of active ingredients.
- H. Water: The Contractor shall provide, at no additional expense, an adequate supply of water to meet the needs of this Contract. The Contractor shall furnish all necessary hoses, equipment, attachments and accessories for the adequate irrigation of planted areas as may be required to complete the work as specified.
- I. Lawn Materials for disturbed areas and areas that occur outside planting areas receiving bare root and native seeding.
 - 1. Seed shall be mixed and guaranteed by the dealer to be as follows:

<u>Common Name</u>	<u>Proportion by Weight</u>	<u>Percent of Purity</u>	<u>Percent of Germination</u>
Rebel Fescue (or approved equal)	40%	98%	90%
Annual Rye	60%	98%	90%

- L. Plant Materials (See Plant List in Construction Drawings):
 - 1. Nomenclature: The names of plants required under this Contract conform to those given in Standardized Plant Names, 1942 Edition, prepared by the American Joint Committee on Horticultural Nomenclature. Names of varieties not included therein conform generally with names accepted in the nursery trade.
 - 2. Quantities: Quantities necessary to complete the planting as shown on the Drawings and located thereon shall be furnished.
 - 3. Quality and Size: Plants shall have a habit of growth that is normal for the species and shall be sound, healthy, vigorous stock, grown in a recognized nursery in accordance with good horticultural practice and free of disease, insects, eggs, larvae and defects such as knots, sun-scald, injuries, abrasions or disfigurement. All plants shall equal or exceed the measurements specified in the Plant List which are minimum acceptable sizes. They shall be measured before pruning with branches in normal position. Any necessary pruning shall be done at the time of planting (see "Pruning and Repairs") requirements for the measurement, branching, grading,

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quality, balling and burlapping of plants in the Plant List generally follow or exceed the Code of Standards currently recommended by the American Association of Nurserymen, Inc. in the American Standard for Nursery Stock ANSI Z60.1.

4. Type of Protection to Roots:
 - a. Bare Root Plants: Plants shall be dug or harvested during their dormant season, cleaned of soil and stored in moist peat moss until planted. Bare root plants must be planted immediately. Store plants in a cool, dark place until planted. Do not over water. If conditions are such that they can not be planted immediately, measures need to be taken to temporarily plant them until proper placement can occur.

PART 3 - EXECUTION

3.01 PREPARATION

Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations and outline areas and secure Owner's acceptance before start of planting work. Make minor adjustments as may be requested by owner or designated representative.

3.02 OBSTRUCTION BELOW GROUND OR OVERHEAD

- A. It is not contemplated that planting shall be done where the depth of soil over underground construction, obstructions or rock is insufficient to accommodate the roots or where pockets in rock or impervious soil will require drainage. Where such conditions are encountered in excavation of planting areas and where the stone, boulders or other obstructions cannot be broken and removed by hand methods in the course of digging plant pits of the usual size, other locations for the planting may be designated by the Owner.
- B. Removal of rock or other underground obstruction, relocation of construction and provisions of drainage for planting areas shall be done only as approved by the Owner.
- C. Should the landscape contractor encounter unsatisfactory surface or subsurface drainage conditions, soil depth, latent soils, hard pan, steam or other utility lines or any other conditions that will jeopardize the health and vigor of the plantings, the landscape contractor must advise the Owner in writing of the conditions prior to installing the plants. Otherwise, the landscape contractor warrants that the planting areas are suitable for proper growth and development of the plants to be installed.

3.03 PREPARATION FOR PLANTING SEEDED AREAS

- A. All areas disturbed by the Contractor's operation, not scheduled for other improvements,

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shall be seeded. See Drawings for more detailed requirements.

- B. Preparation of Subgrade: All areas to be planted in lawn, except as specified below, shall be subsoiled by disking, harrowing or tilling. The term "subsoiling" as used herein means the mechanical cleavage of the subsoil without major displacement or inversion of the existing soil horizon. It is the purpose of this operation to rupture the subsoil, creating cracks and fissures to a depth of 6 inches, except where rock or other equally resistant material is encountered. All subgrades for lawns shall be subsoiled on slopes of 3:1 or less, lawn areas with slopes greater than 3:1 shall not be subsoiled. When subsoiling operation is complete, all stones over 1-inch in size, sticks and rubbish shall be removed, and the surface graded and lightly compacted so that it will be parallel to the proposed finish grade. No heavy objects, except lawn rollers, shall be moved over lawn areas after the subgrade soil has been prepared, unless the subgrade soil is again graded and loosened as specified above before topsoil is spread.
- C. Topsoil Placement and Finish Grading: After the subgrade soil has been prepared, topsoil shall be spread evenly thereon and lightly compacted. No topsoil shall be spread in a frozen or muddy condition. Topsoil shall be spread to a minimum depth of 3 inches on all areas to be seeded or planted and shall be graded to lines, grades and/or contours shown on the Drawings and/or specified. All topsoil shall be reused on site. The finish surface shall be smooth and free of bumps, depressions or other irregularities or foreign materials. In areas where the original existing topsoil is still in place and relatively undisturbed, except for compaction, additional topsoil will not be required.
 - 1. Allowance for settlement shall be made.
 - 2. Areas where the topsoil has not been removed shall be scarified, smoothed, and sticks, stones, and rubbish shall be removed.
- C. Soil Preparation: Soil used in planting shall be topsoil as previously specified and shall be amended in accord with the soil test results. Newly prepared topsoil backfill will be required in all planting areas unless specifically exempted by notes on the Drawings.
 - 1. Topsoil shall be spread to a minimum depth of 3" inches in all seeded areas.
- E. Soil Improvements: Fertilizer shall be applied at the rate of 7 pounds of 14-28-10 per 1,000 square feet per soil classification as shown in Section 2300, Sub-section 2.1. If recommended by the testing agency, limestone shall be thoroughly mixed into the topsoil and as far ahead of seeding as will not interfere with other grading operations. If areas to be sodded have been heavily compacted, they shall be disked, rolled and drug to prepare a suitable growing media.
- F. Seeding of Lawn areas:
 - 1. Sowing of Seed for disturbed areas: Immediately before any seed is to be sown, the ground shall be scarified as necessary and shall be raked until the surface is smooth, friable and of uniformly fine texture. Disturbed areas scheduled to receive lawn seed

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shall be seeded evenly manually or with a mechanical spreader at the rate of 7 pounds per 1,000 square feet of area, lightly raked and rolled with a 200-pound roller and watered with a fine spray. The method of seeding may be varied at the discretion of the Contractor, on his own responsibility to establish a smooth, uniform turf composed of the grasses specified. The sowing of seed shall be done only within the seasons extending from March 1 to May 1 and from August 15 to October 15 unless other seasons may be approved by the Engineer.

2. Mulching: Refer to the Construction Drawings for erosion control means and methods.

3.04 NEW PLANTING

- A. Layout: New planting shall be located where shown on the Drawings except where obstructions below ground or overhead are encountered or where changes have been made in the construction. Necessary adjustments shall be made only after approval by the Owner. No planting, with the exception of lawn seed shall be placed closer than 2 feet to pavement or structures. The landscape contractor shall be responsible for marking and layout of plantings on this project. The Owner shall be advised when paint marks are in place and ready for inspection on various planting areas. All layout work shall be inspected and approved by the Owner prior to opening any plant pits.
- B. Planting Pits: Refer to Construction Drawings or manufacturer's recommendations
- C. Soil Preparation:
 1. Soil use in planting shall be topsoil as previously specified and shall be amended in accord with the soil test results. Newly prepared topsoil backfill will be required in all planting areas unless specifically exempted by notes on the Drawings.
 2. Topsoil shall be spread to a minimum depth of 3 inches in all areas.
 3. Fertilizer shall be uniformly broadcasted. The exact quantity and distribution shall be in strict accordance with the soil test results.
 5. Additional fertilization may be required prior to acceptance of plantings or individual plants that are visibly in a weakened or stressful condition.
- D. Excess excavated spoil shall be disposed of by the Contractor.
- E. Setting Plants: Unless otherwise specified, all plants shall be planted in pits, centered and set to such depth that the finished grade level at the plant after settlement will be the same as that at which the plant was grown.
 1. Plants shall be planted upright.
 3. All broken or frayed roots shall be cut off cleanly.
 4. Topsoil shall be placed and compacted carefully to avoid injury to roots and to fill all voids. Fill the hole to finished grade.

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- F. Herbicide Treatment: Refer to Division 2, Section 02950, Native Seeding for herbicide use.
- G. Watering: Unless otherwise directed by the Engineer, the planting areas shall be watered immediately at a rate of 120 gallons per 1,000 square feet. The water shall be applied by means of a hydro-seeder or a water tank under pressure with a nozzle that will produce a spray that will not dislodge the seeds, plants or blankets. Should a significant rainfall, greater than 1" in 24 hours occur within 7 days of the initial watering, the Owner or Engineer may elect to delay or omit the second watering. The second watering shall occur at the same rate as the first watering. It is the Contractor's responsibility to supply water, even if there is none available on site. Any cost associated with supplying water shall be the responsibility of the Contractor and shall be incidental to the items specified under these vegetation specifications.

3.05 CLEAN-UP

- A. Clean-up: Any soil, bark, peat or similar material which has been brought onto paved areas within or outside the construction area by hauling operations or otherwise shall be removed promptly, keeping these areas clean at all times. Upon completion of the planting, all excess soil, stones and debris which have not been cleaned up shall be removed from the site or disposed of as directed by the Owner. All planting areas shall be prepared for final inspection.
- B. Other Work: The Contractor shall be responsible for the repair of any damage caused by his activities or those of his subcontractors within or outside the construction area such as the storage of topsoil or other materials, operation of equipment and other usages. Such repair operations shall include any regarding, sodding or other work necessary to restore damaged work or areas to a condition acceptable to the Owner.

3.06 MAINTENANCE

- A. Maintenance shall begin immediately following the last operation of installation for each portion of lawn and for each plant and shall continue until installation of planting is complete and the planting is formally accepted by the Owner. Maintenance shall include watering, weeding, cultivating, mulching, removal of dead material, resetting plants to proper grades or upright position and other operations deemed necessary by the Owner. **Mowing shall not be allowed on project unless directed by the Owner.** Any damage resulting from planting or maintenance operations shall be repaired promptly.
- B. Seeded lawn areas shall be protected and maintained by watering, weeding and replanting as may be necessary to produce a uniform stand of grass. Maintenance shall continue until a dense, uniform turf is established composed of the grass specified, and shall include repair of damage caused by erosion until acceptance. For the purpose of an

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acceptable standard, scattered bare spots, none of which is larger than one square foot, will be allowed up to a maximum of 3 percent of any lawn area.

- C. The Owner shall be responsible for all required maintenance after the planting is formally accepted.

3.07 INSPECTION FOR ACCEPTANCE

- A. Inspection of the work of this Section to determine completion of the Contractor's work, exclusive of the possible guarantee replacement of plants, shall be made by the Owner upon receipt of written notice requesting such inspection submitted by the Contractor at least ten (10) days prior to the anticipated date of inspection.
- B. Acceptance: After inspection, the Contractor will be notified in writing by the Owner of acceptance of all work of this Section, exclusive of the possible replacement of plants subject to guarantee or the Contractor will be notified in writing if there are any deficiencies from the requirements for completion of the work. Replacement, maintenance and repair work remaining to be done shall be subject to re-inspection before acceptance. All seeded areas and 60% of all bare root plants shall be alive and in a healthy and vigorous condition at the time of the final inspection.

3.08 WARRANTY

- A. The Contractor shall guarantee all materials and workmanship, including living systems for a period of one (1) year from the date of final acceptance by the Engineer, and shall replace any portions that fail because of faulty materials, workmanship, or lack of maintenance, at no additional cost to the Owner. The Contractor shall repair or replace all defective items upon notification and in accordance with the schedule provided by the Owner.

END OF SECTION 02900

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02925 – EROSION CONTROL BLANKET

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. All Work for this Section shall consist of furnishing and placing of Erosion Control Blanket in locations as specified on the plans or as directed by the Engineer and shall include all labor, materials, equipment excavation and incidentals necessary to complete Work in place and ready to use.
- B. Prior to the start of work on this item, the Contractor shall submit a construction schedule, source of supply and sample of Erosion Control Blanket to Engineer for review.
- C. The Erosion Control Blanket is intended to provide stability to vegetated earthen stream banks against the erosive forces of water.

1.02 SUBMITTALS

The Contractor shall furnish the following submittal to the Engineer:

- A. The Contractor shall provide the Engineer a certificate stating the name of the manufacturer, product name, style, compositions of filaments or yarns, and other pertinent information to fully describe the erosion control blanket.
- B. The manufacturer is responsible for establishing and maintaining a quality control program to assure compliance with the requirements of the specification. Documentation describing the quality control program shall be made available upon request.
- C. The manufacturer's certificate shall state that the furnished product meets the requirements of the specification as evaluated under the manufacturer's quality control program. The certificate shall be attested to by a person having legal authority to bind the manufacturer.
- B. Manufacturer's warranty covering materials and workmanship of the Erosion Control Blanket.

1.03 DEFINITIONS

- A. Typical Roll Value
Property value calculated from average or mean obtained from test data.
- B. Erosion Control Blanket (ECB)
A temporary, degradable material manufactured or fabricated into a blanket to reduce soil erosion and assist in the growth, establishment, and protection of

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vegetation. ECB is composed of processed natural or synthetic fibers that are mechanically, structurally, or chemically bound together to form a continuous matrix.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. ECB labeling, shipment, and storage shall follow ASTM D 4873.
- B. Product labels shall clearly show the manufacturer or supplier name, style name, and roll number.
- C. Each roll of ECB shall be wrapped with a material that will protect the blanket from damage or degradation due to shipment, water, sunlight, and contaminants.
- D. The protective wrapping shall be maintained during periods of shipment and storage.
- E. During storage, rolls of ECB shall be elevated off the ground and adequately covered to protect them from the following: Site construction damage, extended exposure to ultraviolet (UV) radiation, precipitation, chemicals that are strong acids or strong bases, flames, sparks, temperatures in excess of 71° C (160° F), and any other environmental condition that might damage the ECB.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Erosion Control Blanket (ECB)
 - 1. Woven Coir Fiber Blanket shall consist of 100% mattress grade coconut fiber with a density greater than or equal to 20oz./SY. Blanket shall be machine fabricated with an open area of 50%. For the area directly next to the creek, the minimum roll width shall be 13.3 feet.
 - 2. The Straw ECB shall consist of 100% agricultural straw stitched with degradable thread between two degradable nettings. The blanket shall provide erosion control and assist with vegetation establishment assistance for up to 12 months on 2:1 to 3:1 slopes and in moderate-flow drainage channels.
- B. Ground Anchoring Devices
 - 1. Wire Staples - Staples shall be made from 11 gauge bright basic wire. Staples shall have a minimum of 12-inch legs and 1-inch crown.
 - 2. Triangular wooden stakes – Wooden stakes may be dead or live stakes as approved by the Engineer, according to the time of year.
 - 3. Biodegradable pins – Biodegradable pins shall be those as approved by the ECB manufacturer.

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PART 3 – EXECUTION

3.01 CONSTRUCTION METHODS

A. Preparation

1. Grade and compact areas to be treated with ECB and compacted as indicated of as directed by Engineer.
2. Remove large rocks, vegetation, and other objects that could prevent the ECB from having intimate contact with the subgrade.
3. Prepare seedbed by loosening 2 to 3 inches of soil above final grade.
4. Select and apply soil amendments and seed in accordance with Sections 02900 and 02950, which are Landscaping and Native Seeding, respectively.

B. Installation

1. Blanket shall be installed according to the plans and details, and the manufacturer's recommendation.
2. Unroll ECB parallel to the stream, where the width of the ECB spreads up the bank of the stream. Lay the material loosely, maintaining direct contact with soil. Woven Coir Fiber Blanket shall have 6 inches of slack over a 10-12 feet span to ensure that direct contact with the soil is maintained after shrinkage from wetting and drying.
3. Extend ECB 5 to 6 feet over the crest of slope, secure into a 6-inch by 12-inch anchor trench with anchoring devices, backfill, and compact with soil as directed by Engineer.
4. Overlap edges by approximately 6 inches. Install blankets so edge overlaps are shingled away from the prevailing water flow.
5. The upstream end of the blanket shall be trenched to seal out water flow unless they are overlapped by other blanket.
6. Apply anchoring devices in a staggered fashion approximately 5 feet on center each way.
7. Trees shall be installed through the blanket by cutting a slit in the blanket, installing the tree, and installing a "patch" of fabric around the tree in a shingle fashion under the upstream blanket, and over the downstream blanket. The patch material used shall be the same type of material as the damage ECB. The patch shall be thoroughly anchored.

END OF SECTION 02925

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SECTION 02950-NATIVE SEEDING

PART 1-GENERAL

1.01 SCOPE

All Work for this Section shall consist of revegetation in the form of Native Seeding. It shall include seedbed and soil preparation, and furnishing and installing seed, topsoil, mulch and mulch anchoring, erosion control materials, and maintenance. All Zones or Areas as identified on the Plans for native seeding shall be revegetated in accordance with the schedule and provisions in these specifications as well as those provided by the manufacturer or supplier of the seed.

PART 2-PRODUCTS

2.01 MATERIALS

A. Topsoil

1. Topsoil shall consist of the upper portion of the soil profile and shall be loose, friable soil that is free of stones larger than one inch (1”), sub-soil, refuse and other debris including stumps, roots, brush, weeds, and non-organic materials.
2. The acceptable soil texture classification for topsoil, in accordance with the U.S. Department of Agriculture system is: clay (40% maximum), silt (70 % maximum), and sand (60% maximum).
3. Topsoil (both salvaged and furnished) shall meet the following minimum standards through analytical testing, unless otherwise directed by a Certified Soil Testing Agency or the Engineer.

Organic Matter	> 3%
pH (range)	5.8-7.0
Soluble Salts	<500 parts per million

B. Native Seed

1. Native Seed includes warm season grasses, cool season grasses, and forbs/wildflowers for use in natural or vegetated stream mitigation areas. Seed supplied by the Contractor shall be clean and fresh and delivered to the site in the original unopened containers showing net weight, composition of mix, and supplier’s name and guarantee of analysis.
2. The acceptable minimum seed viability standard shall be determined according to Pure Live Seeding (PLS) rate as per section 3 of these

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specifications. Seed supplied by the Contractor shall also conform to applicable state and federal regulations and to test provisions of the Association of Official Seed Analysts.

3. Pure Live Seeding Rate: All seeding rates specified shall meet a minimum of 75% pure live seed (PLS) rate for native grass and forb/wildflower seed as determined by the percent germination multiplied by the percent seed purity. If the PLS is less than specified, the Contractor shall increase the seeding rate to compensate for the PLS difference at their own expense.
4. Native Seed Mixture: Refer to the Construction Drawings for Native Seed Mixes to be used in each zone

C. Mulch

Straw mulch shall consist of well threshed wheat, rye or oak straw and shall be reasonably bright. Mulch must be free of mold and noxious seed and shall not be musty, caked, decayed or excessively dusty. The only areas to receive straw mulch are those that are disturbed outside the limits of the erosion control blankets and shall be mulched immediately after native seed has been sown.

D. Erosion Control Blankets

Erosion control blankets are to be installed immediately after the native seed has been sown. Refer to Construction Drawings for locations and type of erosion control blankets.

PART 3-EXECUTION

3.01 CONSTRUCTION METHODS

A. Schedule

The Contractor shall notify the Engineer at least 48 hours in advance of the time they intend to begin seeding and shall not proceed with such work until permission to do so has been granted by the Engineer. Before starting seeding any area, final dressing and the preparation of the seedbed shall have been completed in accordance with these specifications. All seeding and related activities shall be continuous operations.

B. Seeding

1. Timing: Within the native seed planting season, permanent seeding shall be performed within seven (7) days of completion of all topsoil placement, final grade establishment and planting of bare root trees and shrubs. The native seed planting season is between November 1st and June 1st. Native seeding

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shall not be performed outside of the specified season. Temporary seeding must be applied to the site if grading is completed outside of the native seed planting season. Areas to be seeded shall be reviewed by Owner or the Engineer prior to seeding. Seeding shall not occur during heavy rain (greater than one inch (1”) in 24 hours), snow (any ground coverage), drought (less than one inch (1”) rainfall in a month), or in windy conditions (>10 miles per hour, sustained).

2. Prepare Seed Bed: Each area to be seeded shall be scarified, disked, harrowed, raked, or otherwise worked until it has been loosened and pulverized to depth of not less than three inches (3”). Stones and other foreign materials shall be removed. This operation shall be performed only when the soil is in a tillable and workable condition; i.e., not frozen, snow covered, or saturated (ball formed of topsoil releases water when squeezed).
3. Firm Seed Bed: Seed Bed soil shall be firmed with a water-filled roller or cultipacker such that when stepped on, an impression of the shoe is not left in the soil. A Standard Proctor Testing compaction of 85% must be accommodated but not exceeded.
4. Hand Broadcasting: Seeding shall be performed by applying a uniform cover of seed over each area by walking and sowing seed first in one direction, then walking perpendicular to the first direction while sowing the remaining seed for that area. Roll seeded areas with a water-filled roller or cultipacker immediately after covering to ensure proper seed contact with the soil.

In certain situations other seeding methods for Native Seed (warm season grass/forb/wildflower) establishment may be acceptable with prior approval of Engineer. This may include no-till drilling, modified hand broadcasting, mechanical seeding, or hydroseeding techniques appropriately altered to provide required seed to soil contact.

5. Erosion Control Blankets. When shown on the Plans, manufactured erosion control blankets (straw, coconut fiber, wood fiber, etc.) shall be placed over the Native Seeded areas immediately after seeding. The blankets shall be installed according to the manufacturer’s specifications. Individual blankets shall be secured using staples driven vertically in the ground. Staple patterns should be in accordance with the manufacturer’s specifications. Loose blanket edges shall be stapled and buried in trenches according to the manufacturer’s specifications. Only blankets without mono- or poly-filaments may be used in riparian areas (e.g., within 100 feet of a stream). The live stakes will also be used as a means to secure the erosion control blanket.
6. Watering. Unless otherwise directed by the Engineer, the seedbed shall be watered immediately at a rate of 120 gallons per 1000 square feet, following covering of the seedbed with mulch. The water shall be applied by means of a

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hydro-seeder or a water tank under pressure with a nozzle that will produce a spray that will not dislodge the seeds, blankets, or mulch. A second watering shall be made no sooner than seven (7) days and no later than ten (10) days after the initial application, provided that no significant rainfall has occurred. Should a significant rain fall (>one inch (1") in 24 hours) occur within seven (7) days of the initial watering, the Engineer may elect to delay or omit the second watering. The rate of water application during the second watering shall be 120 gallons per 1000 square feet. It shall be the Contractor's responsibility to supply water even if there is none available on site. Any costs associated with supplying water shall be the responsibility of the Contractor and shall be incidental to the items specified under these revegetation specifications.

7. Maintenance-Vegetation Control. The designated Natural Areas or areas seeded with Native Seed shall be maintained in a manner such that the desired vegetation's growth is encouraged while the undesired vegetation's growth is mitigated. This shall be accomplished by an application of the herbicide PLATEAU™ at the application rate of 4 oz./ac. The application shall follow all manufacturer's directions including using an appropriate surfactant. The timing of the application shall be approved by the Engineer. Upon final acceptance of the plantings, at which the one year maintenance period begins, the area will be continually monitored for the presence of noxious weeds at which time the Contractor will notify in writing the means and methods to be used to remove the undesirable plants. Means and methods of the removal of noxious weeds may include manually removing the plants or using a selective herbicide in small areas as directed by the Owner.
8. Warranty. The Contractor shall maintain a one (1) year, 70% care and replacement warranty for all seeding as determined by percent aerial coverage of living plants. The period of care and replacement shall begin after inspection and approval of the initial seeding and continue for one year, with one potential plant replacement period. Native Seeding amendment shall be performed in accordance with native seeding establishment measures in these specifications. The Contractor shall not be responsible for damage or plant mortality due to vandalism, wildlife predation, or Acts of God beyond the Contractor's control and responsibility.

END OF SECTION 02950