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Section 00150 - Control of Work

00150.00 Authority of the Engineer - The Engineer has full authority over the Work and its suspension. (see Section 00180) The Contractor shall perform all Work to the complete satisfaction of the Engineer. The Engineer's determination shall be final on all matters, including but not limited to the following:

- Quality and acceptability of Materials and workmanship
- Measurement of unit price Work
- Timely and proper prosecution of the Work
- Interpretation of Plans and Specifications
- Payments due under the Contract

The Engineer's decision is final and, except as provided in 00180.80 for adjustments of Contract Time and Section 00199 for claims for additional compensation, may be challenged only through litigation.

Work performed under the Contract will not be considered complete until it has passed Final Inspection by the Engineer and has been accepted by the Agency.

Interim approvals issued by the Engineer, including but not limited to Third Notification, will not discharge the Contractor from responsibility for errors in prosecution of the Work, for improper fabrication, for failure to comply with Contract requirements, or for other deficiencies, the nature of which are within the Contractor's control.

00150.01 Project Manager's Authority and Duties - The Engineer may designate a Project Manager as its representative on the Project with authority to enforce the provisions of the Contract.

When the Engineer has designated a Project Manager, the Contractor should direct all requests for clarification or interpretation of the Contract, in writing, to the Project Manager. The Project Manager will respond within a reasonable time. Contract clarification or interpretation obtained from persons other than the Project Manager will not be binding on the Agency.

The Project Manager shall have the authority to appoint Inspectors and other personnel as required to assist in the administration of the Contract.

00150.02 Inspector's Authority and Duties - To the extent delegated under 00150.01, Inspectors are authorized to represent the Engineer and Project Manager to perform the following:

- Inspect Work performed and Materials furnished, including without limitation, the preparation, fabrication, or manufacture of Materials to be used;
- Orally reject defective Materials and to confirm such rejection in writing;
- By oral order, temporarily suspend the Work for improper prosecution pending the Engineer's decision; and
- Exercise additional delegated authority.

Inspectors are not authorized to:

- Accept Work or Materials.
- Alter or waive provisions of the Contract.
- Give instructions or advice inconsistent with the Contract Documents.

00150.05 Cooperative Arrangements - The Contractor may enter into a voluntary cooperative arrangement with the Agency for the Work covered by this Contract. Some elements of this arrangement are described in 00120.95. The Contractor may exercise the election to enter into a cooperative arrangement by signing and returning the form provided with the Notice of Award. This form must be returned no later than the time that the Contractor returns the signed Contract to the Agency.

If the cooperative arrangement alternative is selected:

- Within five calendar days of receipt of the signed form by the Agency, the Contractor and the Engineer will identify the key personnel who will participate in the orientation workshop. Key personnel should include key Subcontractors and other stakeholders. The Agency will arrange the workshop time and location.
- It is intended that the cooperative arrangement will result in agreements that establish an environment of cooperation between parties and will allow the Contract requirements to be achieved effectively and efficiently by both the Contractor and the Agency.
- A definitive working arrangement for the Contractor and the Agency will be developed and, if agreed at the workshop, committed to writing.
- Either the Contractor or the Agency may withdraw from the cooperative arrangement upon written notice to the other. However, no claim or dispute settled or change approved during the existence of the cooperative arrangement shall be revived.
- The sole remedy for nonperformance of the cooperative arrangement shall be the ability to withdraw from the cooperative arrangement as stated in the paragraph immediately above.

00150.10 Coordination of Specifications and Plans - The Contract Documents, including but not limited to Contract Change Orders, the Special Provisions, the Plans, Supplemental Specifications, and the Standard Specifications are intended to collectively describe all of the items of Work necessary to complete the Project.

(a) Order of Precedence - The Engineer will resolve any discrepancies between these documents in the following order of precedence:

- Contract Change Orders;
- Special Provisions;
- Agency-prepared drawings specifically applicable to the Project and bearing the Project title;
- Reviewed and accepted, stamped Working Drawings;
- Standard Drawings;
- Approved Unstamped Working Drawings;
- Supplemental Specifications;
- Standard Specifications; and
- All other contract documents not listed above.

Notes on a drawing shall take precedence over drawing details.

Dimensions shown on the drawings, or that can be computed, shall take precedence over scaled dimensions.

(b) Immaterial Discrepancies - The Specifications and Plans specify details for the construction and completion of the Work. If Specifications or Plans describe portions of the Work in sufficient detail but are silent in some minor respect, the Contractor may proceed utilizing the current best industry practices.

(c) Material Discrepancies - If the Contractor identifies a discrepancy, error, or omission in the Specifications or Plans that cannot be resolved by the approach specified in (b) above, the Contractor shall immediately request clarification from the Engineer.

00150.15 Construction Stakes, Lines, and Grades:

(a) General - The Contractor shall perform no Work until the Engineer establishes field controls. Work performed without field controls will be subject to removal at the Contractor's expense.

(b) Agency Responsibilities - The Engineer will:

- Lay out and set construction stakes and marks to establish the lines, grades, Slopes, Cross Sections, and curve super-elevations for roadwork;
- Provide one set of construction stakes for line and grade for each additional phase of the Work;
- Set bench marks and stakes for centerline of Bridges and bents;
- Calculate and provide finish deck grades; and
- Deduct from payments due the Contractor all costs incurred to replace stakes and marks negligently or intentionally damaged, removed, or destroyed by the Contractor.

(c) Contractor Responsibilities - The Contractor shall:

- Inform the Engineer of staking requirements at least five Calendar Days before the staking needs to begin;
- Coordinate construction to provide sufficient area for the Engineer to perform surveying work efficiently and safely;
- Accurately measure detailed dimensions, elevations, and Slopes from the Engineer's stakes and marks;
- Perform the Work in such a manner as to preserve stakes and marks; and
- Set any reference lines for automatic control from the control stakes provided by the Engineer.

00150.20 Inspection:

(a) Inspection by the Engineer - The Engineer may test Materials furnished and inspect Work performed by the Contractor to ensure Contract compliance.

If the Contractor performs Work without the Engineer's inspection or uses Materials that the Engineer has not approved, the Engineer may order affected portions of the Work removed at the Contractor's expense. The foregoing sentence shall not apply if the Engineer fails to inspect the Work within a specific period of time required in the Contract, or in the absence of a specific period of time, within a reasonable period of time after receiving the Contractor's timely written request for inspection or testing.

At the Engineer's direction, any time before the Work is accepted, the Contractor shall uncover portions of the completed Work for inspection. After inspection, the Contractor shall restore these portions of Work to the standard required by the Contract. If the Engineer rejects Work due to Materials or workmanship, or if the Contractor performed such Work without providing sufficient advance request for inspection to the Engineer, the Contractor shall bear all costs of uncovering and restoring the Work. If the Engineer accepts the uncovered Work, and the Contractor performed the Work only after providing the Engineer with sufficient advance notice, the costs of uncovering and restoring the Work will be paid for by the Agency as Extra Work.

(b) Inspection Facilities - The Contractor shall furnish walkways, railings, ladders, shoring, tunnels, platforms, and other facilities necessary to permit the Engineer to have safe access to the Work to be inspected. The Contractor shall require producers and fabricators to provide safe inspection access as requested by the Engineer.

(c) Sampling - The Contractor shall furnish the Engineer with samples of Materials that the Engineer will test. All of the Contractor's costs related to this required sampling are Incidental.

(d) Inspection by Third Parties - Where third parties have the right to inspect the Work, the Contractor shall coordinate with the Engineer and shall provide safe inspection access.

(e) Contractor's Duty to Make Corrections - The Contractor shall perform all Work according to the Specifications and Plans. The Contractor shall correct Work that does not comply with the Specifications and Plans at its own expense. Inspection of the Work by the Engineer does not relieve the Contractor of responsibility for improper prosecution of the Work.

00150.25 Acceptability of Materials and Work - The Contractor shall furnish Materials and shall perform Work in Close Conformance to the Plans and Specifications. If the Engineer determines that the Materials furnished or the Work performed are not in Close Conformance with the Plans and Specifications, the Engineer may:

- Reject the Materials or Work and order the Contractor, at the Contractor's expense, to remove, replace, or otherwise correct any non-conformity; or
- Accept the Materials or Work as suitable for the intended purpose, adjust the amount paid for applicable Pay Items to account for diminished cost to the Contractor or diminished value to the Agency, document the adjustment, and provide written documentation to the Contractor regarding the basis of the adjustment.

The Engineer's decisions concerning acceptability of Materials or Work will be final.

00150.30 Delivery of Notices - Written notices to the Contractor, the Engineer, or the Agency shall be delivered via first class mail, or in person to the current office address as shown in the records of the Agency. Notices delivered via first class mail shall be deemed delivered five business days following the postmarked date.

00150.35 Plans and Working Drawings:

(a) Plans - The Plans will show details of lines, grades, and Typical Section of the Roadway, and locations and design details of Structures.

(b) Working Drawings - The Contractor shall supplement the Agency-prepared Plans with stamped or unstamped Working Drawings that show all information necessary to complete the Work. The applicable Section or Subsection of the Standard Specifications will indicate the supplemental information required and whether the drawings are to be stamped or unstamped. Stamped and unstamped Working Drawings are defined as follows:

(1) Stamped Working Drawings - Working Drawings, calculations, and other data which are prepared by or under the direction of a Professional Engineer licensed in the State of Oregon, and which bear the engineer's signature, seal, and expiration date.

(2) Unstamped Working Drawings - Working Drawings, calculations, and other data that do not bear an engineering seal.

(c) Number and Size of Drawings - The Contractor shall submit seven copies of Working Drawings for steel Structures and six copies of Working Drawings for other Structures to the Engineer. The

submitted copies shall be clear and readable. Drawing dimensions shall be 8 1/2 inches by 11 inches, 11 inches by 17 inches, or 22 inches by 36 inches in size. One copy of the submitted Working Drawings will be returned to the Contractor after processing. The Contractor shall submit such additional number of copies to the Engineer for processing that the Contractor would like to have returned.

(d) Processing Working Drawings - The Engineer will process Working Drawings and include all comments on them as follows:

(1) Stamped Working Drawings - Stamped Working Drawings will be designated as "reviewed and accepted" by the Engineer.

(2) Unstamped Working Drawings - Unstamped Working Drawings will be designated on the face of the Drawing, as "approved", "approved as noted", "returned for correction", or "rejected" by the Engineer.

The Contractor shall not fabricate or construct any structural components until the stamped or unstamped Working Drawings are returned by the Engineer with written notation of approval or review, as applicable, of the Working Drawings.

The Engineer's processing of the Working Drawings does not amend any contractual obligations of the parties.

The Engineer will process and return Working Drawings within 21 Calendar Days (65 Calendar Days if Railroad approval is required) after receipt by the Engineer. If the Engineer fails to return such drawings within this period of time, the Engineer will consider granting a Contract Time extension according to 00180.80.

00150.37 Equipment Lists and Other Submittals - The Contractor shall submit Equipment lists, and other required submittals for approval by the Engineer. The Engineer will respond to requests for approval within time frames specified in each Section of the Specifications that requires such approval.

00150.40 Cooperation and Superintendence by the Contractor:

(a) General - The Contractor shall:

- Keep one complete set of Contract Documents available on the Project Site at all times.
- Cooperate in good faith with the Engineer, Inspectors, and other contractors in performance of the Work.
- Designate, from the Contractor's organization, a competent single representative responsible for the Project, experienced in the type of Work being performed, and capable of reading and thoroughly understanding the Plans and Specifications.
- Provide access, facilities and assistance to the Engineer in establishing such lines, grades and points as the Engineer requires.
- Carefully protect and preserve the Engineer's marks and stakes.
- Provide all assistance reasonably required by the Engineer to obtain information regarding the nature, quantity, and quality of any part of the Work.
- Allow the Engineer reasonable access to the Contractor's books and records at all times. To the extent permitted by public records laws, the Engineer will make reasonable efforts to honor the Contractor's request for protection of confidential information.
- Furnish the Engineer all data necessary to determine the actual cost of all, or any part, of the Work.

00150.40(a)

- Diligently pursue progress of the Work according to the schedule requirements of Section 00180.
- Coordinate and control all Work performed under the Contract, including without limitation the Work performed by Subcontractors.

(b) Superintendence - The Contractor shall appoint a single designated representative responsible for the Project described under 00150.40(a), in writing. The single designated representative responsible for the Project shall:

- Have full authority and responsibility to promptly execute orders or directions of the Engineer;
- Have full authority and responsibility to promptly supply the Materials, Equipment, labor, and Incidentals required for performance of the Work;
- Be available during the hours of work on the Project Site for communication with the Engineer; and
- Be present for all On-Site Work except as provided in the Contract Documents, or approved by the Agency.

For short periods of time during the performance of minor or Incidental portions of the Work, the Contractor may designate a person to act on behalf of the single designated representative responsible for the Project. The Contractor shall submit the designation in writing to the Engineer. The form of designation shall state the designee's name, duration of appointment, and scope of authority. The single designated representative responsible for the Project shall be available to the Engineer at all times for contact by telephone or radio. The Engineer expressly reserves the right to require the single designated representative responsible for the Project to be on the Project Site by giving 48 hours advance verbal or written notice thereof to the Contractor.

The Contractor's failure to provide the superintendence required by these provisions constitutes a material breach of the Contract, and the Engineer may impose any remedies available under the Contract, including but not limited to Contract termination or suspension of Contract performance.

00150.50 Cooperation with Utilities:

(a) General - Unless otherwise specified in any Supplemental Specifications, in the Special Provisions, or on the Plans, existing Utilities requiring adjustment may be adjusted by the Utility before, during, or after Project construction. "Adjustment of Utilities" shall mean the alteration, improvement, connection, disconnection, relocation, or removal of existing Utility lines, facilities, or systems in temporary or permanent manner.

(b) Agency Responsibilities - Before Bids are received, the Agency will make preliminary arrangements for planned Adjustment of Utilities. The Agency will list in the Special Provisions the estimated completion dates or times for adjustment work by the Utility owner, and will include a general statement describing any relocation. The Plans will not normally show the anticipated new location of Utilities that have been or will be adjusted.

(c) Contractor's Responsibilities - The Contractor shall:

- Follow applicable rules adopted by the Oregon Utility Notification Center;
- Contact Utility owners during Bid preparation and after the Contract is awarded to verify all Utilities' involvement on the Project Site;
- Coordinate Project construction with the Utilities' planned adjustments, take all precautions necessary to prevent disruption of Utility service, and perform its Work in the manner that results in the least inconvenience to the Utility owners;

- Include all Utility adjustment work, whether to be performed by the Contractor or the Utilities, on the Contractor's Project Work schedule submitted under 00180.41;
- Protect from damage or disturbance any Utility that remains within the area in which Work is being performed;
- Not disturb an existing Utility if it requires an unanticipated adjustment, but shall protect it from damage or disturbance and promptly notify the Engineer; and
- Report to the Engineer any Utility owner who fails to cooperate or fails to follow the planned Utility adjustment.

Subject to the Engineer's approval, the Contractor may adjust the Utilities by asking the Utility owners to move, remove, or alter their facilities in ways other than as shown on the Plans, in any Supplemental Specifications, or in the Special Provisions. The Contractor shall conduct all negotiations, make all arrangements, and assume all costs that arise from such changes.

(d) Delays - If the Contractor complies with Subsection (c) above, and if Utility adjustments are completed later than the date specified in the Special Provisions, thus causing Project completion to be delayed (provide notification under 00180.60), additional Contract Time will be considered under 00180.80, and additional compensation, if applicable, will be considered under 00195.40.

(e) Notification - If the Project is located within the area served by the Oregon Utility Notification Center, the Contractor shall notify owners of Utilities prior to the performance of Work in the vicinity of their facilities. The Utilities notification system telephone number is 1-800-332-2344.

The Contractor shall comply with the rules of the Oregon Utility Notification Center, OAR 952-001-0010 through OAR 952-001-0090, and ORS 757.993. The Contractor may contact the Oregon Utility Notification Center at 503-232-1987 about these rules.

00150.55 Cooperation with Other Contractors - The Agency reserves the right to perform other work on or near the Project Site, including without limitation any Materials site, with forces other than those of the Contractor.

If such work takes place within or next to the Project Site, the Contractor shall have the following obligations:

- The Contractor shall coordinate Work with other contractors or forces.
- The Contractor shall cooperate in good faith with all other contractors or forces.
- The Contractor shall perform the Work specified in the Contract in a way that will minimize interference and delay for all forces involved.
- The Contractor shall place and dispose of the Materials being used so as not to interfere with the operations of other forces.
- The Contractor shall join the Work with that of other forces in a manner acceptable to the Engineer or the Agency, and shall perform it in the accepted sequence with the work of the other force.

The Engineer will resolve any disagreements under this Subsection that may arise among the Contractor and other work forces, or between the Contractor and the Agency. The Engineer's decision in these matters is final, as provided in 00150.00.

When the schedules for Work of the Contractor and the work of other forces overlap, each contractor involved shall submit a current, realistic progress schedule to the Engineer. Before the Engineer accepts the schedule, each party shall have the opportunity to review all schedules. After this review and any necessary consultations, the Engineer will determine acceptable schedules.

The Contractor waives any right it may have to make claims against the Agency for any damages or claims that may arise because of inconvenience, delay, or loss due solely to the presence of other contractors working on the Project Site.

If the Contract gives notice of work to be performed by other forces that may affect the Contractor's Work under the Contract, the Contractor shall include any costs associated with coordination of the Work in the appropriate Pay Item or as a portion of a Pay Item.

In an emergency, the contractor most immediately able to respond may repair a facility or Utility of another contractor in order to prevent further damage to the facility, Utility, or other Structure as a result of the emergency.

00150.60 Construction Equipment Restrictions:

(a) Load and Speed Restrictions for Construction Vehicles and Equipment - The Contractor shall comply with legal weight and speed restrictions when moving Materials or Equipment beyond the limits of the Project Site.

The Contractor shall control vehicle and Equipment loads and speeds within the Project Site according to the following restrictions, unless the Special Provisions provide otherwise:

- The Contractor shall restrict loads and speeds as necessary to avoid displacement or loss of Materials on Subgrades and Aggregate Bases.
- The Contractor shall restrict weights to legal loads, and shall travel at speeds of no more than 45 mph or the posted construction speed, whichever is less, on treated Bases, Pavement, or wearing Courses.
- The Contractor shall not cross Bridges or other Structures with Equipment or vehicles exceeding the legal load limit without prior written permission of the Engineer. The Contractor shall make any such request in writing, describing the loading details and the arrangement, movement, and position of the Equipment on the Structure. The Contractor shall comply with any restrictions or conditions included in the Engineer's written permission.

(b) Protection of Buried Items - The Contractor shall use temporary fill or other methods to avoid overload of pipes, box culverts, and other items that are covered, or to be covered, by fill or backfill.

(c) Responsibility for Damages - The Contractor shall assume responsibility for damages caused by excessive Equipment speed or loads while performing the Work, both inside and outside the Project Site. The Engineer's permission to cross Bridges and other Structures, according to 00150.60(a) will not relieve the Contractor from responsibility for load-caused damages.

00150.70 Detrimental Operations - The Contractor shall avoid operations whose methods, conditions, or timing may injure people or damage property or the Work. Damage may include without limitation, staining surfaces with mud or asphalt. (also see 00150.60, 00150.75, and Section 00170)

When any such damage occurs, the Engineer will determine if it is to be corrected by repair, replacement, or compensatory payment by the Contractor. If compensatory payment is required, the Engineer will determine the amount. Compensatory payment may be deducted from monies due or to become due to the Contractor under the Contract.

00150.75 Protection and Maintenance of Work During Construction - The Contractor shall protect and maintain the Work during construction and until Third Notification has been issued, unless otherwise provided in the Contract. For the purposes of this Subsection, "maintenance" shall include measures to prevent deterioration of Roadway and Structures at the Project Site, and to keep them in

good condition at all times during the prosecution of the Work. The Contractor shall continuously allocate sufficient Equipment and workers to achieve such maintenance.

If the Contract requires the placement of a Course upon a previously constructed Course or Subgrade, the Contractor shall maintain the previous Course or Subgrade during all construction operations.

The Contractor shall include costs of protecting and maintaining the Work during construction in the unit prices bid for the various Pay Items. The Contractor will not be paid an additional amount for this Work, unless otherwise specified.

The Engineer will immediately notify the Contractor of Contractor's noncompliance with this Subsection. If the Contractor fails to remedy unsatisfactory protection or maintenance within 24 hours after receipt of such notice, the Engineer may proceed immediately to remedy the deficiency, and deduct the entire cost from monies due or to become due the Contractor under the Contract.

00150.80 Removal of Unacceptable and Unauthorized Work - The Contractor shall correct or remove unacceptable Work, as directed by the Engineer in writing. The Contractor shall replace such work with Work and Materials conforming to the requirements of the Contract.

For the purposes of this Subsection, "unauthorized work" shall include without limitation the following:

- Work that extends beyond lines shown on the Plans or otherwise established by the Engineer;
- Work that is contrary to the Engineer's instructions; and
- Work that is conducted without the Engineer's written authorization.

The Agency will not pay the Contractor for unauthorized or unacceptable work. The Engineer may issue a written order for the correction or removal of such work at the Contractor's expense.

If, when ordered by the Engineer, the Contractor fails to correct or remove unacceptable or unauthorized work, the Engineer may have the correction, or removal and replacement, done by others and deduct the entire cost from monies due or to become due the Contractor under the Contract.

00150.90 Final Inspection:

(a) On-site Construction Work - The Engineer will inspect the Project at a time close to the completion of On-Site Work to ensure the Contractor's compliance with the Plans and Specifications.

When all On-Site Work on the Project is completed, including but not limited to Change Order Work and Extra Work, the Engineer will issue Second Notification as specified in 00180.50(g).

Within 15 Calendar Days after the Engineer receives the Contractor's written notification that all punch list items, final trimming and cleanup according to 00140.90 have been completed, the Engineer will review the Project and notify the Contractor that all Work is complete, or will give the Contractor written instruction regarding incomplete or unsatisfactory Work.

(b) All Contract Work - The Engineer will issue the Third Notification when the Contractor has satisfactorily accomplished all of the following:

- The Contractor has completed all On-Site Work required under the Contract, including the punch list items from (a) above;
- The Contractor has removed all Equipment; and
- The Contractor has submitted all required certifications, bills, forms, warranties and other documents.

00150.91 Post-Construction Review - The Contractor or the Engineer may request a Post-Construction Review meeting, to be held at a time prior to issuance of Third Notification but not earlier than 15 Days following the date of Second Notification. The meeting may be held if agreed to by both parties. The party making the request will conduct the meeting, and will announce the time and place of the meeting at least 15 Days prior to the meeting date. The purpose of this meeting is to examine the Project for possible process improvements that may benefit future projects.

00150.95 Final Acceptance - After the Engineer completes Final Inspection of all Work and sends Third Notification to the Contractor, the Agency will acknowledge Final Acceptance. The Agency will notify the Contractor in writing of the date of Final Acceptance within seven Calendar Days after Final Acceptance, or as soon thereafter as is practicable.

00150.96 Maintenance Warranties and Guarantees - Prior to Third Notification, the Contractor shall transfer to the Agency all unexpired manufacturers' warranties and guarantees for Materials and Equipment installed on the Project. Such warranties and guarantees shall recite that they are enforceable by the Agency.

00150.97 Responsibility for Materials and Workmanship:

(a) The Contractor shall perform the Work according to the terms, conditions, requirements, Plans, and Specifications set out in the Contract.

(b) Whether before or after the Agency's acceptance of the Work, the Contractor shall be responsible for:

- Correcting or repairing any defects in, or damage to, the Work which results from the use of improper or defective materials or workmanship; or
- Replacing, in its entirety, the Work affected by the use of improper or defective materials or workmanship to the extent provided by law; and
- Correcting or repairing any Work, Materials, Structures, Existing Surfacings, Pavement, Utilities, or sites, including without limitation Wetlands, damaged or disturbed in that correction, repair, or replacement. (see 00170.80 to 00170.85)

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Section 00280 - Erosion and Sediment Control

Description

00280.00 Scope - This work consists of implementing structural and non-structural Best Management Practices (BMP) for the purpose of controlling soil erosion by wind or water and keeping eroded sediments and other construction-generated pollutants from moving off project sites.

Requirements described in these Specifications and shown on the plans are part of the project Erosion and Sediment Control Plan (ESCP) and are the minimum for all project construction sites and conditions. These Specifications cover all project activities performed under the authority and jurisdiction of the Agency, including material sources, disposal sites, and off-site mitigation areas unless specific project activities are excluded elsewhere in these Specifications or in other Agency approved documents controlling the work.

00280.01 National Pollutant Discharge Elimination System - Comply with Federal, State, and local laws, rules and regulations, and the National Pollutant Discharge Elimination System (NPDES) 1200 Permit or Permits applicable to the project. A copy of the Agency's General Construction 1200 CA Permit, if applicable to the project, is available from the Agency. A local government 1200 CA Permit may also apply and some local agency requirements may be more stringent than these Specifications.

00280.02 Erosion and Sediment Control Plan on Agency Controlled Lands - For work on Agency-controlled lands, submit signed copies of the following for review and approval ten days before the preconstruction conference:

- A Contractor-developed, "construction" ESCP that incorporates the Agency's ESCP and all proposed modifications to it that fully complies with NPDES 1200 Permits applicable to the project.
- A narrative as described in the NPDES 1200 Permit and the Agency Erosion Control Manual.
- Implementation schedules for the ESCP based on each phase of the contractor's construction schedule.

An Agency-developed ESCP is typically furnished as part of a conventional contract plan set, which helps fulfill part of the ESCP requirement of the Permit. This initial ESCP, when adopted by the Contractor, may be used as the basis of the construction ESCP. Additional or revised erosion and sediment control features, not shown on the initial ESCP, may be required depending on the Contractor's methods of operation and schedule.

For each phase of the scheduled work, indicate on the ESCP all the BMP proposed and installed for erosion and sediment control to minimize clearing, stabilize exposed soil, divert or temporarily store flows, limit runoff from exposed areas, and filter transported sediment. Include all temporary slopes, constructed for staging or other reasons, which may not have been identified in the original contract plans. For assistance in preparing or modifying the ESCP, refer to the current Agency Erosion Control Manual.

Some ESCP required elements typically required by NPDES 1200 Permits:

(a) Narrative Site Description:

- Nature of the construction activity planned for the site
- Estimates of total site area and the areas of the site expected to be disturbed
- Soil types found on the site and their erosion potential
- The types of fill materials to be used
- Timetable for sequence of major construction events

(b) Site Map:

- All areas of development
- Drainage patterns
- Areas of soil disturbance, including pre-development and post-development elevation contours
- Areas used for storage of soils or wastes
- Areas where vegetative practices are to be implemented
- Location of all erosion and sediment control BMP or structures
- Location of all impervious structures and surfaces after project is completed
- Springs, wetlands, and other surface waters located on-site
- Boundaries of the 100 year floodplain, if determined
- Ordinary High Water line, if determined
- Location of storm drainage outfalls to receiving waters, if applicable
- Details of sediment and erosion controls
- Details of detention ponds, storm drain piping, inflow and outflow details

(c) Required BMP and Procedures for Erosion Prevention, Runoff Control, and Sediment Control:

- Construction entrances and parking areas
- Unpaved site roads such as haul roads
- Hauling saturated soils from the site
- Water washed from concrete trucks
- Correct installation of erosion and sediment control BMP (contract documents and agency references such as these Specifications may be cited as installation standards if applicable)
- Prompt maintenance and repair of BMP
- Clearing and grading practices to minimize area of exposed soil throughout the life of the project
- Schedule of phased clearing operations to limit soils to what can be stabilized
- Vegetative practices including preservation of existing vegetation, seeding, mulching, and buffer strips
- Preventing erosion of exposed areas
- Diverting flows from exposed slopes
- Limiting runoff from exposed areas
- Limiting sediment transport within work sites and keeping it from moving off of project areas
- Perimeter controls for all clearing and grubbing, both planned and installed
- Additional controls for wet season work and temporary work suspensions
- Sensitive areas such as wetlands
- Off site material source and waste areas
- Dust
- Emergency materials stockpiled on-site
- Storing flows, and filtering sediment
- Stockpiles

Ensure that the Contractor's construction ESCP and implementation schedules are prepared by an individual who meets qualifications of 00280.30. Furnish a signed copy of the ESCP with individual's name, title, state certifications, and employing firm if different than Contractor's firm.

Do not begin any site activities that have potential to cause erosion or sediment movement until the ESCP and implementation schedules are approved by the Engineer.

Keep a copy of the approved ESCP with updated changes on-site during all construction activities. During inactive periods longer than 7 calendar days, keep the ESCP on-site or provide a copy to the Engineer to retain.

Continually update the ESCP and schedules as needed for unexpected storm or other events to ensure that sediment-laden water does not leave the construction site. If there are approved changes, add them to the ESCP no later than 24 hours after implementation.

00280.03 Non-Agency Controlled Lands ESCP - For work on non-Agency controlled lands, in addition to the requirements of 00280.02, submit the following for review ten days before the preconstruction conference:

- A Contractor-developed ESCP for each unique site covered under project NPDES 1200 Permits.
- A description of how the ESCP will be implemented and monitored on these sites.
- A complete list of other applicable permits controlling work on these lands, whether the Agency is one of the permittees or not, and copies of the applicable permits.
- Proof that permits are not required from all pertinent federal, State, county, city, and local agencies
- Signed letter from the property owner that allows the Contractor access to the property. Include a statement in the letter that holds the Agency harmless for all consequences related to the Contractor's use of the property.
- Signed agreement with the property owner detailing the Contractor's operation, use of the property, and stating that Contractor will abide by permits, if any.

If the Contractor's operations require work on non-Agency controlled lands not presented at the preconstruction conference, or if changes to the Contractor's submitted ESCP are necessary, submit a new or revised ESCP to the Agency for approval before beginning work.

00280.04 Erosion and Sediment Control Manager - Designate and provide a representative as the Erosion and Sediment Control Manager (ESCM) who meets the qualifications of 00280.30.

Materials

00280.14 Erosion Prevention Materials:

(a) Plastic Sheeting - Furnish plastic sheeting slope protection, anchoring system, and toe protection meeting the following requirements:

- **Plastic Sheeting** - Minimum 6 mil thick polyethylene plastic sheeting.
- **Anchoring System** - Minimum 65 pounds, non-puncture type anchor weights with cords or ropes of adequate strength to support the weights on the slope or new or used chain link fence conforming to 03010.30.
- **Stakes** - Commercial grade metal posts with a weight of at least 1.35 pounds per foot.
- **Rock** - Class 50 riprap conforming to Section 00390.

(b) Chemical Soil Binder - Furnish a liquid stabilizing emulsion meeting the requirements of 00280.14(c).

(c) Chemical Dust Control - Furnish non-toxic materials with no adverse effect on soil structure or establishment and growth of vegetation. Furnish one of the following materials and apply as directed by the manufacturer's instructions:

(1) Liquid Stabilizer Emulsion - A tackifier of liquid and polyvinyl acetate polymers with emulsion resins containing not less than 55% total solids by weight. Do not use tackifiers containing polyacrylates or polyvinyl acrylics.

(2) Dry Powder Tackifier - A tackifier consisting of one or more active hydrocolloids from natural plant sources which hydrates in water and blends with other slurry materials, and upon application and drying tacks the slurry particles to the soil surface, and exhibits no growth or germination inhibiting factors. Provide stabilizing emulsion in a dry powder form that may be re-emulsifiable and consists of a processed organic adhesive derivative of one of the following:

- Gumbinder derived from guar (*Cyamopsis tetragonoloba*)
- Gumbinder derived from plantain (*Plantago insularis*)

(d) Temporary Mulching - Furnish temporary and permanent seeding, fertilizing, and mulching meeting the requirements of Section 01030.

(e) Slope and Channel Liner Matting - Matting is organized according to categories from the Texas DOT/TTI Hydraulics and Erosion Control Laboratory. Furnish matting from the QPL that meets the following performance criteria categories:

- **Type A** - Slope protection mat for clay soil slopes 1V:3H or flatter.
- **Type B** - Slope protection mat for sandy soil slopes 1V:3H or flatter.
- **Type C** - Slope protection mat for clay soil slopes steeper than 1V:3H.
- **Type D** - Slope protection mat for sandy soil slopes steeper than 1V:3H.
- **Type E** - Flexible channel liner for shear stress from 0 to 2 pounds per square foot.
- **Type F** - Flexible channel liner for shear stress from 0 to 4 pounds per square foot.
- **Type G** - Flexible channel liner for shear stress from 0 to 6 pounds per square foot.
- **Type H** - Flexible channel liner for shear stress from 0 to 8 pounds per square foot.

Furnish check slot material and fasteners for matting meeting the following requirements:

(1) Check Slot:

- **Channel Application** - Compacted Class 50 riprap meeting the requirements of Section 00390.
- **Slope Application** - Compacted suitable native embankment material.

(2) Fasteners - U-shaped wire staples or heavy duty pins as follows:

- **Staples** - 14 gauge steel wire staples. 1 inch "U" width with a length of 6 inches minimum for cohesive soils and 8 inches minimum for non-cohesive soils.
- **Pins** - 3/16 inch diameter steel pin with a 2 inch diameter steel washer secured at the head of the pin with a length of 18 inches minimum for cohesive soils and 24 inches minimum for non-cohesive soils.

00280.15 Runoff Control Materials:**(a) Check Dams** - Furnish check dam material meeting the following requirements:

- **Type 1: Aggregate** - Aggregate with maximum size between 6 inches and 3 inches meeting the requirements of 00330.16.
- **Type 2: Straw Bales** - Standard rectangular straw bales meeting the requirements of 01030.15.
- **Type 3: Biofilter Bags** - Minimum size 18 inch x 6 inch x 30 inch plastic mesh bags with 1/2 inch openings filled with approximately 45 pounds of clean, non-toxic 100% recycled wood product waste containing no fine materials or sediments, or as shown on the standard drawings for this device.
- **Type 4: Sand Bags** - Durable, weather-resistant bags woven tightly enough to prevent leakage of filler material. Fill bags with at least 75 pounds of firmly-packed fine PCC 3/8" - 0 aggregate, or round 3/8" - 3/16" pea gravel.
- **Type 5: Prefabricated System** - Prefabricated check dam system conforming to the manufacturer's recommendations and on the QPL.
- **Check Dam Stakes** - Stakes meeting the requirements of 00280.14(a).

(b) Diversion Dikes and Swales - Furnish diversion dike and swale materials meeting the following requirements:

- **Aggregate** - Aggregate with maximum size between 4 inches and 1 inch meeting the requirements of 00330.16.
- **Seeding, Fertilizing and Mulching** - Permanent or temporary seeding, fertilizing and mulching meeting the requirements of Section 01030.

(c) Temporary Drainage Curbs - Furnish temporary drainage curb material meeting the following requirements:

- **Type 1 Curb** - Concrete drainage curb meeting the requirements of 00480.10.
- **Type 2 Curb** - Asphalt concrete drainage curb meeting the requirements of 00480.10.
- **Type 3 Curb** - Sand bags meeting the requirements of 00280.15(a).

(d) Temporary Slope Drains - Furnish either plastic pipe meeting the requirements of Section 02410 or metal pipe meeting the requirements of Section 02420. If the runoff contributing area is not established, use 12 inch diameter.

(e) Flow Spreader - Furnish aggregate for flow spreaders with a maximum size between 6 inches and 3 inches meeting the requirements of 00330.16.

00280.16 Sediment Control Materials:

(a) Construction Entrances - Furnish materials meeting the following requirements:

- **Aggregate** - Aggregate with a maximum size between 6 inches and 3 inches meeting the requirements of 00330.16.
- **Geotextile** - Subgrade geotextile meeting the requirements of Section 02320. Provide "Level B" documentation according to 02320.10(c).

(b) Tire Wash Facility - Furnish tire wash facility materials meeting the following requirements:

- **Aggregate** - 1 1/2" - 0, 1" - 0, or 3/4" - 0 aggregate base material meeting the requirements of Section 00641.
- **Reinforcing Steel** - Reinforcing steel meeting the requirements of 02510.10.
- **Geotextile** - Subgrade geotextile meeting the requirements of Section 02320. Provide "Level B" documentation according to 02320.10(c).
- **Concrete** - Commercial grade concrete meeting the requirements of Section 00440.

(c) Sediment Fence - Furnish sediment fence materials meeting the following requirements:

- **Geotextile** - Geotextile meeting requirements of Section 02320. Provide "Level B" documentation according to 02320.10(c).
- **Posts** - Furnish the following posts for the types of fence shown:
 - **Sediment Fence, Supported** - Commercial grade metal posts with a weight of at least 1.35 pounds per foot.
 - **Sediment Fence, Unsupported** - Minimum 1 1/2 inch x 1 1/2 inch x 48 inch untreated wood posts (wood stain is acceptable).
- **Wire Mesh** - For supported sediment fence, furnish galvanized wire mesh with 2 inch x 2 inch openings, horizontally and vertically self-supporting prior to fastening to posts, a minimum tensile strength of 70 ksi, and meeting the requirements of ASTM A 82.

(d) Inlet Protection - Furnish inlet protection materials meeting the following requirements:

- **Wire Mesh** - Wire mesh materials as follows:
 - **Type 1 Inlet Protection** - Wire mesh meeting the requirements of 00280.16(c).
 - **Type 2 Inlet Protection** - 19 gauge steel-wire mesh with 3/8 inch x 3/8 inch openings.
- **Geotextile** - Type 1 sediment fence geotextile meeting the requirements of Section 02320. Provide "Level B" documentation according to 02320.10(c).
- **Aggregate** - Aggregate with maximum size between 4 inches and 1 inch meeting the requirements of 00330.16.

- **Stakes** - Stakes meeting the following requirements:
 - **Type 1 Inlet Protection** - Commercial grade metal posts with a weight of at least 1.35 pounds per foot.
 - **Type 4 Inlet Protection** - Minimum 1 inch x 2 inch x 18 inch wooden posts.
- **Biofilter Bags** - Biofilter bags meeting the requirements of 00280.15(a).
- **Prefabricated Filter Inserts** - Prefabricated filter inserts manufactured specifically for collecting sediment in drainage inlets and listed on the QPL. Include handles and fasteners sufficient to keep the insert from falling into the inlet during maintenance and removal of the insert from the inlet.
- **Concrete Masonry Units** - Nominal 8 inch x 8 inch x 16 inch, 29 pound concrete masonry units (CMU).
- **Sod** - Grass sod meeting the requirements of 01040.19(h).
- **Reinforcing Steel** - No. 4 rebar commercial grade reinforcing steel.

(e) Sediment Barriers - Furnish sediment barriers and sediment barrier stakes meeting the following requirements:

- **Type 1: Straw Bales** - Standard 45 to 65 pound rectangular straw bales that are wire-bound or string-tied meeting the requirements of 01030.15(b).
- **Type 2: Biofilter Bags** - Biofilter bags meeting the requirements of 00280.15(a).
- **Type 3: Fiber Rolls (Wattles)** - Fiber rolls made of straw meeting the requirements of 01030.15(b), except use only rice or coconut straw material. Wrap the straw to a minimum density of 2.75 pounds per cubic foot in tubular plastic netting meeting the following requirements:
 - 8 inch to 10 inch diameter size
 - Minimum strand thickness of 0.003 inch
 - Knot thickness of 1/16 inch
 - Weight of 0.35 ounces per foot $\pm 10\%$
 - Made from 85% high density polyethylene, 14% ethyl vinyl acetate, and 1% color for UV inhibition
- **Type 4: Sand Bags** - Sand bags meeting the requirements of 00280.15(a).
- **Type 5: Brush Barrier** - Maximum 6 inch diameter woody debris brush or topsoil strippings for brush barriers. Provide type 1 sediment fence geotextile meeting the requirements of Section 02320. Provide "Level B" documentation according to 02320.10(c).
- **Type 6: Filter Berm** - Aggregate with maximum size between 4 inches and 1 inch meeting the requirements of 00330.16. Provide subgrade geotextile meeting the requirements of Section 02320. Provide "Level B" geotextile documentation according to 02320.10(c).
- **Type 7: Prefabricated Barrier System** - Prefabricated barriers manufactured specifically for temporarily obstructing the flow of sediment-laden water and listed on the QPL.

- **Stakes** - Sediment barrier stakes as follows:
 - **Biofilter Bags** - Use minimum 1 inch x 2 inch x 18 inch wood stakes.
 - **Brush Barrier** - Use minimum 1 inch x 2 inch x 18 inch wood stakes.
 - **Straw Bales** - Use minimum 1 1/2 inch x 1 1/2 inch x 36 inch wood stakes.
 - **Fiber Rolls** - Use minimum 1 inch x 1 inch x 24 inch wood stakes.

(f) Sediment Mat - Furnish sediment mat from the QPL.

(g) Temporary Scour Basin - Furnish class 100 riprap for temporary scour basins meeting the requirements of Section 00390.

(h) Temporary Sediment Trap - Furnish sediment trap materials meeting the following requirements:

- **Geotextile** - Type 2 drainage geotextile meeting the requirements of Section 02320. Provide "Level B" documentation according to 02320.10(c).
- **Aggregate Base** - 1 1/2" - 0, 1" - 0, or 3/4" - 0 aggregate for aggregate base meeting the requirements of Section 00641.
- **Aggregate** - Aggregate with maximum size between 6 inches and 3 inches meeting the requirements of 00330.16.

Labor

00280.30 Erosion and Sediment Control Manager - Designate and provide an ESCM with the following minimum qualifications:

- Experience in all major disciplines of highway construction.
- Knowledgeable in principles of and practice of erosion and sediment controls.
- Skilled in assessing site conditions and effectiveness of erosion control BMP used.
- Successful completion of erosion control formal training sponsored by the Agency or acceptable to the Engineer.
- Responsible participation in construction of at least one Agency project with erosion control.
- Authority to immediately mobilize necessary personnel to correct and modify erosion control BMP as required.

Duties typically required of ESCM include:

- Manage and ensure proper implementation of the ESCP.
- Accompany the Engineer during field review of the ESCP prior to construction activities.
- Monitor rainfall on and in the vicinity of the Project site.
- Monitor water quality in receiving streams in the vicinity of the Project site.
- Inspect erosion and sediment control on active construction sites weekly.
- Inspect erosion and sediment control on inactive sites every two weeks.
- Inspect erosion control BMP on all active and inactive sites at least daily during rainy periods when 5/8 inch or more of rain has fallen within a 24 hour period.

- Mobilize crews to make immediate repairs to BMP or install additional BMP during working and non-working hours.
- Record actions taken to clean up significant amounts of sediment.
- Report potential permit violations to the Agency in a timely manner.
- Regularly update the approved Erosion Control Monitoring form.
- Update the ESCP monthly and within 24 hours after changes or major BMP modifications are implemented.
- Prepare a contingency plan in preparation for emergencies and the rainy season.
- Accompany the Engineer on inspections and, if required, on inspections by representatives of regulating agencies.

Provide the ESCM name, description of experience and training, qualifying certifications, and contact phone number ten days before the preconstruction conference. If changes in the appointment of the ESCM occur during the term of the Contract, provide written notice to the Engineer within five calendar days.

Construction

00280.40 Installation - Install erosion and sediment control BMP as shown and according to the most current edition of the ODOT Erosion Control Manual. Install these BMP before performing clearing, grading, or other land-altering activities. Ensure that sediment laden water does not leave the Project boundaries, enter drainage systems or waterways, or violate applicable water standards.

Included in this work are both non-structural BMP, such as limiting clearing of vegetation, and structural BMP such as various kinds of physical devices or materials like sediment fences. BMP may be temporary or they may be permanent when required to continue functioning after the Contract ends. Coordinate temporary erosion control BMP with permanent BMP and all related project work.

Provide continuous erosion prevention and sediment control throughout the period the Contractor is responsibilities for project sites under the Contract as determined by the Engineer. Take all reasonable steps to minimize or prevent any erosion and transport of sediment. Install and maintain all erosion and sediment control BMP to function as required. If planned or installed BMP are not effective, modify or change them so they are effective. Effective functioning is defined as preventing erosion, controlling runoff, or controlling sediment in each location where a measure is needed so all erosion-related impacts of site construction are fully mitigated as required.

00280.41 Work Restrictions - The following work restrictions apply:

(a) Disturbance Limits - Flag all construction site-clearing limits with high visibility flagging and do not disturb areas outside the flagging limits. Maintain the flagging during Project construction.

(b) Perimeter Controls - Perimeter controls include sediment fences, ditches, filter berms in flatter areas, and other methods for channeling flows. Install all appropriate perimeter controls before beginning any ground disturbing activities, especially at critical locations such as stream banks, the toe of fill or cut slopes, and sites near the two-year flood elevation.

(c) Wet Season Work and Temporary Work Suspension - Wet season work is defined as work between October 1 and May 30. Update the ESCP and schedule for work proposed during the wet season to ensure that all appropriate controls, including work suspension controls, are implemented and maintained. Submit the updated ESCP and schedule to the Agency and receive approval before beginning any work during the wet season. The Agency may not approve work on critical sites with high erosion potential if controls are not properly installed or have a likelihood of failure.

During the wet season, limit excavation and bare ground activities to only that required for immediate operations. Stabilize soil stockpiles at the end of each workday by diverting flows, placing covers, or installing sediment barriers at the stockpiles.

(d) Disturbance Restrictions - If soil erosion and sediment resulting from construction activities is not effectively controlled, the Agency will limit the amount of disturbed areas to that which can be effectively controlled. Implement erosion and sediment control BMP at the earliest practicable time. Install all erosion and sediment control devices according to the approved ESCP and schedule. If the Contractor fails to control erosion, the Agency will stop all construction work according to 00180.70.

00280.42 Stabilization - Protect exposed soils from erosion by water, wind, or vehicles when required by permits or directed by the Engineer. At a minimum, stabilize soil areas as follows:

(a) Soil Exposure Limitations:

- **Statewide (Entire Year)** - Within seven days of exposure, stabilize all areas within 100 feet of waterways, wetlands, or other sensitive areas using methods that do not rely solely upon germination to control erosion.
- **West of the Cascades (Entire Year)** - Stabilize all other areas within 14 days of exposure.
- **East of the Cascades (October 1 through April 30)** - Stabilize all other areas within 14 days of exposure.
- **East of the Cascades (May 1 through September 30)** - Stabilize construction areas in stages based on site conditions, weather, and as determined by the Engineer.

(b) Temporary Stabilization - Temporarily stabilize exposed soils:

- Every 14 days or more frequently if needed or directed.
- Upon approval, active work areas scheduled for re-disturbance may be left unstabilized for 14 day periods if erosion by wind, water, or vehicles is not occurring or imminent.
- A minimum of one day before expected rain events.
- During wet periods and when not actively raining, at the end of each day.
- As an emergency measure when rain is falling on unprotected areas.
- When wind or vehicle traffic is visibly causing more than minor dust.
- Soil surfaces at finish grade when working outside the permanent seeding dates.

Temporary stabilization includes, but is not limited to, chemical soil binders, mulching and tacking, erosion control matting, plastic sheeting, and temporary seeding or other BMP required to achieve the necessary stabilization.

Document all implemented BMP on the ESCP. Ensure that permanent slope stabilization is achieved before removing temporary BMP.

(c) Permanent Stabilization - Permanently stabilize exposed soil surfaces at finished grade. Permanent stabilization methods include, but are not limited to, seeding, mulching, structural surface coverings such as riprap, and vegetative stabilization. Permanent stabilization includes stabilization of temporary structures such as detours and staged earthwork. Immediately perform permanent stabilization at each completed excavation and embankment area except for areas that are scheduled to be redisturbed.

If seeded areas are not sufficiently stabilized by an established stand of vegetation according to 01030.60, or if the soil surface is not sufficiently protected with temporary stabilization BMP by November 1 of each year, do the following:

- Use BMP necessary to redirect water flows away from disturbed areas.
- Re-grade disturbed areas to finish grade.
- Apply permanent seeding at the original specified rate.
- Apply temporary mulching or matting.

If areas for temporary stabilization are too steep or lack access for effective straw mulch application, apply, upon approval, another effective measure such as chemical soil binder.

Incorporate permanent erosion control features into the Project at the earliest practicable time. Use temporary erosion control features for the following situations:

- To correct conditions that occur during construction activities that were not foreseen during the design stage of the Project.
- That are needed prior to installing permanent erosion control features.
- To temporarily control erosion that develops during normal construction activities.

Where potential for erosion exists and if construction permits, construct permanent erosion control features immediately after clearing and grubbing and grading operations are complete. If permanent erosion control BMP are not practicable to construct, furnish and install temporary erosion control BMP.

00280.43 Area Preparation - Prepare areas according to 01040.48(d) and track all fill slopes at finished grade steeper than 1V:3H and flatter than 1V:1.5H so that track impressions run parallel to slope contours. Maintain at least 1 3/8 inch tall track grousers.

00280.44 Erosion Prevention BMP - Install erosion prevention BMP as shown and according to the following:

(a) Plastic Sheeting - Place plastic sheeting on disturbed, temporary slopes or stockpiles where immediate protection is required and mulching or other methods of soil stabilization are not feasible. Temporary slopes include vertical excavations for retaining walls and other temporary soil excavations and embankments related to structural work.

Cover exposed soil with plastic sheeting and secure tightly using an anchoring system of sand bags, chain link fence, or other approved methods. Do not allow the anchoring system to puncture the plastic sheeting. Trench plastic sheeting at the top of slope and secure adequately to keep in place during any conditions that can be reasonably expected in the area. Direct runoff away from areas above plastic sheeting to prevent undermining. Control runoff from plastic sheeting so water discharges into protected drainage.

(b) Chemical Soil Binder - Hydraulically apply a liquid stabilization emulsion at the following rates unless the manufacturer recommends a greater rate of application:

- **Long Term Control of Exposed Soil Surfaces** - Apply 35 gallons per acre of emulsion. Dilute with water at the rate of one part emulsion to 20 parts water.
- **Steep Slopes with Raveling Small Rock** - Apply 45 gallons per acre of emulsion. Dilute with water at the rate of one part emulsion to 10 parts water.

(c) Chemical Dust Control - Apply appropriate dust control for wind or equipment-caused erosion according to the following:

- **Water** - Apply water according to Section 00340.
- **Liquid Stabilizer Emulsions** - Dilute the emulsion with water at a rate of one part emulsion to 30 parts water. Apply the diluted mixture at the rate of 865 gallons per acre unless the manufacturer recommends a greater rate of application.
- **Dry Powder Tackifier** - Apply at a rate of 140 pounds per acre unless the manufacturer recommends a greater rate of application.

Watering for dust control may also be covered under Section 00340.

(d) Temporary Mulching - Evenly apply dry mulch and tackifier material to form a cohesive surface cover that is resistant to displacement by wind and water. In areas not accessible to heavy equipment, mulch by hand or by other approved methods. Areas not prepared according to 01040.48(d) will require greater rates of application at no additional cost to the Agency.

(1) Dry Mulch - Apply straw mulch on slopes 1V:1.5H or flatter. Spread straw mulch by hand or blower. Place approximately 2 inch deep, in loose condition, at a rate between 2 to 3 tons per acre of dry mulch. Place straw mulch so that it is loose enough for sunlight to penetrate and air to circulate, but dense enough to shade the ground, reduce water evaporation, and materially reduce soil erosion. Anchor using hydraulically applied tackifier, crimping disc, or sheep's-foot roller approved by the Agency or methods specified in the Special Provisions.

Provide blower equipment that uses air pressure with an adjustable spout that uniformly applies dry mulch at constantly measured rates. Apply the materials using a sweeping, horizontal motion of the nozzle.

(2) Tacking - Straw mulch may be tackified using hydraulically applied tacking agents or mechanical methods at the following rates of application:

a. Hydraulically Applied Tacking Agents:

- **Liquid Stabilizer Emulsions** - Dilute the emulsion with water at a rate of one part emulsion to 30 parts water. Apply the diluted mixture at the rate of 865 gallons per acre unless the manufacturer recommends a greater rate of application.
- **Dry Powder Tackifier** - Apply at 80 pounds per acre with 2,000 pounds of hydromulch fiber unless the manufacturer recommends a greater rate of application.

b. Mechanical Methods - Straw mulch may be mechanically tackified using a crimping disk or sheep's-foot roller.

- **Crimping Disc** - A heavy disk with flat, scalloped discs approximately 1/4 inch thick, having dull edges and spaced no more than 9 inches apart.
- **Sheep's-Foot Roller** - Modified sheep's-foot roller equipped with straight studs, made of approximately 3/4 inch steel plate, placed approximately 8 inches apart and staggered. Ensure that the studs are not less than 6 inches long or more than 6 inches wide, and rounded to prevent withdrawing the straw from the soil. Use a roller with enough weight to incorporate the straw sufficiently into the soil providing a uniform surface cover.

(e) Slope and Channel Liner Matting - Ensure that the matting is installed according to the plans, these Specifications, or the manufacturer's recommendations, whichever is more stringent. Within 25 feet of water resources or as indicated, install only matting that is fully biodegradable (photodegradable is not acceptable).

(1) Area Preparation - Remove all materials (vegetation, rocks, wood, etc.) larger than 2 inches in size. Smooth the surface and remove undulations sufficient to allow the matting to be placed in complete contact with the soil.

(2) Seeding - Apply seeding to all disturbed areas, including the area where matting is required, according to one of the following:

a. Seeding Prior to Matting Installation - Apply according to Section 01030. This method is preferred.

b. Seeding After Matting Installation - This method is allowed only if specified in the Special Provisions or approved. Apply according to Section 01030 at double the application rate for seed.

c. Single Application - Matting and Seed:

- **Hydraulically Applied Matting** - Apply seed at double the rate specified in Section 01030. Thoroughly mix seed, fertilizer, and matting material.
- **Manually Applied (Pre-seeded) Matting** - Pre-seed the matting at double the rate specified with the seed mix specified in Section 01030.

(3) Matting Placement - Apply matting loosely so it is in complete contact with the soil to prevent erosion occurring beneath it. Apply mat and fasteners as shown. Construct check slots on all channel applications and on slope applications when shown or specified.

00280.45 Runoff Control BMP - Install runoff control BMP as shown and according to the following:

(a) Check Dams - Construct check dams as shown or directed.

- **Type 1: Aggregate** - Place aggregate in the ditch section with the center low point below the outside edge.
- **Type 2: Straw Bales** - Straw bales are not acceptable for use as check dams except in emergency situations and when approved at each location. If straw bales are used as check dams, replace with another acceptable check dam as soon as practicable but no longer than seven calendar days.
- **Type 3: Biofilter Bags** - Place aggregate in ditch section and extend check dam with biofilter bags sufficient to direct flow over aggregate weir. Aggregate weir may be replaced with additional biofilter bags if approved.
- **Type 4: Sand Bags** - Place aggregate in ditch section and extend check dam with sand bags sufficient to direct flow over aggregate weir. Aggregate weir may be replaced with additional sand bags if approved.
- **Type 5: Prefabricated System** - Install prefabricated systems according to the plans, Special Provisions, and the manufacturer's recommendations. Field fabricated systems are not acceptable.

(b) Diversion Dikes and Swales - Construct diversion dikes and swales above the cut slope to divert runoff from undisturbed areas away from disturbed slope areas. Convey runoff to an undisturbed area and discharge in a non-erosive manner.

Construct diversion dikes and swales at the toe of fill slopes to divert and convey sediment laden water to a sediment control facility. Compact dike material according to the Agency Manual of Field Test Procedures.

Immediately after construction of diversion dikes and swales, place temporary seed and mulch according to Section 01030, or place erosion matting and seed as directed.

(c) Temporary Drainage Curbs - Construct temporary drainage curbs as shown or directed.

(d) Temporary Slope Drains - Construct watertight slope drains and extend as the embankment height increases. Construct temporary slope berms at the top of embankment slopes to direct water into the drains until permanent drainage structures are completed.

(e) Flow Spreader - A flow spreader is a device that receives channeled runoff and uniformly disperses it along the length of the spreader. It may be constructed of clean aggregate in a berm or trench or lumber or similar materials. Place the flow spreader to discharge water into a stabilized area at non-erosive velocities. See the plans for details and locations of this device.

00280.46 Sediment Control BMP - Install sediment control BMP as shown and according to the following:

(a) Construction Entrances - Install construction entrances at every point of access onto paved surfaces.

When construction entrances are in use and mud and dirt tracking is still evident, take additional steps to eliminate tracking by hosing off tires before vehicles leave the site, or by modifying construction techniques or work operation. Perform tire washing on gravel pads. Use silt-trapping structures to collect and drain wash water before it leaves the construction site.

(b) Tire Wash Facility - Excavate the area for installation of the tire wash facility. Install subgrade geotextile, aggregate base coarse, reinforced concrete, and water as shown.

(c) Sediment Fence - Construct supported (mesh and metal posts) and unsupported (no mesh) as follows:

- When installing geotextile and mesh, or geotextile alone, use a continuous roll of geotextile cut to the length of the barrier to avoid joints.
- Manufacturer's factory seams are acceptable. Field sewn seams are not acceptable.
- Drive posts into undisturbed soil as shown.
- Securely fasten the geotextile (and mesh) to the upslope side of the posts. Securely fasten each end of the geotextile (and mesh) to the end posts.
- Use stitched loops over posts for unsupported silt fence.
- Excavate a trench on the upslope side of the fence and place geotextile to the bottom of the trench. Backfill the trench with native material and compact.
- Attach the supported sediment geotextile to the wire mesh.
- Install the manufactured silt fence system according to the plans, Special Provisions, and manufacturer's recommendations. Connect end of rolls as shown.

(d) Inlet Protection - Construct inlet protection that directs flows through the control and into the inlet.

- **Type 1: Sediment Fence** - Install supported sediment fence around the perimeter of the inlet according to 00280.46(c).
- **Type 2: Geotextile/Wire Mesh/Aggregate** - Place wire mesh over the inlet grate. Place sediment fence geotextile over the wire mesh and perimeter area near the inlet. Install aggregate over the geotextile fabric.
- **Type 3: Prefabricated Filter Inserts** - Install prefabricated filter inserts according to the plans, Special Provisions, and manufacturer's recommendations. Prefabricated inserts with provisions for overflow are allowed only when accompanied by additional BMP to prevent the potential of sediments entering project storm systems. Field fabricated inserts are not allowed.
- **Type 4: Biofilter Bags** - Install biofilter bags according to the plans.
- **Type 5: Masonry** - Install concrete masonry units around the perimeter of the inlet. Place sediment fence geotextile around the outside perimeter, up the outside face, and on the top of masonry units. Place aggregate over the geotextile fabric and flush with the top of masonry units.
- **Type 6: Sod** - Install sod around the perimeter of inlets within 36 hours of harvest of the sod.

(e) Sediment Barriers:

- **Type 1: Straw Bales** - Straw bales are only acceptable for use as short-term emergency containment. Receive approval before each use of straw bales and remove within 30 calendar days of installation unless directed to replace with new bales.
- **Type 2: Biofilter Bags** - Place and arrange biofilter bags as shown or directed.
- **Type 3: Wattles** - Place and arrange wattles as shown or directed.
- **Type 4: Sand Bags** - Place and arrange sand bags as shown or directed.
- **Type 5: Brush Barrier** - Place brush barrier as shown or directed. Place woody debris in a linear pile.
- **Type 6: Filter Berm** - Place and arrange filter berms as shown or directed. Place rock in an evenly spread, trapezoidal berm.
- **Type 7: Prefabricated Barrier System** - Install prefabricated barrier systems according to the plans, Special Provisions, and manufacturer's recommendations. Field fabricated systems are not allowed.

(f) Sediment Mat - Place sediment mats a minimum of 20 feet downstream of work areas. Install mats individually or in groups on the stream bottom. Remove the mats not later than 48 hours after stream activities are complete. Remove them from the Project site, or if approved, place them on the stream bank and cover with permanent seeding.

(g) Temporary Scour Basin - Construct temporary scour basins at the outfall ends of temporary slope drains or as shown.

00280.46(h)

(h) Temporary Sediment Trap - The trap may be formed by constructing a berm or by partial or complete excavation. Direct the discharge flow to a stabilized conveyance outlet or level spreader.

00280.47 Work Quality - Protect areas according to 01030.49.

00280.48 Emergency Materials - Provide, stockpile, and protect emergency materials on-site for unknown weather or erosion conditions. A list of emergency materials will be listed in the Special Provisions. Replenish emergency materials as they are used.

The emergency materials are in addition to the other erosion control materials required to implement and maintain the ESCP.

Remove all unused emergency materials from the Project site at the completion of the Project.

Maintenance

00280.60 General - Maintain installed erosion and sediment control devices in good working order at all times. Keep the devices in place until the Agency issues notification of acceptance of stabilization. All maintenance and repairs are at no additional cost to the Agency.

00280.61 Ineffective Controls - If a control feature does not function effectively, immediately repair, replace, or provide additional devices. Devices repaired, replaced, or added due to improper installation, insufficient maintenance, or damage from Contractor operations will be made at no additional cost to the Agency.

00280.62 Inspection and Monitoring - Ensure that regular site inspection and monitoring is performed according to the schedule and record keeping requirements of the NPDS permit.

(a) Inspection - Perform general site inspection, complete all applicable parts of the ODOT Erosion Control Monitoring Form, and submit the Form to the Agency as follows:

- Weekly for active sites
- Every two weeks for inactive sites
- When direct by the Engineer

(b) Rainfall - Furnish and install a rain gauge at the Project site. Notify the Agency if 1/2 inch or more of rainfall occurs within a 24 hour period. As soon as practicable, but not later than 24 hours, after 1/2 inch or more of rainfall occurs, including weekends and holidays, inspect the entire Project to determine the condition of all erosion and pollution control devices.

(c) Monitoring Receiving Stream - Observe and record color and turbidity or clarity within 30 feet upstream and downstream of locations where surface waters from the construction site enter the receiving stream. Note whether sheen and floating matter are present or absent. Describe any apparent color and the clarity of the discharge, and any observable difference in comparison with the receiving stream.

If a significant permit noncompliance or serious water quality issues occur which may endanger health or the environment, verbally report to the Engineer within 24 hours and submit a written report within 5 calendar days.

00280.63 Sediment Removal - Remove sediment and upgrade or repair the devices as needed as soon as practicable, but not later than two days after the surrounding exposed ground has dried sufficiently to prevent further damage from equipment needed for repair operations. If rainfall continues

over a 24 hour period, or other circumstances that preclude equipment operation in the area, hand carry and install additional sediment control devices with best management practices and approved by the Agency.

(a) Catch Basins - Maintain catch basin inserts and other forms of inlet protection by removing trapped sediment when storage capacity has been reduced by 50%.

(b) Sediment Controls - Remove sediment from sediment fences, sediment barriers, check dams, and sediment traps once it has reached one third of the exposed height of the device or storage depth. Replace aggregate and rock filter material with new aggregate material when the sediment reduces the filtering capacity of the device by one half. Replace biofilter bags with clean, washed bags when removing sediment from them. Wash bags in an approved sediment control area.

(c) Paved Areas - Keep all paved areas clean for the duration of the Project. Use cleaning methods that do not transport sediment-laden water to receiving streams.

(d) Construction Entrances - Add and remove aggregate or other specified material as needed to maintain the proper function of the construction entrances.

(e) Permanent Stabilization - Restabilize within two calendar days of disturbance all areas disturbed by the Contractor's operations or other causes including wind, water, and vandalism.

(f) Straw Bales - Replace straw bales when they become non-functional or, at a minimum, on an annual basis or at the beginning of each construction season as appropriate.

Finishing and Clean Up

00280.70 Removal - Within 30 days of the notification of acceptance of permanent stabilization, remove temporary erosion and sediment control devices and materials from the area. Remove accumulated sediment before removing the devices and materials. Immediately shape and permanently stabilize areas affected by the removal process. All temporary erosion and sediment control features that are not incorporated into the permanent work remain the property of the Contractor. Do not remove temporary erosion and sediment control devices before permanent stabilization is accepted.

00280.71 Sediment Disposal - Regrade removed sediment into slopes or remove and dispose of off-site according to 00290.20. Do not flush sediment-laden water into waterways or drainage systems.

Measurement

00280.80 Measurement - Quantities of work performed under this Section will be measured according to the following:

(a) Lump Sum Basis - No measurement of quantities will be made for lump sum items.

(b) Unit Basis - Unit basis items will be measured on the unit basis, of each device or location where the device is constructed or placed.

(c) Length Basis - Length basis items will be measured on the length basis along the line and grade of the item or device constructed or placed.

- Flow spreaders and diversion dikes and swales will be measured along the long axis.
- Sediment barrier, when measured on the length basis, will be measured along the long axis of the barrier regardless of type.

- Temporary slope drains will be measured from the beginning of the metal end pieces to the end of the drain. Measurement will be made when each installation is at its maximum length.

(d) Area Basis - Area basis items will be measured on the area basis along the ground surface, and computed to the square foot or acre as applicable.

(e) Limitations - The quantities of emergency materials listed in 00280.48 of the Special Provisions are included in the items listed in the Contract Schedule of Items.

Payment

00280.90 Payment - The accepted quantities of work performed under this Section will be paid for at the Contract unit price, per unit of measurement, for the following items:

Pay Item	Unit of Measurement
(a) Erosion Control	Lump Sum
Erosion Prevention	
(b) Plastic Sheeting	Square Yard
(c) Chemical Soil Binder.....	Acre
(d) Chemical Dust Control	Acre
(e) Temporary Mulching	Acre
(f) Matting	Square Yard
Runoff Control	
(g) Check Dam	Each
(h) Temporary Diversion Dike/Swale	Foot
(j) Temporary Slope Drain	Each or Foot
(j) Flow Spreader.....	Foot
Sediment Control	
(k) Construction Entrance	Each
(l) Tire Wash Facility	Each
(m) Sediment Fence, _____	Foot
(n) Inlet Protection	Each
(o) Sediment Barrier	Each or Foot
(p) Sediment Mat.....	Square Yard
(q) Temporary Scour Basin	Each
(r) Temporary Sediment Trap	Each

Item (a) includes:

- providing the Erosion and Sediment Control Manager
- developing, revising, and documenting the ESCP
- mobilization
- monitoring activities
- furnishing, stockpiling, protecting, restocking, and removing emergency materials
- preparing Project for winter shut-down

- inspecting, maintaining, and removing erosion control devices
- restoring, mulching, tacking, and seeding all disturbed ground, work, and storage areas not otherwise covered

When only item (a) is listed in the Contract Schedule of Items, no separate or additional payment will be made for modifications or additions to the BMP that become necessary for permit compliance during construction.

Partial payments for item (a) will be made as follows:

- When the initial Contractor developed ESCP, narrative, and schedule are complete and accepted, and the initial erosion control devices are installed 25%
- When 50 percent of the Contract is complete, excluding advances on materials 25%
- When 75 percent of the Contract is complete, excluding advances on materials 25%
- At completion of the Contract and all erosion control devices are either removed from the Project site or are fully functioning as permanent BMP..... 25%

Item (b) includes protecting exposed slopes with plastic sheets, anchoring devices, and toe protection maintenance.

Item (f) includes preparing the slope surface and stabilizing exposed soil with erosion matting material.

Items (g), (n), and (o) includes the biofilter bags, sand bags, and sediment fence as applicable.

Emergency materials that are incorporated into the Project will be paid for under the appropriate items listed in the Contract Schedule of Items.

Payment will be payment in full for furnishing and placing all materials, and for furnishing all equipment, labor, and incidentals necessary to complete the work as specified.

No separate or additional payment will be made for:

- removing and disposing of sediment build-up behind sediment fences and sediment barriers
- removing and reinstalling required appurtenances to modify temporary slope drains as the embankment slopes are changed
- constructing and removing temporary slope berms
- applying dust control
- erosion control for work outside the construction limits including but not limited to borrow pits, haul roads, disposal sites, and equipment storage sites

Section 00290 - Environmental Protection

Description

00290.00 Scope - This Section describes the Contractor's duties and obligations with respect to protection of the land, waters, air, wildlife, and other environmental resources of the State.

Comply with all applicable federal, State, and local environmental, health, safety, and other laws, acts, statutes, regulations, administrative rules, ordinances, orders, and permits, as they may be amended from time to time (referred to in this Section as "Laws"). Comply with all applicable Laws, whether or not specifically referenced in this Section or elsewhere in the Contract.

Federal, State, and local agencies known to have enacted ordinances and regulations relating to environmental pollution and the preservation of natural resources that may affect the performance of the Contract are listed in 00170.01.

If any provision of these Specifications appears to conflict with one or more Laws, the more stringent requirement shall apply, unless the Engineer directs otherwise in situations where these Specifications are more stringent.

Comply with all additional requirements or Laws imposed by any agency or governmental unit having authority to enforce the Endangered Species Act (ESA) and other Laws.

All penalties assessed against the Agency because of the Contractor's violation of Laws referenced above, or permits applicable to the Project, will be withheld from the progress or final payments according to 00195.50(e).

No condition of the Contract releases the Contractor from any responsibility or requirement under any environmental or other Law.

00290.10 Staging and Disposal Sites - Locate staging areas and disposal sites in previously improved or disturbed sites, including existing roadways, pullouts, turnouts, parking lots, and storage yards that have been compacted, graveled and paved, unless otherwise approved, in writing, by the Engineer.

00290.11 Water Conservation - Minimize use of water by maintaining equipment, immediately fixing water line and container leaks, ensuring water valves are turned off promptly, and using recycled water when feasible.

00290.20 Waste, Hazardous Waste, and Hazardous Substances - Comply with all applicable federal, State, and local Laws as they pertain to the storage, handling, management, transportation, disposal, and documentation of waste, hazardous waste, and hazardous substances.

(a) Hazard Communication - Ensure the following documents are readily available on-site to employees, subcontractors and inspectors:

- Material Safety Data Sheets (MSDS) for all hazardous substances stored or used on-site.
- Written hazard communication program, including employee training documentation.

The Oregon Occupational Safety and Health Division (OR-OSHA) provides guidance to meet these requirements in their publication "Hazard Communication: A Safe-Work-Practice Guide".

(b) Fuel Storage - Store fuel according to the current edition of the International Fire Code and all applicable federal, State, and local Laws.

If total fuel and petroleum storage, in containers 55 gallons or larger, exceeds 1,320 gallons, comply with the applicable spill prevention control and countermeasures (SPCC) requirements of 40 CFR 112. If applicable, submit the professional engineer stamped SPCC plan, 10 days before the preconstruction conference. Comply with the plan and keep a copy on-site and readily available. The SPCC plan may be combined with the Pollution Control Plan required under 00290.30(b).

(c) Waste Management:

(1) General - Prepare a hazardous waste determination for all waste generated on-site to determine whether the waste is classified as hazardous waste, universal waste, excluded waste, waste water, or solid waste. The Agency may provide initial analytical results for some wastes such as lead-based paint and asbestos containing material. Conduct additional testing necessary for waste characterization and disposal using an Oregon Environmental Laboratory Accreditation Program (ORELAP) accredited laboratory, under chain of custody procedures.

Segregate all demolition debris according to its intended end use (reuse, recycle, or dispose). If required, store in designated areas in a manner that prevents contamination to soil and water and prevents fugitive dust emissions. Remove all waste materials recovered from the site unless otherwise approved, in writing. Retain disposal and recycling facility receipts for wastes generated on-site for at least one year after completion of the Project. Provide copies of the receipts to the Engineer within seven calendar days of the disposal or recycling.

Dispose of noxious weeds and Specified Weeds according to Section 01030.

Do not reuse demolition material, coated or treated materials, or concrete and masonry materials in waters of the State or U.S.

(2) Clean Fill - Clean fill, as defined by OAR 340-093-0030(13), becomes the property of the Contractor at the place of origin.

(3) Reuse, Recycle, and Dispose of Materials - Waste materials become the property of the Contractor at the place of origin. Unless prohibited by Law, treat waste materials according to the following priority:

- Reuse demolition debris on-site.
- Recycle demolition debris.
- If it is not feasible to reuse or recycle, ("feasible" is defined as a facility that is capable of handling the material, will take the material and the cost of transportation plus the cost to reuse or recycle the material is equal to or less than the costs of disposal) dispose of waste material according to the following:

a. Burnable Materials - Dispose of burnable material, that cannot be reused or recycled, according to 00290.30(c-3).

b. Woody Matter - Woody matter may be burned according to 00290.30(c-3) or may be chipped to a size of no more than 3 inches in any direction then uniformly spread over selected landscape areas, as directed, in loose layers not more than 3 inches thick. Burying wood, stumps, or other woody material is not allowed.

c. Preserved and Coated Wood - Dispose of chemically preserved wood, pressure treated wood, and wood coated with latex paint that does not contain lead according to the following:

- Reused whole.
- Provided to others to reuse.
- Burned as fuel at an energy recovery facility with a DEQ or LRAPA stationary source permit.
- Delivered to a DEQ permitted municipal solid waste landfill or a DEQ permitted construction and demolition landfill.

Dispose of wood coated with lead-containing paint at a DEQ permitted municipal solid waste landfill or a DEQ permitted construction and demolition landfill.

Test wood as required by the receiving facility.

d. Concrete and Masonry - Concrete and masonry, when not recycled, may be reused to fill basements or be buried in embankments on-site, provided that the materials are broken into pieces not exceeding 15 inches in any dimension, and placed so that:

- No part of any piece is within 2 feet of the top, side or end surface of the basement, embankment, or other structures.
- The fill or embankment is constructed and compacted according to 00330.42 and 00330.43.

If the Engineer provides written approval, concrete may be reused as aggregate if it meets the requirements of Section 02610 through Section 02690.

e. Disposal on Agency-Owned Lands - Do not dispose of waste materials on Agency-owned or Agency-controlled lands, except when shown, specified, or allowed in writing to be used as fill. If allowed, place waste materials only at specified locations, as directed.

f. Off-Site Disposal - Dispose of waste at an energy recovery facility with a DEQ or LRAPA Stationary Source Permit, at a permitted landfill, or at other waste disposal facilities as required depending on that type of waste.

Subject to local zoning codes and the requirements of 00280.03, materials that meet the definition of clean fill may be placed on other properties in a manner consistent with environmental requirements, and with written permission of the property owner. Furnish the Engineer a copy of the signed agreement with the owner before placement of the clean fill material. Do not place the clean fill material at locations that are visible from a public highway, road, or street unless the site is zoned and licensed for landfill.

(d) Hazardous Waste Management - Determine the generator category for the Project, based on the amount and type of hazardous waste generated. Use the following definitions. If they differ from current Laws, use the current Laws.

- **Conditionally Exempt Generator** - A conditionally exempt generator (CEG) generates 220 pounds or less of hazardous waste per month or 2.2 pounds or less of acutely hazardous waste per month and accumulates up to 2,200 pounds hazardous waste or 2.2 pounds acutely hazardous waste on-site.

- **Small Quantity Generator** - A small quantity generator (SQG) generates 220 pounds to 2,200 pounds hazardous waste per month, can accumulate up to 13,200 pounds hazardous waste on-site (or more with a permit), and ship hazardous waste off-site within 180 days of generation.
- **Large Quantity Generator** - A large quantity generator (LQG) generates more than 2,200 pounds hazardous waste per month or more than 2.2 pounds acutely hazardous waste per month, has no accumulation limit, but ship all hazardous waste off-site within 90 days of generation.

In addition to current Laws, comply with the following:

- If the Project generator category is SQG or LQG, or if it requires a hazardous waste identification number, obtain a Resource Conservation and Recovery Act (RCRA) site identification number from the DEQ. Pay all fees and complete the RCRA application form as follows:
 - List the Contractor as the Site Contact, the Site Operator, the Hazardous Waste Form Contact, and the Hazardous Waste Fee Contact.
 - List ODOT as the Site Location, the Land Owner, and the Legal Owner.
 - Fill in the Comments section with the following statement:

"[Contractor name] is responsible for the following: All hazardous waste management on site for the duration of this construction project, for delivery of the waste to a permitted recycling or disposal facility, and for all forms and fees associated with the hazardous waste management including cancellation of the RCRA site identification number at the end of the Project. ODOT is the owner of the waste and maintains long term responsibility for the waste as required by RCRA, excluding all wastes generated solely from materials brought to the site by the Contractor, which remain the property of the Contractor."
 - The Contractor may sign hazardous waste manifests for the off-site shipment of hazardous wastes as the "offeror" rather than as the "generator".
- Maintain all required waste management records, including monthly hazardous waste generation records, manifests, recycling and disposal receipts, test results, and annual DEQ reports. Submit monthly records to the Engineer by the fifteenth day of the following month and submit DEQ reports to the Engineer concurrently with DEQ. Keep copies for at least three years following completion of the Project and resolution of any regulatory violations or citations.
- If the quantity of hazardous waste projected to be generated meets the requirements for a CEG, store hazardous wastes on-site for no more than 180 days.
- If the quantity of hazardous waste projected to be generated meets the requirements for a SQG or for a LQG, prepare a Hazardous Waste Contingency Plan according to 40 CFR 265.51. Maintain a copy of the Contingency Plan on-site at all times during construction activities, readily available to employees and inspectors.
- If the project is SQG or LQG, retain a Certified Hazardous Materials Manager (CHMM) in good standing and with experience managing the hazardous wastes associated with the Project to oversee waste management at the site.
- All employees involved in the handling and management of CEG hazardous waste shall comply with the federal and State Laws for hazardous waste management. All employees involved in the handling of SQG and LQG hazardous waste shall be trained according to federal and State Laws. For LQC hazardous waste projects, keep employee training records on-site and readily available.

- If the quantity of hazardous waste generated in a month changes the generator category, immediately implement the requirements for the new category and comply with them for the remainder of the year. Complete the new documentation and training requirements within 30 calendar days of the change.
- Ensure hazardous waste containers are clearly and visibly labeled with the contents and accumulation start date, compatible with the contents and in good condition. Store them in a designated weather-protected area that is secured from public access, has secondary containment adequate to contain a release, and has sufficient aisle space to safely maneuver containers and respond to spills (minimum 30 inches).
- If hazardous waste will be treated on-site, obtain approval from DEQ and the Engineer for each specific treatment or recycling process, treat wastes within accumulation tanks or closed containers that meet RCRA requirements, conduct treatment within the storage time for the applicable generator category, maintain current copies of all required notifications and waste analysis plans readily available on-site and request DEQ technical assistance prior to starting any on-site recycling or treatment.

(e) Hazardous Substance Transportation - Comply with the following requirements for transportation of hazardous substances and hazardous waste:

- Train all employees involved in transportation and shipping as required by US DOT.
- Use drivers who have a commercial driver's license with a hazardous materials endorsement when required.
- Ship hazardous wastes from SQG and LQG projects using a DEQ registered hazardous waste transporter under a hazardous waste manifest.
- Ensure shipments are appropriately packaged and labeled, and vehicles are appropriately placarded.
- Submit copies of the completed manifests and documentation to the Engineer and retain copies for at least one year.

(f) Unexpected Contamination - If, during construction, unanticipated hazardous substances are discovered that threaten the health and safety of workers, the public, or the environment, do the following:

- Immediately remove all affected employees and secure the area to prevent access.
- Notify the Engineer immediately and provide written notification within 24 hours, setting forth a description of the hazardous substances encountered.

The Engineer will attempt to resolve the unanticipated situation expeditiously according to 00140.40. Delays to work due to the discovery of unexpected contamination shall be considered for exclusion from Contract time according to 00180.50(e).

(g) Spills and Releases - Obtain a response agreement with a professional on-call spill response team. The professional on-call spill response team, identified in the PCP, agrees to be available and respond to spills that cannot be cleaned up with on-site resources. A professional spill response team is a company or section of a company specifically dedicated to hazardous materials emergency spill response, insured, and bonded for hazardous materials cleanup, and employing experienced personnel certified according to 29 CFR 1920.120.

In the event of a spill or release of a hazardous substance or hazardous waste or any other material, do the following:

- Immediately commence response actions to protect human health and the environment. Follow the PCP, SPCC and Contingency Plan, as appropriate. If any of the provisions in these plans conflict, implement the actions providing the greatest protection of public health and safety and the environment.
- If the spill can not be safely contained and cleaned up with on-site resources, activate the professional on-call spill response team.
- Immediately notify the Engineer.
- If the quantity released exceeds the State or Federal reportable quantities, or if the release impacts or threatens to impact any surface water body, immediately notify DEQ by the Oregon Emergency Response System (OERS) at 1-800-452-0311 and the EPA and USCG through the National Response Center (NRC) at 1-800-424-8802 (Federal reportable quantities or spills impacting or potentially impacting water only). If the quantity released is unknown, proceed with OERS and NRC notifications. Reportable quantities are listed at 40 CFR 302.4 and OAR 340-142-0040 to OAR 340-142-0050.
- Conduct cleanup of the released material according to all applicable Laws and DEQ requirements. Cleanup to background levels unless otherwise agreed to by the Agency in writing.
- Provide a written report to the Engineer, using the DEQ Spill/Release Report form, within 10 calendar days of completing spill response, but no more than 30 calendar days after the initial event. If the spill was reported to DEQ, submit the report to DEQ concurrently. Include a description of how future releases will be prevented.

00290.29 Health and Safety - Comply with all applicable health and safety Laws as they pertain to the hazardous substances and wastes used, stored and generated on-site. If any of these requirements are in conflict, the more stringent requirements apply.

00290.30 Pollution Control - Prevent, control, and abate pollution of the environment. Comply with new or amended environmental pollution Laws, not contemplated at the time of bid preparation, according to 00140.50 and ORS 279C.525.

(a) Pollution Control Measures - Comply with the following requirements:

(1) General:

- Allow no pollutant of any kind (e.g., petroleum products or fresh "green" concrete) to come in contact with an active flowing stream or waters of the State and U.S.
- Comply with the erosion prevention and sediment control requirements of Section 00280 and all applicable DEQ NPDES 1200 Permit requirements.
- Do not cause turbidity to waters of the State and U.S. outside of regulated levels.

(2) Materials and Waste Management:

- Store construction equipment, materials and debris in a manner that prevents contamination of water and soil and prevents fugitive dust.
- Store hazardous substances in the original containers or labeled compatible containers according to State Fire Marshal's regulations, International Fire Code and product MSDS.
- Locate areas for storing fuels and other potentially hazardous materials at least 150 feet away from any waters of the State and U.S. or storm inlet, unless otherwise approved by the Engineer.

- Dispose of material waste according to 00290.20.
- Do not use treated timbers within any waters of the State and U.S.

(3) Equipment Fueling, Repair and Maintenance:

- Promptly correct or repair operational procedures, leaks, or equipment problems that may cause pollution at the Project Site. If soils or other media become contaminated as a result of operational procedures or equipment problems, remove and dispose of them according to applicable Laws and 00290.20(g).
- Locate areas for parking, refueling and servicing mobile equipment and vehicles at least 150 feet away from any waters of the State and U.S. or storm inlet, unless otherwise approved by the Engineer.
- For large equipment that is not easily moved, prevent fuel and operating fluids from reaching any waters of the State and U.S. or storm inlet by, at a minimum, using spill containment systems designed to completely contain potential spills during all refueling and equipment repair operations.

(4) Equipment Cleaning and Washouts:

- Inspect and clean all equipment prior to operating it within 150 feet of any waters of the State and U.S. or storm inlet. Check for fluid leaks and remove all external oil, grease, weed seed, and dirt.
- Do not discharge untreated wash and rinse water into the any waters of the State and U.S. or storm inlet.
- Establish wash areas that contain all fluids and debris, at least 150 feet from any waters of the State and U.S. or storm inlet, such that untreated waste water does not impact those systems.
- Clean concrete equipment in washout areas that contain all fluids and debris. Recycle washout materials into fresh mixes or dispose of according to applicable permits.

(5) Off Site Tracking:

- Limit water leakage from trucks carrying saturated soils to less than 1 gallon per hour before allowing them to leave the Project Site.
- Remove all loose dirt and debris from trucks prior to leaving the Project Site.

(6) Other Spill Prevention and Response Measures:

- Inspect heavy equipment, storage containers, staging areas and other potential sources of hazardous substances daily to identify and prevent potential releases.
- If flooding of the Project site is expected to occur within 24 hours, evacuate areas used for staging, access roads, or storage and remove materials, equipment, and fuel.
- Immediately contain and repair leaking equipment or containers and cleanup any releases according to 00290.20(g).
- Maintain hazardous material containment kits and spill containment kits on-site to facilitate the cleanup of hazardous material spills on dry-land and/or waters of the State and U.S.

(b) Pollution Control Plan (PCP) - Develop and submit a PCP to prevent pollution related to Contractor operations for approval 10 calendar days before the preconstruction conference. Maintain a copy of the PCP on-site at all times during construction activities, readily available to employees and inspectors. Ensure that all employees comply with the provisions of the PCP.

Include the following information in the PCP:

- Identify a professional on-call spill response team.
- Identify all contractor activities, hazardous substances used and wastes generated.
- Describe how hazardous substances and wastes will be stored, used, contained, monitored, disposed of and documented. Include pollution prevention, spill response, waste reduction, dust prevention, off site tracking prevention, washout facility design, vehicle and equipment fueling and maintenance procedures, employee training and emergency contact information.
- Include the waste determination results from 00290.20(c-1). Provide reuse, recycle, and disposal options, the reason for selecting that alternative, and estimated quantities for each reuse, recycle, and disposal option.
- Include or refer to the SPCC plan and the hazardous waste contingency plan, if required.
- Include scaled site plans showing locations for hazardous substance storage, spill response equipment, communications equipment and fire suppression equipment.

A "Pollution Control Plan Contractor Packet" is available from the Agency.

(c) Air Pollution Control Measures - Comply with ORS 468, ORS 468A, OAR 340-014, OAR 340-200 through OAR 340-268, and all other applicable Laws.

(1) Vehicle and Equipment Idling - Establish truck staging areas for diesel-powered vehicles located where truck emissions have a minimum impact on sensitive populations, such as residences, schools, hospitals and nursing homes.

Limit idling of trucks and other diesel powered equipment to five minutes, when the equipment is not in use or in motion, except as follows:

- When traffic conditions or mechanical difficulties, over which the operator has no control, force the equipment to remain motionless.
- When operating the equipment's heating, cooling or auxiliary systems is necessary to accomplish the equipment's intended use.
- To bring the equipment to the manufacturer's recommended operating temperature.
- When the outdoor temperature is below 20 °F.
- When needed to repair equipment.
- Under other circumstances specifically authorized by the Engineer.

(2) Dust Control and Permitting - Prevent airborne dust and fugitive dust emissions from construction activities including rock, concrete, and asphalt crushing operations and obtain permits according to 00160.70. Do not use oil, waste, waste water, or other illegal materials as dust suppressants.

(3) Burn Restrictions - Burn wastes only if open burning is allowed by State, LRAPA, and local burning Laws. Obtain and comply with all required permits including DEQ permits required by OAR 340-264-0010 through OAR 340-264-0020, LRAPA permits, and local fire district permits. Provide copies of all permits to the Engineer prior to burning. Do not conduct burning within

riparian areas. Conduct burning at locations where existing structures will not be damaged and where smoke will not impact traffic. Do not burn the following materials on-site:

- Rubber products
- Tires
- Plastic
- Wet garbage
- Petroleum and petroleum treated materials
- Asphalt or industrial waste
- Any material that creates dense or noxious odors
- Painted materials
- Asbestos, mercury or PCB containing materials or equipment
- Hazardous wastes
- Scrap wiring or electrical equipment
- Painted or treated wood

Buildings intended for demolition may be burned by the local fire department for training purposes. Contact the local fire department for applicable restrictions.

00290.32 Noise Control - Comply with ORS 467, OAR 340-035, all other applicable Laws, and the following construction noise abatement measures:

- Do not perform construction within 1,000 feet of an occupied dwelling on Sundays, legal holidays, or between the hours of 10:00 p.m. and 6:00 a.m. on other days, without the approval of the Engineer.
- Use equipment with sound control devices no less effective than those provided on the original equipment. Equipment with un-muffled exhausts is prohibited.
- Use equipment complying with pertinent equipment noise standards of the EPA.
- Do not drive piling or perform blasting operations within 3,000 feet of an occupied dwelling on Sundays, legal holidays, or between the hours of 8:00 p.m. and 8:00 a.m. on other days, without the approval of the Engineer.
- Mitigate the noise from rock crushing or screening operations performed within 3,000 feet of all occupied dwellings by placing material stockpiles between the operation and the affected dwellings, or by other means approved by the Engineer.

If a specific noise impact complaint occurs during the construction of the Project, one or more of the following noise mitigation measures may be required, at no additional cost to the Agency, as directed by the Engineer:

- Locate stationary construction equipment as far from nearby noise sensitive properties as feasible.
- Shut off idling equipment.
- Reschedule construction operations to avoid periods of noise annoyance identified in the complaint.
- Notify nearby residents whenever extremely noisy work will be occurring.
- Install temporary or portable acoustic barriers around stationary construction noise sources.
- Operate electric-powered equipment using line voltage power or solar power.

00290.34 Protection of Fish and Fish Habitat - Comply with the Laws of the Oregon Department of Fish and Wildlife, National Marine Fisheries Service, and U.S. Fish and Wildlife Service, and the rules and practices developed through the Oregon Plan for Salmon and Watersheds. Conduct operations to avoid any hazards to the safety and propagation of fish and shellfish in waters of the State and U.S.

(a) Regulated Work Areas - Perform work within regulated work areas only within the regulated in-water work periods. Do not allow equipment to enter any waters of the State or U.S. or the regulated work area except as allowed in permits issued for the Project.

The regulated work area, if any, will be identified in the Special Provisions.

(b) Prohibited Operations - Except where allowed by the Contract or by permit, do not:

- Blast underwater
- Use water jetting
- Release petroleum products or chemicals in the water
- Disturb spawning beds
- Obstruct stream channels
- Cause silting or sedimentation of waters of the State and U.S.
- Use treated timbers within the regulated work area
- Impede adult and juvenile fish passage, including intermittent streams

00290.36 Protection of Wildlife and Wildlife Habitat - Comply with the Laws of the Oregon Department of Fish and Wildlife and U.S. Fish and Wildlife Service. Conduct operations to avoid any hazards to the safety and propagation of wildlife.

(a) Migratory Birds - Comply with the Migratory Bird Treaty Act (16 U.S.C. 703-712) which protects most species of birds in Oregon and prohibits the removal of nests containing eggs and dependent young. Migratory birds include most birds in Oregon, except pigeons, house sparrows, and starlings. Except where allowed by the Contract and by permit, do not disturb a migratory bird nest containing eggs or dependent young, or the surface the nest is built on.

If migratory bird nests are encountered that contain eggs or dependent young, stop all actions that may disrupt the nest and contact the Engineer. Do not resume work, that may disrupt nesting, until approved by the Engineer.

(b) Bats - Avoid destruction of bat colonies as shown.

00290.38 Protection of Plants - Plant habitats to be protected will be shown with the plant habitat boundaries flagged by the Engineer. Avoid destruction of plant habitats by ensuring construction personnel, equipment, and associated pollutants, including sediment, chemical contaminants, discharge water, non-native grass and weed seed, do not enter the habitat.

00290.40 Protection of Forests - Obtain necessary permits according to ORS 477.625 and ORS 527.670, and comply with the Laws of any authority having jurisdiction for protection of forests.

00290.41 Protection of Wetlands - Comply with and require that all the Contractor's employees, agents, and subcontractors on the Project Site comply with the following:

- Clean Water Act Section 404 (33 U.S.C. 1344); Federal Rivers and Harbors Act of 1899, Section 10 (33 U.S.C. 403 et seq.).

- ORS 196.800 to ORS 196.990 (Oregon Removal-Fill law).
- ORS 390.805 to ORS 390.925 (Oregon Removal and Filling in Scenic Waterways law).
- All other applicable Laws governing preservation of wetland resources.

For the purposes of this Section, "wetland" or "wetlands" shall be understood to include wetlands as defined in 00110.20, as well as other jurisdictional waters of the State and U.S.

Willful violation of permit conditions and applicable laws exposes the offending Contractor and other violators to criminal and civil sanctions. Civil sanctions include, but are not limited to, the offender's sole liability for all costs associated with site restoration, maintenance and additional mitigation work required by federal or State authorities.

(a) Identifying Wetlands - Wetlands known to be on the Project Site will be shown and identified either as "permanently filled or excavated" or as "temporarily impacted". Wetlands to be protected will be shown as "no work zones".

(b) Disturbing Wetlands - If wetlands are shown, meet with the Agency Wetland Specialist, the Engineer, and inspector on-site prior to moving equipment onto the site or beginning any work, to ensure that all parties understand the locations of wetlands and the measures that shall be taken to protect them.

Ensure protection of no work zones as follows:

- Fence off no work zones using pedestrian safety fence or approved equivalent.
- Except as authorized by the Engineer for the purpose of installing or maintaining approved wetland protective measures, keep all persons, equipment and materials off no work zones.
- The Engineer has the authority to bar from the Project any person entering a protected site other than for the purpose of installing or maintaining protective measures.

Install all site protection for wetlands required by the Plans and Special Provisions prior to staging equipment or starting work near the site(s).

The Engineer may suspend work until the Contractor, Engineer, Agency Wetland Specialist, and other required federal and State personnel, if any, meet to determine damage to the site and the nature and scope of necessary site restoration and maintenance. The Engineer may require the Contractor to submit a written plan for protection of other sites for the duration of the Project before work resumes.

00290.50 Protection of Cultural Resources - Comply with all Laws governing preservation of cultural resources. Cultural resources may include, but are not limited to, dwellings, bridges, trails, fossils, and artifacts.

If cultural resources are encountered on the Project area or in material sources, and their disposition is not addressed in the Special Provisions, do the following:

- Immediately discontinue operations or move to another area of the Project Site or material source.
- Protect the cultural resource from disturbance or damage.
- Notify the Engineer.

The Engineer will do the following:

- Contact the Agency Archaeologist, to arrange immediate investigations.
- Arrange for disposition of the cultural resources. The Engineer may direct the Contractor to perform salvage operations as Extra Work.
- Notify the Contractor when to begin or resume construction operations in the affected area.

00290.51 Protection of Sensitive Cultural Sites - Comply with and require that all the Contractor's employees, agents, and subcontractors on the Project Site comply with all Laws applicable to the preservation and protection of sensitive cultural sites. The existence of any sensitive cultural sites affecting the Project, and the mandatory preservation and protection measures applicable to the sites, are determined according to the Laws including, but not limited to the following:

- National Historic Preservation Act (NHPA) of 1966, Section 106, codified in 36 CFR Part 800 (Protection of Historic Properties).
- ORS 97.740 to ORS 97.760, ORS 97.990(5), and ORS 97.990(6) (Indian Graves and Protected Objects).
- ORS 358.905 to ORS 358.955 (Archaeological Objects and Sites).
- ORS 390.235 to ORS 390.240 (Archaeological Sites and Historical Material).

Ensure protection for sensitive cultural sites according to the following:

- Except as authorized by the Engineer for the purpose of installing or maintaining approved sensitive cultural site protective measures, keep all persons, equipment, and materials off known sensitive cultural sites.
- Install all sensitive cultural site protection required by the plans and Special Provisions prior to staging equipment or starting work near the site(s).
- Instruct all Contractor and subcontractor personnel to regard the locations of these sites and their contents as confidential.

The Engineer has the authority to bar from the Project any person entering a protected site other than for the purpose of installing or maintaining protective measures.

If sensitive cultural sites are known to be on the Project, additional information will be provided in the Special Provisions.

(a) Disturbing Known Sensitive Cultural Sites - Willful violation of Laws exposes the offending Contractor and other violators to criminal and civil sanctions. Civil sanctions include, but are not limited to the offender's sole liability for all costs associated with monitoring, recovery, site restoration or other archaeological work required by Tribal, federal, and State authorities. Costs can exceed \$100,000.

The Engineer may suspend work until the Contractor and the Engineer meet to determine damage to the site and the nature and scope of necessary site restoration and maintenance. The Engineer may require the Contractor to submit a written plan for protection of other sites for the duration of the Project before work resumes.

(b) Disturbing Unknown Sensitive Cultural Sites - If the Contractor finds a previously undiscovered sensitive cultural site, immediately cease all activities at that site, follow procedures listed in 00290.50, and notify the Engineer. If the Contractor inadvertently disturbs unknown sensitive cultural sites, but immediately ceases all activities and follows the procedures listed in 00290.50, the Agency, to the extent permitted by Article XI, section 7 of the Oregon Constitution and

00290.51(b)

by the Oregon Tort Claims Act, will indemnify, within the limits of the Tort Claims Act, the Contractor for costs associated with monitoring, recovery, site restoration or other required archaeological work, provided neither the Agency nor the State shall be required to indemnify the Contractor for such costs resulting from, arising out of or relating to the willful misconduct, negligence or other wrongful acts attributable to the Contractor or other persons on the Project site.

Delays to work due to new cultural resource finds will be considered for exclusion from Contract time according to 00180.50(e).

Work required for monitoring and site restoration for newly discovered sensitive cultural sites encountered by the Contractor will be paid according to Section 00197.

Measurement

00290.80 Measurement - No measurement of quantities will be made for work performed under this Section.

Payment

00290.90 Payment - The accepted quantities for work performed under this Section will be paid for at the Contract lump sum amount for the item "Pollution Control Plan".

Partial payments will be made as follows:

- When the initial PCP is approved20%
- When 30 percent of the Contract is complete, excluding advances on materials20%
- When 60 percent of the Contract is complete, excluding advances on materials20%
- When 90 percent of the Contract is complete, excluding advances on materials20%
- At completion of the Contract and all waste is removed from the Project site and all reports, receipts, and documents have been submitted20%

Payment will be payment in full for furnishing and placing all materials, and for furnishing all equipment, labor, and incidentals necessary to complete the work as specified.

Payment includes, but is not limited to, the following:

- Contractor's Pollution Control plan (PCP)
- Spill Prevention Control and Countermeasures (SPCC) plan
- Hazardous Waste Contingency plan
- Hazardous waste determination
- Determination of generator category
- The Certified Hazardous Materials Manager
- The Professional on-call Spill Response Team

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PART 01000 - RIGHT OF WAY DEVELOPMENT AND CONTROL

Section 01030 - Seeding

Description

01030.00 Scope - This work consists of seeding and associated tasks to develop plant growth for erosion control, environmental mitigation, and roadside development.

01030.02 Definitions:

Certified Seed - A grass or legume seed named variety that has been reviewed and accepted into the Oregon Certified Seed program. Currently certified seed is individually sold in bags with a blue-colored Oregon Certification Tag, thus the name commonly used for such seed is "blue tag stock".

Establishment Period - A period when planting work has been performed and initially accepted, and there is a Contract requirement to care for the planted areas in some way until the period ends.

Native Plant (existing) - A variety of plant species occurring in its natural habitat without direct or indirect human actions.

Noxious Weed - All weed designated by the Oregon State Weed Board as injurious to public health, agriculture, recreation, wildlife, or all public or private property. The Oregon Department of Agriculture (ODA) will be the authority in determination of noxious weed species.

Pure Live Seed (PLS) - The amount of living seed in the total quantity of seed when non-viable seed or non-seed material is excluded.

Riparian - Related to the bank, shore, or water-influenced areas of a watercourse or water body.

Sensitive Areas - Defined areas such as wetlands, natural water and riparian resources, special environmental zones, or where certain activities are restricted such as the use of chemicals.

Specified Weeds - All noxious weeds as defined above, and all plant species identified in the Special Provisions or on the plans as a species to be removed.

Waters of the State - See ORS 468B.005 for "Waters of the State" definition.

Weed - A plant that is undesirable where it is growing.

Weed Free - For these Specifications, "Weed Free" is defined as the following maximum amount of living weeds per square yard:

- Zero "Type A" or "Type T" Noxious Weeds
- One "Type B" Noxious Weed
- One of each non-noxious weed listed in the Special Provisions

The ODA Noxious Weed Policy and Classification System lists Type "A", "B", and "T" Noxious Weeds.

Weed Management Area (WMA) - A defined project area with Specified Weeds to remove, including areas where weeds begin growing because of project-associated ground disturbance. A WMA may be the entire project site or any portion, including material source and disposal sites as shown.

Materials

01030.11 Topsoil - Furnish topsoil meeting the requirements of 01040.14.

01030.12 Soil Conditioners, Amendments, and Bio-Amendments - Furnish soil modifiers meeting the requirements of 01040.15, 01040.16, and 01040.17.

01030.13 Seed - Furnish seed meeting the following requirements:

(a) Label - Deliver all seed in standard, sealed containers. Label each container with the following:

- The kind and variety of each seed of 3% or more in a mixture, by weight. Be sure that seed mix labels include the words "mixture" or "mixed seed" when the seed is a mixture
- The country or state where the seed is grown
- The lot number or other lot identification
- The total percentage, by weight, of other crop seed
- The total percentage, by weight, of weed seed
- The total percentage, by weight, of inert matter
- Statement of "No Noxious (weed) Found"
- For each named seed:
 - Percentage of germination
 - Percentage of hard (non-living) seed, if more than 1%
- Percent of PLS for each kind of seed
- Percent and kind of other crop
- Month and year of seed test
- Net weight of contents
- Name and address of seed labeler or seller
- Origin for each seed (state or foreign country)
- If seed inoculant is used, the claimed date that inoculant effectiveness ends
- For treated seeds (if any):
 - Statement that the seeds have been treated
 - Name of all chemical used in the treatment
 - Description process used in the treatment
 - Warning statement for all residual chemicals used
- Net weight of each container
- For seeds listed as native, date and location of collection of source (first generation) seed
- For native seeds specified to be collected for direct use on a project, label containers with the date and location of collection sites for each seed species

Alternate label requirements may be identified in the Special Provisions for certain native plant seeds.

(b) Quality - Furnish seed meeting the following requirements:

- The seed and labeling complies with Oregon Seed Law and Federal Seed Act.
- The seed has been tested within 18 months of the planting date.
- The seed is not sprouted, moldy, or showing evidence of having been wet or otherwise damaged.
- The seed is labeled as "Oregon Certified Seed" or the equivalent from another state when identified in the Special Provisions. Information about certified seed is available from County Extension Offices, Oregon State University, and the Oregon Department of Agriculture.

(c) Pure Live Seed - Obtain the amount of seed to apply by using the purity and germination percentages from the label on actual bags of seed to be used on the Project.

To calculate the amount of seed to be applied:

- Obtain the PLS factor - Multiply the seed label germination percentage times the seed label purity percentage.
- Divide the specified PLS rate by the PLS factor.

Example: A PLS seeding rate of 10 pounds per acre is specified. The seed label shows a purity of 80% and germination is 90%. After converting percentages to decimals, 0.80×0.90 equals a factor of 0.72. The specified PLS rate, 10 pounds per acre, divided by the factor of 0.72 equals 13.88. In order to meet a PLS seeding rate of 10 pounds per acre, about 14 pounds of seed needs to be applied per acre. For a seed mix, make this calculation for every seed to obtain the total amount to be applied.

(d) Inspection - Each lot of seed is subject to inspection upon delivery to the Project. Seed that is not labeled or that does not conform to the Specifications will be rejected and shall be replaced at no additional cost to the Agency.

(e) Mixes - Furnish seed mixes that meet the labeling, quality and inspection requirements stated above. Submit all other proposed seed or seed mixes for consideration and receive written approval before seeding work begins. Replace rejected seed before planting.

(f) Types of Seed Mixes - Seed mixes, quantities, standards, seeding rates, and other information will be included in the Special Provisions for each type of seed mix.

The following are the functional categories of seed mixes that may be included on projects (a category may have multiple functions on a project site):

- **Temporary Seeding** - To provide short-term control of soil erosion until permanent seeding is performed or all potential for erosion is removed.
- **Permanent Seeding** - The final seeding, or only seeding performed for erosion control.
- **Lawn Seeding** - Seeding for areas where finished turf appearance is desired.
- **Wildflower Seeding** - Seeding to develop growth of wildflowers. The seed mix will typically contain grass or other plant seed to provide erosion control.
- **Plant Seeding** - Seeding which typically includes more than just grass species, such as seeds of woody or herbaceous plants.
- **Water Quality Seeding** - For use in water quality facilities such as swales or settling basins.

01030.13(f)

- **Wetland Seeding** - To vegetate existing or constructed wetlands with native plant species.
- **Native Plant Seeding** - Seeding to restore native vegetation.

(g) Availability - Provide a list of seed sources for all specified seeds within 60 calendar days after execution of the Contract. Verify that all specified seed has been located and will be available for use on the Project.

01030.14 Fertilizer - Furnish standard, commercial grade fertilizer meeting the following requirements:

(a) General - Deliver fertilizers in separate or mixture containers that have the percentage of total nitrogen, available phosphoric acid, and water-soluble potash (NPK) in the amounts specified. Label each container with a quality compliance certificate that includes the container weight, the percentage of each ingredient, and the source of each component in the mixture. Ensure that each container is labeled with a quality compliance certificate that meets the applicable requirements of Section 00165.

Furnish fertilizer according to State and federal regulations. Fertilizer is subject to testing by the State Department of Agriculture.

(b) Type of Fertilizer - Provide the following fertilizer:

(1) West of the Cascades - Furnish 22-16-8 inorganic fertilizer analyzing 22% nitrogen, 16% phosphoric acid, 8% soluble potash, and including a minimum of 2% sulfur. Furnish fertilizer containing not less than 50% available water-insoluble, controlled-release nitrogen derived from one of the following sources:

- Urea formaldehyde (Nitroform)
- Isobutylidene Diurea (IBDU)
- Polymer coated urea (no sulfur)

(2) East of the Cascades - Furnish 22-10-5 inorganic fertilizer analyzing 22% nitrogen, 10% phosphoric acid, 5% soluble potash, and including a minimum of 10% sulfur. Furnish fertilizer containing not less than 50% available water-insoluble, controlled-release nitrogen derived from one of the three sources stated for West of the Cascades above.

(3) Statewide, Near Water - For application within 50 feet of open water, furnish 22-2-11 low-phosphorus fertilizer analyzing 22% nitrogen, 2% phosphorus, and 11% potassium which releases slowly over an eight to nine month period. Furnish fertilizer containing a minimum of 60% available water-insoluble, controlled-release nitrogen derived from one of the three sources stated for west of the Cascades above. Furnish phosphorus and potassium that is coated to allow a minimum of 95% controlled-release.

01030.15 Mulch - Furnish mulch materials free of all weed or plant seeds and containing no substances detrimental to plant life. The kind of mulch material(s) acceptable for use will be shown on the plans, listed in the Special Provisions, or will be as approved. Furnish mulch meeting the following requirements:

(a) Hydromulch from Cellulose, Wood, or Straw Fiber - Furnish cellulose fiber produced from virgin wood, straw, or paper fiber product from the QPL. Furnish wood or straw mulch processed so the fibers remain uniformly suspended under agitation in water and the fibers have moisture-absorption and percolation properties. Ship hydromulch in packages of uniform weight, plus or minus 5%, and labeled with the manufacturer's name and air-dry weight.

(b) Straw - Unless otherwise specified, furnish straw mulch for non-hydroseeding applications from bentgrass, bluegrass, fescue or ryegrass singly or in combination. Cereal grain straw from barley, oat or wheat may be allowed upon approval of the Agency. Provide straw that is not moldy, caked, decayed or of otherwise low quality. Submit certification from the supplier that the straw is free of noxious weed seeds or plant parts. Acceptable documentation is any one of the following:

- The straw source is an "Oregon Certified Seed" field.
- The straw is certified by a recognized program accepted by the Oregon Department of Agriculture as being weed free.
- Seed lab test results of seed harvested from the straw meet minimum Oregon Certified Seed quality for weed seed content.

(c) Tracer - For hydromulch application, include enough green dye so applied mulch is easily visible.

01030.16 Tackifier - Furnish a commercial quality tackifier containing no agent toxic to plant life. Furnish tackifier of either a liquid stabilizing emulsion or a dry powder tackifier meeting the following requirements:

(a) Liquid Stabilizer Emulsion - Tackifier with a base material of liquid, polyvinyl acetate polymers, using emulsion resins and containing not less than 55% total solids by weight. Furnish tackifier containing no polyacrylates or polyvinyl acrylics. The emulsion shall, when diluted with water and upon drying, allow exchange of air and moisture to the seeds and have an effective life of one year or more.

(b) Dry Powder Tackifier - Tackifier base consisting of one or more active hydrocolloids from natural plant sources, which hydrates in water and blends with other slurry materials, and upon application and drying tacks the slurry particles to the soil surface, and exhibits no growth or germination inhibiting factors. Provide stabilizing emulsion in a dry powder form that may be re-emulsifiable, and consisting of a processed organic adhesive derivative of one of the following:

- Gumbinder derived from guar (*Cyamopsis tetragonoloba*)
- Gumbinder derived from plantain (*Plantago insularis*)

01030.17 Pesticides - Submit proposed pesticides and receive approval before using. Submit a copy of the manufacturer's federal registered label and, if requested, a Material Safety Data Sheet. The Agency reserves the right to restrict chemicals from being used on Sensitive Areas.

Labor

01030.30 General:

(a) Weed Control Coordinator - Submit certification at the preconstruction conference that the weed control coordinator meets the following minimum requirements:

- Demonstrates ability to identify noxious and other weed species commonly seen in Oregon. Some examples of potentially acceptable credentials are at least one year conducting weed surveys in Oregon or Washington State or a degree in botany or horticulture from an accredited institution.
- Has successful weed control experience, with similar duties to those stated under typical duties below, on at least three construction or vegetation management projects. Two examples of acceptable certification are an Oregon Pesticide Consultant License or Oregon Landscape Contractor's License held in the individual's name.

01030.30(a)

Typical duties of the weed control coordinator include the following:

- Identify Specified Weeds.
- Prepare and update the Weed Control Work Plan (WCWP).
- Coordinate Contractor's weed removal work and records.
- Resolve weed control issues as the Contractor's representative.
- Determine when Specified Weed content exists in disposable materials and ensures the materials are disposed of at an approved off-site facility.

(b) Pesticide Applicator - Submit certification before application of pesticide work begins, that when chemical weed control is used, that each applicator possesses an Oregon Commercial Pesticide Applicator's License held in the individual's name. Submit a certification each time a new applicator begins application work on the Project.

Construction

01030.40 General - Notify the Agency not less than 24 hours in advance of seeding operations. Do not begin seeding until prepared slopes in an area have been approved for seeding. Do not perform seeding during windy weather or when the ground is frozen, excessively wet, or otherwise not tillable.

Do not disturb or damage existing desirable vegetation to be left in place. Do not disturb areas previously seeded and mulched, with the exception of disturbances caused by stage construction. If previously seeded areas are disturbed, rework and reseed as directed, at no additional cost to the Agency.

Remove all non-approved plants resulting from the seed mixes provided for the Project at no additional cost to the Agency, including erosion protection required during reseeding.

01030.41 Area Preparation - Refer to 01040.48 for area preparation for the following kinds of seeding:

- Temporary Seeding - Method E
- Permanent Seeding - Method D
- Wildflower Seeding - Method B
- Plant Seeding - Method B
- Water Quality Seeding - Method B
- Wetland Seeding - Method B
- Lawn Seeding - Method C
- Native Plant Seeding - Method B

01030.42 Weed Control - When the Contract Schedule of Items includes an item for "Weed Control", remove and prevent regrowth of Specified Weeds, weed plant parts, and weed seeds from areas within the Project limits.

Do not harm or disturb existing native or ornamental vegetation, unless directed to do so. Do not compact soil with heavy equipment in areas where soil will not be disturbed for roadway or other construction.

If a pesticide has been approved for use, apply according to federal and State laws, including conditions and requirements of the federal registered pesticide label.

(a) Weed Control Work Plan - Depending on project conditions such as location, sensitive environments, permit requirements, jurisdictional regulations, or other items, there may be limits on

the use of chemicals or other weed control methods. Before submitting the initial WCWP, determine if there are restrictions or all potential for restrictions on weed control methods on project sites. At the preconstruction conference, submit a WCWP with the following:

- Name and contact information for the approved weed control coordinator.
- WMA's with existing Specified Weeds mapped on project plan sheets where possible.
- Botanical and common name of each species of weed to be removed.
- The proposed methods of weed removal and continuing control for each weed species listed.
- Schedule of weed control measures.
- Request to use wheeled or tracked construction equipment in sensitive areas.

If changes of the WCWP are necessary, resubmit a revised WCWP for approval before proceeding.

(b) Weed Control Inspections - Inspect the project for new growth of specified weeds at least monthly and apply weed control measures as appropriate. This requirement may be waived by the Engineer during the period that weeds are fully dormant. To ensure satisfactory weed removal, the last WMA inspection will occur at least 30 days after growing season has begun or as directed.

At a minimum, schedule weed control inspection with the Agency at the following times:

- After approval of WCWP and prior to beginning weed control within a WMA.
- Monthly.
- Upon request by the Agency to discuss non-compliant weed control work.
- After completing weed control at material sources and disposal sites.

(c) Remove and Control of Weeds - Remove and control weeds according to the following:

(1) All areas:

- At least three calendar days prior to beginning weed control activities, walk through each WMA with the Engineer and confirm the identity, location, type, and approximate number of Specified Weeds. Verify that control methods in the WCWP are acceptable as planned for each WMA before proceeding with weed control activities.
- Remove Specified Weeds and receive approval prior to beginning construction or equipment mobilization in that area. As much as practicable, ensure that weed seeds or reproducing plant parts such as vines, runners, or rhizomes don't remain or become disbursed during control activities.
- As soon as practicable, place weeds and related materials in an approved container and transport to an approved offsite disposal facility according to applicable laws and regulations. During transport, ensure that materials are fully enclosed at all times to prevent escape.
- Keep a record of all weed material loads transported off the Project and submit documentation from the approved disposal facilities that a corresponding number of weed material loads were disposed of at that facility.
- Keep WMA's Weed Free including weeds not initially present in the walk through.

(2) Sensitive Areas:

- Unless otherwise approved in writing, use only hand or light mechanical weed control methods within 50 feet of Sensitive Areas. Hand methods include the use of hand tools. Light mechanical methods include the use of hand carried, motorized machinery.

01030.42(c)

- Inside Sensitive Areas, obtain approval before using wheeled or tracked construction equipment. Requests will be approved only when all vegetation in the area will be cleared, such as under new roadways or slopes.
- The Engineer will be the authority in the determination of Sensitive Areas.

(d) Weed Control Corrective Work - If corrective work for areas identified as deficient by the Engineer is not completed within a 15 calendar day period, the Engineer may suspend the work according to 00180.70. If the Contactor's weed control work is determined to be unsatisfactory, the Agency reserves the right to do the work at the Contractor's expense.

01030.43 Temporary and Permanent Seeding:

(a) Temporary Seeding - Temporarily seed disturbed soils and slopes that are not at finished grade and which will be exposed for two months or longer before being disturbed again. Provide fertilizer, mulch, water, and other amendments necessary to ensure establishment. Ensure that temporary seeding work achieves the coverage of live plants required by 01030.60 by the end of the next permanent seeding date stated in 01030.43(b). If this coverage is not achieved, or if the Agency determines that it is not effective in stabilizing the soil from erosion, stabilize the area with other temporary stabilization methods as described in 00280.42 at no additional cost to the Agency.

(b) Permanent Seeding - Perform this seeding during the permanent seeding dates shown below. If work done within the seeding dates does not provide coverage according to 01030.60, re-seed according to 01030.48 and as directed. The dates for permanent, wildflower, plant, water quality, wetland, lawn, and native plant seeding are as follows:

- **West of the Cascades** - March 1 through May 15 and September 1 through October 31. If new lawn areas are regularly watered, they can be seeded from March 1 through November 15.
- **East of the Cascades** - October 1 through February 1. If new lawn areas are regularly watered, they can be seeded from March 1 through October 31.
- **Wetland (Statewide)** - September 1 through October 31 and March 1 through April 30.

Permanent seeding outside the these dates requires written authorization from the Agency. Approval to seed outside these dates will only be given when physical completion of Project work is imminent and environmental conditions are conducive to satisfactory growth. For permanent seeding done outside the seeding dates, ensure that the coverage of live plants required by 01030.60 is achieved no later than three weeks into the next permanent seeding period. If this coverage is not achieved, re-seed and re-fertilize areas of insufficient coverage according to the permanent seeding requirements, at no additional cost to the Agency.

01030.44 Fertilizer:

(a) Inorganic - Apply 22-16-8 or 22-10-5 inorganic fertilizer at the rate of 400 pounds per acre.

(b) Low-Phosphorous - Apply 22-2-11 polymer coated urea low-phosphorus fertilizer at the rate of 200 pounds per acre.

01030.45 Soil Testing - Test soil according to 01040.13.

01030.46 Topsoil and Wetland Topsoil - Construct topsoil areas according to 01040.43 and 01040.44, as appropriate.

01030.47 Soil Amendments and Bio-Amendments - Incorporate soil amendments and bio-amendments into the seeding operation according to 01040.45 and 01040.46, as appropriate.

01030.48 Application - The following application methods are acceptable for both temporary and permanent seeding:

(a) Hydroseeding, Fertilizing, Hydromulching, and Tacking - Apply seed, fertilizer, mulch, and tackifier as follows:

Use hydraulic equipment that continuously mixes and agitates the slurry and applies the mixture uniformly through a pressure-spray system providing a continuous, non-fluctuating delivery. Ensure the equipment and application method provides a uniform distribution of the slurry. Place seed, fertilizer, mulch, and tackifier in the hydroseeder tank no more than 30 minutes prior to application.

(1) Hydroseeding Operation - Perform hydroseeding according to the following:

a. One-step Operation - Apply materials in one step only for the following situations:

- When seeding in conjunction with erosion control matting. Apply seed, fertilizer, and tracer before installing matting.
- When treating small areas according to 01030.48(e). Double the amount of seed to compensate for seed suspended above soil by the mulch.

b. Two-step Operation - Except for the one-step method situations in 01030.48(a-1-a), use the two-step method for all hydroseeding operations:

1. Step 1 - Apply seed, fertilizer, and tracer. The seed and fertilizer may be applied separately or together. If hydromulch is used as a tracer, apply it at a rate of 500 pounds per acre.

2. Step 2 - Apply mulch and tackifier. Hydromulch, if used as a tracer in Step 1, will be included as part of the specified hydromulch rate specified in 01030.48(a-3).

(2) Seed - Thoroughly mix seeds when more than one kind is to be used.

(3) Mulch - Apply hydromulch at the following rates based on dry fiber weight:

a. Slopes Flatter Than 1V:2H - Apply cellulose fiber that includes a tackifier at a rate of 2,000 pounds per acre.

b. Slopes 1V:2H or Steeper - Apply cellulose fiber that includes a tackifier at a rate of 3,000 pounds per acre.

(4) Tackifier for Cellulose Fiber Applications - Use one of the following:

a. Liquid Stabilizer Emulsion - Dilute the emulsion with water at a rate of one part emulsion to 30 parts water. Apply the diluted mixture at the rate of 865 gallons per acre unless the manufacturer recommends a greater rate of application.

b. Dry Powder Tackifier - Apply at the following rates unless the manufacturer recommends a greater rate of application:

1. Slopes flatter Than 1V:2H - 60 pounds per acre mixed with hydromulch fibers at the rate specified.

2. Slopes of 1V:2H or Steeper - 100 pounds per acre mixed with hydromulch fibers at the rate specified.

(b) Seeding, Fertilizing, Dry Mulching, and Tacking - Apply seed and fertilizer separately or together as the first step. Apply dry mulch as the second step. Tackify the mulch as the third step.

(1) Seed and Fertilizer - Apply seed and fertilizer at the specified rates. When fertilizer and seed are to be applied in dry condition, apply them separately. When applied from separate compartments, the application may be done in one operation. Apply seed and fertilizer by one of the following methods:

a. Blower - Blower equipment using air pressure and an adjustable spout that uniformly applies dry fertilizer and dry seed in separate and successive applications at constant measured rates.

b. Helicopter - Helicopter equipped with hoppers and adjustable disseminating mechanisms that separately and successively apply fertilizer and seed in uniform and prescribed quantities.

c. Mechanical Spreaders - Hand or machine operated mechanical spreaders that uniformly apply dry fertilizer and dry seed separately and successively in the prescribed quantities.

d. Hydroseeding - Uniformly apply at the rate specified. Add 500 pounds per acre of hydromulch fiber to the seed and fertilizer mixture to visibly aid uniform application at no additional cost to the Agency.

(2) Dry Mulch - Evenly apply straw mulch within 24 hours after seeding and fertilizing. In areas not accessible to heavy equipment or hose, apply straw mulch by hand or other approved method.

Place straw mulch approximately 2 inches deep, in loose condition, which requires approximately 2 1/2 tons per acre of dry mulch, depending on moisture content. Do not use straw mulch on slopes of 1V:1.5H or steeper.

(3) Tacking - Anchor straw mulch using one of the following methods:

a. Dry Powder Tackifier - Unless the manufacturer recommends a greater rate, apply dry powder tackifier at the rate of 80 pounds per acre mixed with 800 pounds per acre of hydromulch.

b. Mechanical Crimping - Mechanically incorporate the straw into the top 2 inches of the soil forming a uniform surface cover effective at preventing erosion by one of the following:

1. Crimping Disc - A heavy disk with flat scalloped discs approximately 1/4 inch thick, having dull edges and spaced no more than 9 inches apart.

2. Sheep's-Foot Roller - Modified sheep's foot roller equipped with straight studs, made of approximately 3/4 inch steel plate, placed approximately 8 inches apart and staggered. Ensure that the studs are not less than 6 inches long or more than 6 inches wide, and are rounded to prevent withdrawing the straw from the soil. Use a roller with enough weight to incorporate the straw sufficiently into the soil providing a uniform surface cover.

(c) Drill Seeder - Apply seed and fertilizer with a grass seed drill that works fertilizer into the soil and places seed under about a 1/4 inch soil cover.

(d) Seeding Over Mulched Areas - If an area has been previously mulched for erosion control or temporary seed and mulch is present on the soil surface, double the amount of each seed type used.

Apply seed and fertilizer hydraulically and add a green dye to the mixture to visibly aid uniform application. Upon approval, fertilizer and seed may only be applied after mulching if one of the following conditions apply:

- Mulch is punched into the soil by mechanized means.
- It is necessary to hold down mulch with netting or like material.
- The slope is 1V:1.5H or steeper and a slurry mixture would tend to run down the slope.
- Mulch is removed prior to seeding.

(e) Optional Temporary or Permanent Seeding - Upon approval, the following may be used to stabilized disturbed areas that are 1,500 square feet or less and totaling no more than 0.5 acre:

(1) Seed - Seed the disturbed area with the seed mix at the rate of 2 pounds per 1,000 square feet. Seed may be spread by mechanical spreader according to 01030.48 (b-1-c).

(2) Cover - Cover seeded areas with one of the following:

- Straw mulch at a rate of 100 pounds per 1,000 square feet. Spread the mulch uniformly and apply commercial tackifier or netting to hold in place.
- Bark mulch spread uniformly at an approximate depth of 1/2 inch. Use well-decomposed mulch for seed mulching.
- Suitable open-weave, biodegradable erosion control matting installed according to manufacturer's instructions.
- Hydromulch applied in one step according to 01030.48(a).

(3) Fertilizer - Fertilize according to 01030.44.

01030.49 Work Quality:

(a) Drift - Prevent drift and displacement of seed and fertilizer regardless of equipment and methods used. Use protective covering on structures and objects where coverage and stains would be objectionable and when tacking agents are used with mulch. Protect vehicles and people from drifting spray. If equipment and methods of application result in wasting material, make corrections to prevent waste.

(b) Displacement - Prevent seed, fertilizer, and mulch from falling or drifting onto areas occupied by rock base, rock shoulders, plant beds, or other areas where grass is detrimental. Remove material that falls on plants, roadways, gravel shoulders, structures, and other surfaces where material is not specified.

(c) Damage - Prevent damage to prepared areas and to completed fertilizer, seed, and mulch work. Replace all material that becomes displaced before acceptance of the work.

Maintenance

01030.60 General - Ensure that each seeded area has a uniform, healthy and weed-free stand of grass or other seeded plants growing at the end of the establishment period. The minimum living plant coverage standards for acceptance of seeding in a planted area are as follows:

- **Temporary Seeding** - 70% coverage of ground surface.
- **Permanent Seeding** - 90% coverage of ground surface.

- **Wildflower and Wetland Seeding** - 70% coverage of ground surface.
- **Water Quality and Lawn Seeding** - 100% of ground surface.
- **Woody or Other Plant Seeding** - See Special Provisions for minimum living plant coverage.
- **Native Plant Seeding** - See Special Provisions for minimum living plant coverage.

01030.61 Establishment Period - The seeding establishment period is as follows:

(a) Erosion Control Seeding - For temporary and permanent seeding done solely for erosion control, the establishment period begins upon acceptance of the initial seeding work and ends upon satisfactory plant growth and coverage of the seeded areas according to 01030.42 and 01030.60.

(b) All Other Seeding - Establishment periods for wildflower, plant, water quality, lawn, wetland, native plant, and permanent seeding begins upon acceptance of the initial seeding work and ends as follows:

- The seeding establishment period will end 45 days after the beginning of the establishment period, if the area was seeded during the seeding season and all establishment responsibilities have been met.
- If the original seeding construction is completed and accepted outside the permanent seeding dates, the establishment period will end 45 calendar days after all necessary reseeding is completed and accepted during the following seeding season.

01030.62 Establishment Work:

(a) Erosion Control Seeding - Select and provide establishment work for erosion control seeding from 01030.62(b) necessary to provide performance described in 01030.60.

(b) All Other Seeding - Ensure the establishment of wildflower, lawn, plant, water quality, wetland, native plant, and permanent seeding by the following:

(1) Protection - Protect seeded areas from trespass and other hazards of damage. Use protective fences and signs at no additional cost to the Agency. Obtain approval of protective methods used.

(2) Fertilizing and Watering - Apply fertilizer according to 01030.44. Apply water according to good horticultural practice under the prevailing conditions, as required to promote a healthy stand of plants. Obtain water at no additional cost to the Agency.

(3) Weed Control - Remove Specified Weeds prior to plants going to seed and keep WMA's and seeded areas "Weed Free" throughout the establishment period.

(4) Mowing - Mowing is required for lawn seeding and water quality seeding. Do the first mowing of grass when soil is firm enough to prevent rutting and grass is about 3 inches tall. After mowing, leave grass that is approximately 2 inches tall. At each subsequent mowing, leave about 1 1/2 inches of growth. After the second mowing, grass clippings may be left in place upon written approval. The approval may be granted if:

- Mowing is done with a mulching blade.
- There are no weed seeds in the mulch.
- Mulch is not detrimental to the growth of grass.

(5) Repair and Restore - Repair and restore soil grades and re-seed damaged, settled, or unproductive areas to the specified conditions of this Section at no additional cost to the Agency.

Finishing and Clean Up

01030.70 Cleanup - Remove weeds, trash, debris, stones, and other extraneous matter from seeded areas as directed and dispose of according to 00290.20.

01030.71 Waste Disposal - Protective coverings used on structures and all waste materials associated with seeding, fertilizing, mulching, and associated activities become the property of the Contractor at the point of origin. Dispose of these waste materials according to 00290.20.

Measurement

01030.80 Measurement - The quantities of seeding and associated work performed under this Section will be measured according to the following:

- **Unit Basis** - Unit basis items will be measured by actual count.
- **Area Basis** - Area basis items will be measured on the ground surface.

Payment

01030.90 Payment - The accepted quantities of seeding and associated work performed under this Section will be paid for at the Contract unit price, per unit of measurement, for the following items:

Pay Item	Unit of Measurement
(a) Weed Control.....	Acre
(b) Seeding Mobilization.....	Each
(c) Temporary Seeding, _____.....	Acre
(d) Permanent Seeding, _____.....	Acre
(e) Wetland Seeding, _____.....	Acre
(f) Water Quality Seeding, _____.....	Acre
(g) Plant Seeding, _____.....	Acre
(h) Native Plant Seeding, _____.....	Acre
(i) Wildflower Seeding, _____.....	Acre
(k) Lawn Seeding.....	Acre or Square Yard
(l) Fertilizing.....	Acre
(m) Mulching.....	Acre

Item (a) includes all work associated with the WCWP.

Item (b) includes all labor and transportation of materials and equipment, each time the Contractor mobilizes as required for all hydraulically or airborne applied seeding, fertilizing, and mulching.

In items (c) through (i), the type of seed mix, such as Mix No. 1, if applicable, will be inserted in the blank.

Items (c) through (k) include preparing the seed bed, soil preparation, seeding, fertilizing, mulching, applying tacking agent, and all establishment work.

When temporary seeding, applied according to 01030.43(a), is later accepted as permanent seeding according to 01030.43(b), payment will be made only one time under the permanent seeding pay item. No separate payment will be made for the initial seeding.

01030.90

Payment will be payment in full for furnishing and placing all materials, and for furnishing all equipment, labor, and incidentals necessary to complete the work as specified.

No separate or additional payment will be made for:

- mobilization for application by blowers, mechanical spreaders, or hand spreading
- inspections or maintenance
- seeding mobilization if it is not included in the Contract Schedule of Items

Partial payments for permanent seeding, regardless of type, will be made as follows:

- At completion of seeding70%
- At completion of seeding establishment period.....30%

Section 01040 - Planting

Description

01040.00 Scope - This work consists of planting and associated work as shown or directed.

01040.02 Definitions:

Arborist - A specialist in the care and maintenance of trees.

Certified Arborist - An Arborist certified by the International Society of Arboriculture (ISA).

Consulting Arborist - An Arborist registered with the American Society of Consulting Arborists (ASCA).

Caliper - The diameter of a tree measured at a point 6 inches above the ground. If the measurement is over 4 inches, a new measurement is taken at a point 12 inches above the ground.

Dripline - The area directly under the branch and leaf canopy of trees and large shrubs. This area typically contains the most important of a plant's roots and is sometimes used as an approximate guide to estimate a root protection zone.

Licensed Nursery - Commercial nursery licensed by the Oregon Department of Agriculture to operate as a grower, dealer or agent, or to transport or store nursery stock grown or held for sale.

Native Plant (existing) - See 01030.02 for native plant definition.

Noxious Weed - See 01030.02 for noxious weed definition.

Ornamental Plant - A desirable plant species that is not native, or a plant propagated in such a way that it does not carry genetic characteristics of the species that are native to the area where it is planted.

Plant Establishment Period - A period of time, that is part of the planting work, that ensures satisfactory growth and establishment of plants.

Permanent Wilting Point - The level of soil wetness at which point a plant wilts and can no longer recover its sustainable turgidity when placed in a saturated atmosphere for 12 hours.

Root Protection Zone - A generally circular area around an existing plant to be protected from disturbance or compaction by the use of temporary fencing or other means. The zone as actually staked may exceed the current root area to allow for future growth of the plant. Root Protection Zones will be shown on the plans or staked before construction activities begin.

Weed - See 01030.02 for weed definition.

01040.03 General - Ensure that work meets the following requirements:

(a) Existing Vegetation - Do not disturb existing desirable vegetation that is to remain or is designated for protection, unless approved by the Agency prior to construction.

(b) Pesticide Applicators License and Chemical Registration - Furnish evidence to the Agency that each applicator is licensed for the specific class of chemical being applied. Also, furnish evidence that any chemical is registered for the proposed use by the Oregon Department of Agriculture according to ORS Chapters 452, 561, 570, and 634.

(c) Weather Conditions - Planting work will not be allowed during the following conditions, unless otherwise approved:

- **Cold weather** - When air or ground temperatures are expected to be below 32 °F.
- **Hot weather** - When air or ground temperatures are expected to be above 88 °F.
- **Wet weather** - When the ground reaches saturation, except as approved when planting wetland plants.
- **Windy weather** - When wind velocity exceeds 25 mph.

(d) Work Performed During Unacceptable Conditions - If any work occurs during unacceptable weather conditions, the Contractor may be required to provide the following services at no additional cost to the Agency:

(1) Expert Consultation - Consultation with a certified Arborist (for trees) or other expert as approved (for other plants) to determine what plant care measures are required to maintain the plants installed during the unacceptable weather conditions in a healthy and vigorous condition.

(2) Replacement - Replacement of all work performed during unacceptable weather conditions.

(3) Watering and Maintenance - Watering and maintenance of all plant materials installed during the unacceptable weather conditions and responsibility for all extra costs incurred.

01040.04 Coordination - Coordinate the following elements with the Agency prior to construction:

(a) Planting Work Plan (PWP) - Within 90 calendar days of award of the Contract, submit a PWP for approval. Include or describe the proposed methods for the following:

- Work progress schedule according to 00180.41
- Material submittals according to 01040.10
- Contract Growing Plan according to 01040.19(g)
- Topsoil and/or Wetland Topsoil approvals according to 01040.14
- Plant installation and establishment
- Weed Control Work Plan (WCWP) according to 01030.42(a)
- Emergency contact person, including the Name, telephone and pager numbers, and voice mail and/or email address information

The following are included as part of the PWP, but are required only before the related planting work begins:

- Soil Fertility Test and Soil Amendment Report according to 01040.13.
- Soil Testing and Soil Bio-amendment Report according to 01040.13.

Proceed according to the approved PWP once written approval is received from the Agency. If any part of the PWP become unworkable at any time during construction, notify the Agency, then submit a revised plan. Do not proceed with the planting work until approved by the Agency.

(b) Notice for Inspections - Notify the Agency a minimum of 24 hours prior to each required inspection.

- (c) Site Conditions** - Ensure that the area is properly prepared prior to the start of the planting operation.
- (d) Utility Locate** - Coordinate all existing utility locations according to Section 00150.
- (e) Utility Use** - Provide required water and electricity for planting and plant establishment at no additional cost to the Agency unless an approved Agency source is available.
- (f) Verification** - Verify actual ground dimensions prior to construction. Notify the Agency of any discrepancies before beginning work.

Materials

01040.10 General - Submit a list of Project materials for approval according to 01040.04(a) before arranging for procurement of any materials. For materials not approved, submit a list of alternate materials for approval. Materials installed without approval will be subject to removal and replacement with acceptable material at no additional cost to the Agency.

Substitute materials may be allowed if proof of equivalent quality, suitable product specifications, manufacturer's literature and other detailed information is furnished to the Agency according to 00140.70.

01040.12 Product Delivery, Storage, and Handling - Deliver manufactured products in original, unopened containers, each bearing the manufacturer's guaranteed analysis, name, trade name, and conformance with governing regulations and laws. Protect products against damage or dehydration. Remove unacceptable products as soon as possible from the Project site. If required or requested, provide any manufacturer's literature to the Agency.

01040.13 Soil Testing - Furnish the following kinds of soil testing and reports:

(a) Soil Fertility Test and Soil Amendment Report - Prior to planting, furnish a soil fertility analysis of existing soils performed by a certified testing lab. Prior to planting, adjust soil amendment and fertilizer applications as recommended by the soil amendment report and as approved by the Agency.

(1) Sampling - Take five samples per acre of each soil type. Mix the five samples into one test sample for each soil type. Furnish soil fertility test results that provide information on available nutrient content and fertility status of the soil. Conduct sampling procedures according to the Oregon State University Extension Service handout EC 628, "How to Take a Soil Sample... and Why".

(2) Testing - The test may be performed by any qualified soils testing laboratory. A list of qualified soils testing laboratories is available from the Oregon State University Extension Service. Include testing for levels of acidity (pH), salinity, nitrates, ammonium, phosphates, potassium, calcium, magnesium, and any other tests necessary to determine appropriate fertilization and amendment needs for the type of plants being planted.

(3) Soil Amendment Report - Provide a report from the testing laboratory summarizing sampling locations and procedures with printed results, and which makes recommendations for fertilizers and soil amendments to effectively develop productive soil.

(b) Testing and Soil Bio-Amendment Report - Have soils tested prior to planting by an approved soil ecology lab. Provide information on soil foodweb structure and function, and include total and active bacterial biomass, total and active fungal biomass, protozoan numbers, nematodes,

microarthropods, and mycorrhizal colonization. Adjust the kind and amount of soil conditioners, soil amendments, soil bio-amendments, and fertilizers (if any) as recommended by the soil bio-amendment report, and as approved by the Agency prior to construction.

(1) Sampling - Take five samples per acre of each soil type. Mix the five samples into one test sample for each soil type. Conduct sampling according to the standard procedures for soil organism assessment as recommended by the soil ecology lab.

(2) Testing - Perform the following soil ecology tests and furnish soil meeting these minimum soil organism biomass requirements:

Test	Minimum Requirements
Percent active bacterial and fungal biomass.....	between 5% and 25% activity
Total bacterial biomass	6×10^8 per gram of dry soil
Total fungal biomass	100 µg for grasslands
	200 µg for shrubs or perennials
	300 µg for forested areas
Protozoa.....	5000 per gram of soil
Beneficial nematodes.....	20 per gram of soil
	(No root-feeding nematodes)

Determine if anaerobic or compacted conditions are present, based on the assessment of total bacterial biomass, percent bacterial activity, and protozoan biomass.

If the soil contains biomass numbers lower than these levels, apply amendments and inoculates according to the soil ecology lab recommendations in the soil bio-amendment report in 01040.13(b-3).

(3) Soil Bio-Amendment Report - Provide a report summarizing sampling locations and procedures. Include the soil ecology lab report of the soil organism assessment and the recommendations for:

- Inoculation of missing organisms groups to the soil.
- Amendment with food resources for organism groups with too low of a biomass.
- Reduction of undesirable groups, or groups with the biomass too high for the optimal growth of the desired plants.
- Any adjustments to the bio-amendments required for the types of plants being planted.

01040.14 Topsoil - Furnish topsoil containing no substance detrimental to the growth of plants and that is free of plants designated by the Oregon Department of Agriculture as Type "A" or Type "B" weeds. Unsuitable topsoil, or topsoil placed by the Contractor without approval in areas to be planted, may be required to be replaced at no additional cost to the Agency.

20 days before furnishing any type of topsoil, do the following:

- Give the Agency notice of intent to use the source.
- Provide access to the source for Agency inspection.
- Provide one 20 pound representative soil sample of each topsoil type for testing of particle size range and organic matter by the Agency, unless otherwise specified.
- Obtain approval of the source before excavation of topsoil begins.

(a) Selected Topsoil - Furnish native topsoil from the required excavations meeting the requirements of 00330.10 or from other Agency-controlled lands. The general limits of topsoil materials will be indicated on the plans. The Agency will make the final determination of the areas where the most suitable materials exist. Furnish topsoil that is the fertile part of a soil profile commonly referred to as the "A" horizon, typically ranging in depth from 3 inches to 12 inches. Do not take material for topsoil from a depth greater than 12 inches below existing ground, unless approved.

Select only sources that are well-drained and, before stripping, have a healthy crop of vegetative growth. Remove and dispose of all heavy grass or other vegetation before taking materials from the source.

(b) Imported Topsoil - Furnish imported topsoil from non-Agency controlled lands that, when tested according to AASHTO T 88, meeting the following limits:

Standard Sieve Analysis

Particle Size Range	Percent Retained (by Weight)
Larger than 2"	0
2" - 3/4"	0 - 5
3/4" - No. 4	0 - 20
No. 4 or less	0 - 100

Of the fraction passing the No. 4 sieve, excluding organic material, furnish topsoil that conforms to the following limits:

Hydrometer Analysis

Particle Size Range	Percent (by Weight)
No. 4 - No. 200	5 - 70 (Retained)
No. 200 - 2 μ m	20 - 80 (Retained)
Less than 2 μ m	5 - 30 (Passing)

In addition, furnish topsoil that analyzes at least 2 percent organic matter according to ASTM D 2974.

(c) Wetland topsoil - Furnish a native, naturally hydric wetland topsoil consisting of silts, clays, and organic matter in combination that is free from substances detrimental to plant growth, such as noxious weeds, undesirable plant roots, refuse, sticks, or lumps. Provide wetland topsoil that is from a wetland with an existing, well established, healthy growth of the desired wetland plants. Obtain approval of the source before excavation of wetland topsoil begins.

Excavate, at a minimum, the top 24 inch depth of existing wetland soils using standard construction equipment.

01040.15 Soil Conditioners - Soil conditioners are for modifying soil structure and improving soil aeration characteristics, as distinguished from plant foods, mulch, and soil organism amendments. Furnish soil conditioners free of noxious weeds, living plants and rhizomes, and substances detrimental to plant life. Submit a 15 pound sample for approval by the Agency prior to construction. Provide soil conditioners that are free of weed seeds, excessive salts, chemicals detrimental to plant growth, and pest organisms. Soil conditioners proposed for use are subject to testing at any time or place the Agency deems appropriate.

Furnish one or more of the following soil conditioners:

(a) Mushroom Compost - The used bedding material from commercial mushroom production.

(b) Composted Yard Debris - Commercially manufactured material, made from dead plant material such as grass clippings, weeds, green and dead dry leaves, garden and vegetable material, and ground branches of trees and shrubs. Furnish a product that is composted under controlled aerobic decomposition, with the internal temperature reaching 135 °F for 15 days, without exceeding 155 °F. Ensure that it contains a maximum of 10% bacteria and 10% fungus. Additional certification may be required in areas having a certification program.

(c) Peat Moss - Horticultural grade, natural peat moss in air-dry condition, free from woody substances, in bales or bags labeled for content and volume. Only peat moss used in combination with one of the above composts is acceptable.

01040.16 Soil Amendments - Soil amendments are intended to improve soil nutrition. Furnish soil amendments that are free of materials detrimental to plant life. Furnish manufacturer or supplier quality compliance certification according to 00165.35. Ensure that material testing methods meet the requirements of the Oregon Department of Agriculture appropriate to that material. Obtain approval for use before beginning work. Soil amendments may include the following:

- Lime
- Dolomite Lime
- Gypsum
- Rock, Diammonia, or other Phosphate
- Calcium or Potassium Nitrate
- Iron Sulfate

01040.17 Soil Bio-Amendments - Soil bio-amendments are intended to increase beneficial soil organism numbers or soil organic nutrient content. Furnish bio-amendment products or materials that are free of substances or life forms detrimental to plant life and receive approval prior to use on the Project. Furnish manufacturer or supplier quality compliance certification according to 00165.35. Ensure that material testing methods meet the requirements of the Oregon Department of Agriculture appropriate to that material. The following are typical soil bio-amendments that may be identified in the soil bio-amendment report:

(a) Bacterial Food Amendments:

- Simple sugars such as brown sugar, brown syrups, or molasses
- Plant extracts of Yucca or Nettle, usually containing sap of the plant comprised of a combination of simple sugars, proteins, and carbohydrates
- Fulvic acids
- Yeast, including baker's yeast, brewer's yeast, and champagne yeast
- Kelp meal
- Rock dust

(b) Fungal Food Amendments:

- Cellulose
- Lignin
- Humic acids - brown to dark brown products (black is not acceptable)

(c) Protozoa Food Amendments:

- Bacteria
- Hay infusions - A method of growing protozoa for soil inoculation by using hay in water

(d) Nematode Food Resources - Nematodes come as four types: bacterial-feeders, fungal-feeders, root-feeders, and predatory nematodes. Predatory nematodes eat other nematodes, while the name of the other groups indicate what organisms they eat.

The primary source of material containing a wide diversity of beneficial nematodes is good compost. Provide certification that the compost contains beneficial nematodes and does not contain root-feeding or other detrimental nematodes.

(e) Mycorrhizal Inoculates - Commercially produced ectomycorrhizal and endomycorrhizal fungi that improve plant root absorption of soil nutrients.

(f) Microbes - Commercially produced product designed to enhance microbiological activity in the soil by the addition of beneficial and essential microbes. Commercial products may also contain vitamins, amino acids, plant growth hormones, micronutrients, and plant stress relievers.

(g) Earthworms - Common earthworms that are either "Red Wigglers" or "Night Crawlers" delivered in peat moss or other damp medium.

01040.18 Fertilizer - The soil amendment and bio-amendment reports will recommend fertilizer types and application rates. When identified in the report furnish commercial fertilizer meeting the requirements of 01030.14 and the following:

(a) Organic - Organic fertilizer 5-4-3, analyzing 5% nitrogen, 4% available phosphoric acid, and 3% soluble potash.

(b) Plant Bags and Tablets - Plant bags or tablets containing 20-10-5, or approved equal, may be used instead of granular fertilizer in pit planting.

Furnish plant bags or tablets that are controlled-release with a minimum one-year release period. Chemical formulation, rates and use will be approved by the Agency.

01040.19 Plants:

(a) Nomenclature - Botanical identification and nomenclature of plant materials shall be according to the most current edition of "Hortus Third", by Bailey. The Agency may authorize use of other references such as the "Sunset Western Garden Book", the "Flora of the Pacific Northwest", by Hitchcock, or the "Manual of California Plants", by Jepson.

Furnish plants that conform to the applicable requirements of the current issue of the "American Standard for Nursery Stock", published by the American Association of Nurserymen. When a conflict exists between this publication and the Specifications, the Specifications will prevail.

(b) Quality - Provide plants that are healthy, first-class representatives of their species or variety, free from disease and insect pests, with top growth that is well developed and free of disfiguring knots, sun scalds, bark abrasions, wind or frost injury or any other objectionable features.

Furnish plants that are acclimated to the specific project environmental site conditions prior to planting. Store all container-grown and balled and burlapped (B&B) plant materials acquired for fall planting a minimum of three months before planting, at a location north of the 42nd Latitude (Oregon - California border).

Furnish plants that possess top growth and root systems typical to their variety. Provide trees with central leaders that have a symmetrical, well-branched, straight trunk. Trees with a damaged or missing leader, multiple leaders or Y-crotches will be rejected, as will sheared conifer trees.

Protect plants at all times during handling, shipping, storage and planting against such detrimental effects as windburn, extreme weather conditions and drying of roots, root balls and foliage.

(c) Certification - Furnish a State inspection certificate and shipping certificate for each load or lot of plant material that includes the following information:

- Date of shipment
- Name of nursery where grown
- Name of plants (Including all names as specified in the Contract)
- Number of plants
- Grade or classification of plants (Verifying conformance with the Specifications)
- Size (Including height, spread, runner length, caliper and other measurements as required)
- Identify at least one plant (botanical and common name) within each group of like species
- Identify one plant (botanical and common name) within each different size category

(d) Inspection - Plants will be subject to inspection by the Agency, at any time and place. The Agency will make no plant material inspection at the source, except as it may elect. Notify the Agency of each delivery of plants to the Project site no less than 24 hours ahead of delivery. Do no planting until the plants have been inspected and approved for use. Any planting done without prior approval of the plants will be considered in violation of these Specifications.

The presence of noxious weeds in the soil accompanying plants or at the nursery source will be cause for rejection of any or all plants from that source.

(e) Availability - Furnish a list of nursery sources for all specified plants within 90 calendar days after execution of the Contract. Verify, by this list, that all specified plant material has been located and will be available for use on the Project. If applicable, see 01040.19(g) for alternate requirements.

(f) Plant Substitution - No substitution of plant materials will be allowed unless written evidence is submitted that a specified plant or material cannot be obtained and has been unobtainable since the execution of the Contract. If substitution is allowed, it will be by written approval from the Agency for the nearest acceptable variety, size and grade. Make any request for substitution in writing to the Agency with ample time for approval without delaying the work.

(g) Contract Grown Plant Materials - When required by the Special Provisions, include a contract growing agreement between the Contractor and a nursery supplier in order to ensure plant availability or suitability.

If a contract growing agreement is part of the Project, submit a Contract Growing Plan that describes plant material size at delivery, growth environment, name and location of nursery, and the source for each plant (native seed, indigenous cuttings, or commercially grown). Submit this required information as part of the PWP.

(h) Definition of Plants and Descriptive Terms - The following definitions describe the distinctive habit and characteristics of the most common plant materials:

(1) Conifer Trees - Trees with needle or scale-like leaves that maintain live-leaf foliage throughout the year, and that usually bear seed from a woody cone.

(2) Deciduous Trees - Trees with leaves that are shed at the end of the growing season, and which remain leafless throughout dormancy.

(3) Transplanted Specimen Plants - Unique or large plants typically used in low numbers on projects. See the plans for specimen type, size, and location. Deliver trees to the site that are dormant and with buds that have not yet swelled. Furnish plants that have an unbroken root ball sufficient to sustain continued growth. Ensure that the root ball size conforms to the current edition of the "American Standard for Nursery Stock". Provide plants with no broken limbs or bark abrasions, and cleanly cut off any frayed roots or damaged limbs. Deliver trees that are balled and burlapped, boxed or moved by commercial tree spade.

(4) Balled and Burlapped (B&B) Plants - Plants excavated with soil around the root system whose root ball is wrapped for shipping and handling. B&B materials are generally trees or shrubs, such as evergreens, that require a large ball of earth to sustain them after the transplant. Furnish plants that are balled and burlapped meeting the requirements of the latest edition of the "American Standard for Nursery Stock", including minimum size of root balls.

Furnish plants with root balls securely wrapped in burlap or similar mesh fabrics not harmful to plants, and bound with removable twine or wire. Provide root balls that are firm, intact and held solidly together by a fibrous root system consisting of only the earth in which the plant was growing. "Made" balls will be rejected.

(5) Collected Plants - Plant material that is harvested from existing on- or off-site plant populations. Furnish collected plants that conform to all appropriate quality, grade and class requirements of the current issue of the "American Standard for Nursery Stock".

(6) Container Grown Plants - Plants that are grown and delivered in containers which possess well-formed top growth and whose root growth is typical to the variety.

Furnish plants that are resident in their delivery containers long enough to have established new fibrous roots, have a root mass that will retain its shape, and hold 90% (visual estimate) of the root ball material when removed from their containers. Some root growth should be visible along the outer edges of the container. Root-bound container grown plants and "made" container plants will be rejected.

(7) Seedling Trees - Plants that are grown from seed in a nursery and brought to the site in a bare root condition. Provide seedlings labeled with age and certification (class number) which shows the number of seasons grown in a nursery seedbed, followed by the number of seasons grown in a transplant bed. Furnish seedling trees that are a minimum two years old.

Furnish seedling trees that are Oregon Department of Forestry "zoned" (grown) within approximately 500 vertical feet of the Project site elevation. Submit seedling zone information for the proposed plants to the Agency prior to construction.

(8) Bare-root Plants - Small deciduous plant material that is excavated for transplant with exposed roots. Furnish only bare-root plant materials that have dormant buds at the time of planting. Take great care to protect bare root plants against dehydration and sunburn.

(9) Plant Cuttings - Living, freshly cut branches from certain woody shrub or tree species that readily propagate when embedded in damp soil. Furnish plant cuttings of regionally native species and dimensions as shown on the plans. Obtain written approval of the cutting stock sources before taking any cuttings and furnish a brief, written description of the cutting site(s) and the date and time the cuttings were taken to the Agency. Take cuttings in such a manner so as to leave no long-term damage to the source population. If willow species are called for, select the local native shrub variety.

(10) Fascine - Bound, cylindrical bundles of live plant cuttings that are placed in shallow trenches, partially covered with soil, and staked in place, typically used to stabilize stream banks against erosion. Furnish only fascines of regionally native materials having the dimensions shown on the plans.

(11) Brush Mattress - A combination of plant cuttings and fascines installed to cover and protect stream banks and shorelines. Brush mattress dimensions and any material requirements will be shown on the plans.

(12) Tubeling Plants - Plants grown in containers that encourage deep root growth.

(13) Vines - Plants with growth primarily along stems, often having climbing characteristics, and typically attaching to walls by tendrils or other means.

(14) Groundcovers - Low growing or spreading plants.

(15) Wetland Plants - Plants that meet the definition of hydrophyte, which is any macrophyte that grows in water, or on a substrate, that is at least periodically deficient in oxygen as a result of excessive water content.

(16) Bulbs - For the purposes of this section, these will typically include the forms known as bulbs, corms, culms, plantlets, rhizomes, runners, small offsets, stolons and tubers. These plants will be collectively referred to as "Bulbs". The appropriate propagule (plant part that can be separated and used to grow another plant) will vary depending on the plant species.

(17) Sod Lawn - Grass sod grown on agricultural land that is commercially cultivated specifically for turf sod. Furnish sod that is free of weeds, diseases, harmful nematodes and insects. Provide sod that is mature, not less than 10 months old, and machine cut to a uniform thickness of 5/8 inch or more, excluding top growth and thatch. Broken pieces and torn or uneven ends will not be accepted. Plant sod within 36 hours of harvest.

01040.20 Mulch - Furnish plant bed mulch materials free of noxious weed seeds or plants and which contain no substance detrimental to plant life. Mulches are subject to inspection at any time and place at the discretion of the Agency. The following are some types of materials that fall under the category of "mulch", and may be used on projects:

(a) Bark Mulch - Ground, shredded or broken particles from the bark of fir, pine or hemlock trees which is free of non-bark debris, harmful bacteria, disease spores, pests and substances toxic to plant growth. Provide mulch that is the standard trade size known as "medium fine mulch".

(b) Cinder Mulch - Crushed lava cinders, screened to an approximate size between 3/16 inch to 5/8 inch. Furnish cinders free of fines and other non-cinder material.

(c) Straw Mulch - Provide straw mulch according to 01030.15.

(d) Rock Mulch - Round 3/8" - No. 4 pea gravel or round 2" - 3/8" rock. Provide material that is free of fines and other non-gravel material. Rock colors may vary.

(e) Wood Chip Mulch - Mulch that is chipped from cleared site vegetation. Ensure that chipped material is free of any noxious weeds or invasive vegetation. Allowable size range or other qualities may be listed in the Special Provisions.

01040.21 Herbicides - The use of herbicide chemicals will be allowed only upon approval of the Agency. Select and apply chemical herbicides according to all applicable Federal, State and local laws, as well as the WCWP requirements of the PWP. The following are standard herbicide functional categories:

- (a) **Soil Sterilant** - Chemical herbicide that is used to kill all new emergent vegetation, often including seeds or other plant parts.
- (b) **Pre-emergent** - Chemical herbicide that is used to stop the germination of seeds before they grow above the soil level.
- (c) **Post-emergent** - Chemical herbicide that is used to selectively or non-selectively kill vegetation after germination and emergence above ground.

01040.22 Water - When required by the Special Provisions, furnish the following:

- (a) **Pressure Moisture Stress Sensor** - A pressure chamber instrument capable of applying up to 40 bars or 600 psi to a small leaf or shoot in order to determine its water uptake potential. Instrument is to include all accessories necessary to perform a plant moisture stress test.
- (b) **Timed-Release Water** - Containerized moisture retention chemical in the form of a solid gel delivered in biodegradable cartons. Typical ingredients are 97.85% water, 2% cellulose and 0.15% aluminum sulfate.
- (c) **Moisture Retention Chemicals** - Granular chemical that are typically cross-linked potassium based polyacrylate or polyacrylamide copolymers. Provide commercial quality product from the QPL.

01040.23 Miscellaneous Items - Furnish miscellaneous items meeting the following requirements or provide commercial-quality products from the QPL. Obtain approval from the Agency prior to use.

- (a) **Anti-transpirant** - Apply liquid anti-transpirant spray to all appropriate deliverable plant materials, prior to transport.
- (b) **Boulders** - Furnish boulders of indigenous materials, with source, dimensions, and other characteristics as shown.
- (c) **Browsing Protectors** - Flexible, semi-rigid plastic or metal mesh, brown or light green in color, with stake supports.
- (d) **Game Repellent** - A commercial nontoxic spray that makes vegetation unpalatable for animal forage.
- (e) **Root Barrier** - A root barrier designed to contain and control root intrusion into unwanted areas.
- (f) **Tree Grates** - Tree grates complete with frames, all required attachment hardware, and at least one issue of any specialty key or tool that is required to open or move the item for maintenance.
- (g) **Tree Stakes and Ties** - Rough sawn tree stakes of 1 1/2 inches x 1 1/2 inches douglas fir or pine, construction grade or better. Use stakes 6 foot long for trees less than 8 feet tall, and stakes 8 foot long for trees 8 feet or taller. Stain all tree stakes with an approved, dark green penetrating oil stain. Provide tree trunk protection of guying material of either a commercially available tree tie or a section of garden hose. Furnish tree guying material of a commercial product manufactured for this use, such as plastic chain, or stainless steel woven-wire with clamp fasteners. Size the guying material appropriate to the size of the tree and the wind factors of the area.

(h) Trunk Wrap - Typically manufactured of waterproof, crinkled paper and is designed to protect tree trunks against sunscald, loss of moisture and insect attack.

(i) Weed Control Geotextile - Weed control geotextile is typically manufactured of permeable, fibrous synthetic material and is generally for use under material such as mulch or gravel.

(j) Woody Course Debris - Logs or root-wads salvaged from on-site deciduous tree clearing and grubbing activity.

Construction

01040.40 General - Planting areas and plant locations shown on the plans are approximate unless shown with dimensions. Be responsible for layout and staking for plant placement, subject to approval by the Agency before planting. The Agency will make only field measurements necessary to calculate and verify quantities for payment.

Adjust tree locations to avoid possible conflicts with vehicle recovery clear zones, utilities, structures, miscellaneous appurtenances, and signing, as directed. In mowable grass areas, locate trees at least 10 feet from the edge of plant beds, other trees, fences, and ditch bottoms, unless otherwise specified.

01040.41 Planting Season (West of the Cascades) - Perform all plant installation work from September 1 to May 15, unless otherwise specified. Container-grown materials located within irrigated areas may be planted at other times, depending upon written Agency approval.

Do not place lawn sod before March 15 or after September 30 without written Agency approval.

01040.42 Planting Season (East of the Cascades) - Perform all plant installation work from October 15 to November 30, unless otherwise specified. Container-grown materials located within irrigated areas may be planted at other times, depending upon written Agency approval.

01040.43 Topsoil:

(a) Excavation - Prevent fouling of suitable material with subsoil or other detrimental matter. Form stockpiled soil into windrows at least 6 feet high, not to exceed 13 feet high, to maintain and preserve soil organism vitality.

(b) Subsoil Preparation - Grade and finish areas that are to receive topsoil, allowing for the specified amounts of topsoil. Scarify or till subsoil that is not loose and friable to a depth of 6 inches and obtain approval from the Agency before placing topsoil.

(c) Hauling and Spreading - Haul and spread material without compacting the topsoil or areas where it is placed. Protect from damage any surrounding objects, pavement, structures and areas that are traveled, crossed, or mounted by equipment.

Smoothly spread the topsoil over the specified areas to the thickness, grades, and slopes shown or directed. Avoid wasting topsoil and do not place material during wet conditions. Do not work saturated soils in any manner. Material placed contrary to Agency instructions or in undesignated places will not be paid for and removal may be required at the discretion of the Agency.

(d) Finishing and Cleaning Up - Finish areas covered with topsoil to proper grade, contour and cross section. Cultivate all topsoil not in a loose and friable condition to a depth of at least 4 inches. Bring the surface to a condition ready for planting operations.

01040.44 Select Wetland Topsoil:

(a) Excavation - Stage construction so that excavated soils may be moved directly to the wetland mitigation location. If that is not possible, stockpile the material for not more than 28 days. Water stockpiled material twice weekly and keep moist until used. Form stockpiled soil into windrows at least 6 feet high, not to exceed 13 feet high, to maintain and preserve soil organism vitality.

(b) Subsoil Preparation - Excavate or grade areas to receive selected wetland topsoil as shown on the plans and finish as smooth as practicable through one pass of standard construction equipment. Have subsoil preparation inspected and approved by the Agency prior to spreading the selected wetland topsoil.

(c) Hauling and Spreading - Transport select wetland topsoil to the site by any means which meets all applicable regulations related to hauling potentially wet or moist materials. Spread the topsoil to a depth of 6 inches minimum to 24 inches maximum, or to meet the finished elevations as specified on the plans. Make as smooth as practicable without excessive soil compaction. After spreading, have the area inspected and approved by the Agency prior to planting.

01040.45 Soil Amendments - Incorporate soil amendments into the topsoil when required by the soil fertility test and soil amendment report. The application rate will be verified by checking settings on the spreading or application equipment.

01040.46 Soil Bio-Amendments - Incorporate the following soil bio-amendments into the topsoil of areas to be planted, according to the recommendations of the soil bio-amendment report, the supplier, or the following:

- Bacterial Food Amendments
- Fungal Food Amendments
- Protozoa Food Amendments
- Nematode Food Amendments
- Microbes and Biostimulants
- Earthworms - Add nine worms per cubic yard of topsoil (this roughly equates to three worms per 10 square feet of topsoil at 12 inches depth).
- Mycorrhizal inoculation - Incorporate into the planting hole quantities of mycorrhizia sufficient to correct the soil for the type of plants or grasses being grown.
- Mycorrhizal Inoculation (Injection) - Provide pre-measured packets containing live endomycorrhizal and ectomycorrhizal fungi.
- Mycorrhizal Inoculation (Root Dip) - Apply root dip material containing live endomycorrhizal and ectomycorrhizal fungi.

The application rate will be verified by visual inspection of application rates. A one-time application should be adequate, as long as pesticides, fertilizers or other toxic materials are not used at the same time. If it becomes necessary to apply pesticides that have non-target organism effects, or to apply fertilizer at rates greater than 13 pounds per acre, re-inoculate the organisms about one month after the pesticide or fertilizer was applied.

01040.47 Fertilizers - Incorporate fertilizer based upon recommendations of the soil amendment and soil bio-amendment reports or, with Agency approval, at the type and rate as follows:

Plant Bags/Tablets

Plant	Rate	Size
Tree	3 per tree	3/4 ounce
Shrub	2 per shrub	3/4 ounce
Vine/Ground Cover	1 per plant	3/16 ounce

Granular Fertilizer Rate

1 pound per tree per application
 1/2 pound per shrub per application
 1/8 pound per vine/ground cover per application

Evenly space planting bags or tablets around plants after planting pits are two-thirds filled with backfill. Mix granular fertilizer into the upper one-half of plant backfill.

The application rate will be verified by visual inspection. Furnish manufacturer or supplier quality compliance certification according to 00165.35. Ensure that material testing methods meet the requirements of the Oregon Department of Agriculture appropriate to that material.

Do not allow the fertilizer application to conflict with the soil bio-amendments. In case of questions, provide the soil bio-amendment supplier's written recommendations to the Agency.

01040.48 Planting Area Preparation - All planting areas shall be Weed Free before planting or seeding operations begin. Identify, kill, and remove plants according to 01030.62(b-3).

Prepare planting areas according to the following methods, or as otherwise specified:

(a) Method "A" (Cultivated Planting Areas, Non-lawn) - Cultivate plant beds to a depth of 2 inches. Thoroughly mix 52 inches of soil conditioners into the top 12 inches of plant beds. In addition, add soil amendments, soil bio-amendments and fertilizers, as shown or specified, according to the soil amendment and soil bio-amendment reports recommendations, into the top 12 inches of topsoil.

Finish grades by raking to a grade tolerance of plus or minus 1 inch, with a smooth and firm condition, and an even grade that is free of undulations or low areas that could create standing water. Match existing grades at the perimeter. Finish to the proposed grades shown or specified.

On slopes that the Agency determines are too steep to cultivate, plants may be planted in individual planting holes prepared using method "B".

(b) Method "B" (Non-Cultivated Planting Areas) - Spray existing weeds and non-desirable vegetation with herbicide to kill all top growth and roots in areas not requiring cultivation. Use herbicides that have limited residual toxicity to permit safe planting as required under the Contract. Do not spray or otherwise harm plants to be saved. After inspection and approval, remove the dead top growth of plant material within 2 inches of the surface and dispose of according to Section 00320. Replace plants to be saved that are damaged by herbicide application at no additional cost to the Agency.

Add any soil conditioners, soil amendments, soil bio-amendments or fertilizers with the backfill at each plant pit or to the seeding operation.

Finish wetland mitigation planting areas to specified finish elevations, blending to existing ground smoothly, as required and directed. Except for projects that are less than one year in duration and unless otherwise approved, review the seasonal hydrology of the area to be planted for one full winter season (November 15 to February 28) prior to planting any wetland plants. Adjust plant types and planting locations as required or directed, based on the review of site hydrology.

When planting seedling plants, completely scalp vegetation from a 12 inch diameter area around each planting hole. Clear all debris such as wood and rocks from the planting spots, provided debris is not deeper than 12 inches. When debris is deeper, move the planting location. Use herbicides around seedlings only upon written approval of the Agency.

(c) Method "C" (Sod Lawn and Seeded Lawn Areas) - Cultivate existing ground to a depth of 6 inches, achieving a loose and friable condition suitable for fine grading. Remove all vegetation, rocks larger than 2 inch diameter, clods, roots, sticks, debris, and other matter detrimental to the growth of sod.

Uniformly spread soil conditioners, soil amendments, soil bio-amendments, and fertilizer evenly over the area and thoroughly rototill into the soil to a depth of 4 inches. Apply at rates recommended by soil testing, or as follows:

Material	Rate (per 100 square yards)
Soil Conditioner	1/2 cubic yard
Fertilizer	10 pounds
Lime (Western Oregon only)	40 pounds

Fine grade and roll planting areas with a water-filled roller to provide a fine-textured, smooth, firm surface, free of undulations, irregularities or low areas that could create standing water. Grade areas receiving sod to within 1/2 inch of the designed grades, and 1 inch below adjacent walks, curbs and pavement. Since sod thickness varies, adjust initial grades so the final sod soil level is slightly below adjacent hard surface grades. Ensure that final sod grade does not create a pedestrian tripping hazard.

Furnish the Agency with sod mixture information and a quality compliance certificate from the sod grower, certifying sod compliance with mixture requirements, according to 01040.10.

Prior to completion of any sodding and seeding, re-grade ruts, footprints, washouts, or any other irregularities, and re-seed or re-sod repaired areas as originally specified.

(d) Method "D" (Rough Areas Seeded for Revegetation or Erosion Control) - Remove any matter detrimental or toxic to the growth of plants, including weeds, clods, rocks or debris. On slopes 1V:3H or flatter, remove all debris larger than 2 inches in any dimension. On cut slopes 1V:1.5H or flatter, roughen the surface with furrows parallel with slope contours and loosen the soil to a depth between 3 inches and 6 inches.

(e) Method "E" (Temporary Seeding Areas) - If grading is required or directed, make equipment passes at right angles to the slope in order to form seed-holding tracks in the soil.

01040.49 General Planting - Plant trees, shrubs, groundcover, vines, and bulbs using the following practices:

- Inspect plants after arrival at the Project and before planting. Do not install plant materials until each required inspection by the Agency is complete. Replace plants not meeting the requirements of the Specifications with plants as specified or otherwise directed, at no additional cost to the Agency. Initial approval of plant materials for planting by the Agency will not constitute final acceptance.

- Protect all plants during shipping, handling, storage, and planting from windburn or exposure to harmful weather conditions, and root or root ball drying.
- When excavating planting holes, stockpile excavated topsoil separately from subsoil. Do not include alkali soil, subsoil, gravel, debris or rocks in the topsoil. Dispose of any substandard excavated materials in a manner not harmful to plants or planting work. Scarify planting pit sides and bottoms to eliminate glazed surfaces. Dispose of excess soil in a manner that is not harmful to plants or planting work.
- Do not plant in standing water unless approved by the Agency. If standing water is present within a plant pit, notify the Agency prior to planting to determine what corrective measures are required. Perform corrective measures on an Extra Work basis according to Section 00196.
- Excavate tree plant pits a minimum of twice the diameter of the plant root ball or 2 feet larger than the root ball, whichever is greater. Dig shrub plant pits a minimum of 1 foot larger than the root ball diameter. Dig pits to the same depth as the root ball, root mass, or container. Spread root systems of bare root plants and container stock as necessary to keep plants from being root bound.
- Cleanly cut off broken or frayed roots of bare-root plants before planting. Spread out roots in their natural position within the pit and trim only damaged roots as approved by the Agency. Remove all labels, tags and attachment materials from the plants before final inspection.
- Set upright growing plants straight and plumb, and prostrate growing plants level to the ground surface. Set all plants so that, after settlement, they are at the same level as when growing in the nursery or container.
- Place the backfill then add soil amendments, soil bio-amendments, and fertilizers as recommended by the soil amendment and bio-amendment reports. Moisten backfill completely after placing to eliminate air pockets and minimize settlement of the backfill. Form a shallow (2 inch high) water-holding saucer in the soil around the plant unless directed otherwise.
- Balled and burlapped plants may be placed with the root ball wrapping removed or, if all materials are untreated and fully biodegradable, left in place. If the root ball wrapping (burlap) is left around the plant, completely remove all tie wire, string or twine and fold down the burlap from the top half of the root ball.
- Perform any required pruning using good horticultural practice appropriate to the type of plant. Prune to remove all dead, damaged, crossed or rubbing twigs and branches, and to compensate for loss of roots during planting. Make cuts close to the parent stem, but not flush or through the bark "knob" at the branch joint. Do not prune terminal ends of tree leaders without approval of the Agency.
- Apply bark or wood chip mulch of the type and depth as shown. Correct contamination of new mulch due to the Contractor's operations at no additional cost to the Agency. Feather mulch into plant material trunks, stems, canes or root collars, and leave 1 inch below the top of junction and valve boxes, curbs and pavement edges. Any mulch placed to a thickness greater than specified will be at no additional cost to the Agency.
- Do not disturb protected existing vegetation unless approved by the Agency prior to construction.
- Dig pits for street trees that have hard surfaces around them so the crown of the root ball is 3 inches below the finished surface of the surrounding grade.
- Water deciduous trees that are 1 1/2 inches or larger in diameter, conifer trees that are over 4 feet in height, and all shrubs at a minimum frequency identified in the Special Provisions.

01040.50 Special Planting Requirements:

(a) Transplanted Specimen Plants - Use the following methods for transplanting specimen plants, unless otherwise specified:

(1) Mechanical Digging - Use a "Vermeer" type of tree spade or approved equal. Move only during the season that the tree is dormant. Treat deciduous plants with anti-transpirant prior to excavation. Confirm with the Agency that the size of the spade is appropriate to the size and type of tree prior to beginning work. Dig the receiving hole prior to digging the tree to be transplanted. Take care not to damage the tree bark. Refill the original hole after transplanting. Do not move Oregon White Oak (*Quercus garryana*) by this method.

(2) Hand Digging - Before digging, obtain approval from the Agency for the size of container or root ball to be used for each plant. Begin digging at a diameter greater than the expected size of the root ball and remove dirt toward the plant until the surface roots show. When completely dug, secure the root ball with burlap and twine, wire basket or in a wooden box. Take special care to dig deep enough so that the taproot is not cut until it is smaller than 3/8 inch. Take care not to damage the tree bark. Refill the original hole and compact the soil after transplanting.

Install perforated plastic drainpipe as shown. Add fertilizer, soil amendments or bio-amendments to backfill topsoil mixture. Stake or guy the tree as specified.

Provide one application of anti-transpirant before transplanting, and one application of Vitamin B1 growth hormone after planting to each specimen plant according to the manufacturer's recommendations.

Perform all replanting of specimen plants according to 01040.41 and 01040.42.

(b) Staking and Guying Trees - Stake and guy planted trees as shown or directed.

(c) Seedling Trees - Plant seedling trees using one of the following three methods:

- Planting hoe capable of opening a vertical hole broken out on three sides, with a minimum blade length of 12 inches and width of 3 inches.
- Planting shovel capable of opening a vertical hole broken out on three sides and at least 10 inches deep.
- Normal bare-root planting method.

No pre-staking of planting locations will be required. The Agency will be present as planting begins and will approve the spacing, planting method, and areas to be planted before work can begin. Vary plant spacing in order to allow seedlings to be planted in suitable soil. During the planting process, remove one tree at a time from the planting bag or other container to prevent drying of roots.

Place the roots of each seedling in the ground so that they assume a natural arrangement and do not twist, angle, bunch together or turn up at the ends. Plant seedlings so that the root collar is at or above the ground plane by no more than 1/2 inch. During planting, tamp soil around the roots in the lower half of the hole. Then fill the hole to the surrounding soil level and firmly pack so that no air pockets remain around the roots.

Ensure that seedlings do not pull loose with a tug strong enough to detach a small group of needles or small branch ends as applicable. Place a stake at the edge of each planting pit and install browsing protection and browsing repellent.

(d) Tubeling Plants - Place the tubeling into the planting pit without breaking the root mass. Set the top of the root collar 1/2 inch above finish grade, and gently tamp soil around the plant to compact the backfill. Place a stake at the edge of the plant pit and attach a browsing protector around each plant.

(e) Collected Plants - After plants become dormant, excavate collected plants by hand, protecting the root mass against drying, freezing or breaking. If possible, plant all collected stock the same day as gathered, or transport to a local nursery for temporary storage until final planting.

If immediate planting is not possible, place collected plants in heavy paper or plastic with slightly damp peat moss or sterile potting soil. Store dormant plants at 32 °F to 37 °F until planting. Examine stored material frequently for signs of stress or disease and correct storage conditions as necessary. Plant collected plants before dormant bud development.

(f) Bulbs - Plant dormant bulbs at a depth of 1 inch to 2 inches or to the grade they grew naturally. Compact the soil firmly around the bulbs to prevent float-out and ensure good establishment. Dig holes large enough to naturally space bulbs within the planting area.

(g) Plant Cuttings - Collect and plant the cuttings while in winter dormancy, generally between October and March. Notify the Agency if conflicts exist with permit requirements. Store all cut material in ventilated plastic containers that allow free flow of water. Protect root systems from excessive drying at all times. Do not store plants in airtight containers.

Plant stock within four hours of harvest. If plants are a willow species, plant in the riparian zone on that portion of the slope where the plant stem ends will be in contact with year-round moist soil as determined by the Agency. Make planting holes by forcing a steel bar or similar tool into the ground about 12 inches deep. Place the cuttings into the holes and tamp soil firmly around the stems, leaving a minimum of 6 inches showing. Vary these dimensions as required for larger plant cuttings.

01040.51 Planting Wetland Plants - When planting wetland plants, do not use soil amendments, mulch, or fertilizer. Plant rhizomes, tubers and plugs within the upper 2 inches to 3 inches in exposed muddy or moist soils. When the water depth reaches or exceeds 1 inch notify the Agency of the potential need for adjustment to the planting.

01040.52 Placing Sod Lawn - Place sod only after approval of the Agency. Immediately before placing sod, water the soil bed to prevent drying of grass roots. Lay the first sod row in a straight line, then place subsequent rows parallel to and tightly against each other, staggering lateral joints. Do not stretch or overlap the sod. Tightly butt all joints. Do not use sod segments containing less than 2 square feet of surface area.

After placement, diagonally roll and thoroughly water the sod. Apply a second application of fertilizer (22-16-8) at the rate of 510 pounds per 100 square yards and thoroughly water.

01040.53 Mulch - Apply mulch according to the following:

(a) Ornamental Plant Bed Areas - Submit a 15 pound sample of bark mulch to the Agency for visual inspection and approval. The approved sample will be the standard of acceptability for all mulch used on the Project.

Apply bark mulch after beds are made free of weeds and debris, the surface is brought to a smooth finished grade, and all planting work (except for vines and groundcovers) is complete. Uniformly bark mulch planted areas to a nominal depth of 2 inches with bark mulch. Apply bark mulch so that it presents a smooth and even appearance as approved by the Agency (raking may be required).

Keep bark mulch off plants, structures, roadways, shoulders, walks, and lawns. Uncover all plants covered by mulch material as soon as possible and leave the site in a neat, clean and finished appearance. When planting vines or groundcover, rake bark mulch away from planting pits so that the bark is not contaminated. After planting, evenly spread excess soil and rake bark mulch back into place.

Replace bark mulch that is displaced or blown away, and correct to the specified depth any bark mulch placed to a greater than specified depth, at no additional cost to the Agency.

Spread rock or cinder mulch to a depth of 2 inches after planting trees and shrubs.

(b) Non-Ornamental Plant Bed Areas - Apply mulch according to one of the following methods:

(1) Straw Mulch - Spread grass straw mulch to a nominal 2 inch depth and tackify, after planting of tubeling plants and seeding as required.

(2) Wood Chips - Spread wood chips to a nominal depth of 2 inches. Add 15 pounds of Ammonium Nitrate/1000SF to neutralize nitrogen loss.

01040.54 Water - Water all plants at intervals as required to maintain and promote healthy growth. Avoid excessive watering of shrub bed areas that may leach herbicide and damage adjacent lawns or desirable or protected vegetation. Repair all lawn vegetation damage at no additional cost to the Agency.

(a) Pressure Moisture Stress Sensor - When a pressure moisture stress sensor is specified, the Agency will test a 1% to 5% representative sample to ensure that the moisture stress level is below 20 bars of pressure and inform the Contractor if any material exceeds this limit. Any plant material found to have greater than 25 bars of pressure will be considered to be under extreme moisture stress. Provide sufficient water within 24 hours to bring the plant into normal range. The Agency will retest to determine the new representative pressure. Plant material that have 30 bars or greater will be considered to have reached its permanent wilting point. Replace all such material during the next planting period. Testing will occur mid-day at the following times until the end of the establishment period(s):

- After plant delivery, during temporary storage, and before planting.
- At one-month intervals throughout the summer season, up to the first fall rain or snow.
- At weekly intervals during extremely hot or dry summer periods.
- Any time the Agency believes the plant material may be under stress.

(b) Timed-Release Water - Apply timed-release water containers when specified. Cut the bottom from the carton, dig a hole next to the plant and place so the contents touches the root ball or root area approximately 4 inches beneath finish grade, or according to the manufacturer's directions. Fill soil back around the carton to hold it firmly in place. Apply one carton for seedlings and tubelings, two cartons for No. 1 containers, and four cartons for larger plant material.

(c) Moisture Retention Chemicals - Utilize moisture retention chemicals according to the manufacturer's recommendation, depending upon specific applications.

01040.55 Miscellaneous Items - Place or install miscellaneous items as follows:

(a) Boulders - Place boulders in locations as shown. Do not scar or break boulders with equipment. Ensure that one-third to one-half of each rock is buried beneath finish grade. Verify all rock placement with the Agency prior to installation.

(b) Tree Grates - Install grates, frames, and appurtenances as shown and according to the manufacturer's recommendations. Place frames flush at sidewalks and place guards plumb according to the manufactures recommendations.

(c) Weed Control Geotextile - Place weed control geotextile at finish soil grade when planting is complete but before mulch placement begins. Place weed control geotextile with a minimum 4 inch overlap between rolls, turned under edges, and attached to the ground as recommended by the manufacturer.

(d) Woody Course Debris - Place woody course debris within the stream channel, facing upstream at approximately 45 degrees from the stream bank, or as shown or as directed. Anchor woody course debris to the stream channel bottom as shown.

(e) Anti-transpirant - Apply anti-transpirant according to the manufacturer's directions to all exposed foliage surfaces immediately before materials are delivered to the Project, or as otherwise specified. Provide certification of compliance.

(f) Game Repellent - Apply a game repellent to all exposed foliage surfaces immediately after materials are planted, or as otherwise specified. Re-apply to each plant every 120 days, or according to the manufacturer's printed instructions, until the end of the plant establishment period.

(g) Browsing Protectors - Install browsing protectors according to the manufacturer's recommendations.

(h) Root Barrier - Install root barrier according to the manufacturer's recommendation.

(i) Tree Stakes and Ties - Place tree stakes parallel with the prevailing winds and drive vertically into the ground at least 12 inches below the planting hole depth, or as shown. Do not drive stakes through the root ball.

(j) Trunk Wraps - Wrap tree trunks with the specified wrap, covering all exposed trunk between finish ground and the first whorl of tree branches.

01040.56 Cleanup During Construction - Maintain the Project in a neat, orderly condition. Remove unsightly construction materials at the end of each working shift. Clean all pavement surfaces of mud, debris, or other materials that may, in the opinion of the Agency, cause problems. If material is not removed, the Agency reserves the right to have the cleanup work performed and deduct the value of this work from the monies otherwise due the Contractor.

Plant Establishment

01040.70 General - The Contractor is responsible for the survival of all plant material until the end of a plant establishment period of one calendar year. The plant establishment period will begin when all the original planting is complete. The original planting is considered complete when all the plant material has been planted to the satisfaction of the Agency.

Establishment period work includes removing all plants that have reached their permanent wilting point, are dead, dying, or which do not meet Specifications, and replacing them with healthy plants. All plants in place after this replacement will be recognized as the original planting and will be subject to the establishment specifications. Repair, restore, and replace all plantings that have been damaged by vehicles, vandalized, and stolen according to 00170.80.

01040.71 Plant Care and Success Criteria - During the plant establishment period, maintain plants in a vigorous growing condition by regularly doing the following:

- Watering and fertilizing sufficiently to promote growth.
- Weeding, cultivating, pruning, and repairing.
- Adjusting tree stakes and guys.
- Controlling weeds before they seed according to 01040.48.
- Controlling pests and noxious weeds before the reproductive cycle.
- Removing dead or non-vigorous plants.
- Replacing missing plants.
- Re-mulching of plant bed areas.

The determination of a successful plant establishment period will be made at periodic plant establishment inspections. A successful planting establishment for each inspection is defined as follows:

- All plants are surviving and have vigorous growth.
- Plants are free of insects and disease.
- Plants show signs of continuing health.
- Plants have not reached permanent wilting point.

At the discretion of the Agency, certain types of regularly spaced plantings such as groundcovers may be measured using an area sampling method. To determine the rate of survival, set out (delineate) representative plots measuring 100 square feet at the completion of the original planting at random locations in each general planting area. The representative plots will be mutually agreed upon between the Contractor and the Agency. Mark the plot corners with permanent markers such as re-bar, including date and identification. Delineate a minimum of three plots per acre of new planting area.

The use of representative plots is intended to simplify the measurement of planting establishment work. If work within the representative plots does not accurately reflect the condition of the entire planting area(s), the Agency reserves the right to reject all establishment work.

01040.72 Periodic Inspections - During the plant establishment period, the Agency will make three plant establishment inspections jointly with the Contractor at the following times:

- Spring, early May
- Summer, mid July
- Fall, late September

Depending on when the establishment period begins, one of the above inspections will be the final inspection.

During each plant establishment inspection, the Agency may determine, based upon the specified success criteria, that corrective work is required. If so, the Agency will provide the Contractor with a written notice of required corrective work sent by hand-delivery or mail.

01040.73 Corrective Work - Complete all corrective work within 15 calendar days after receiving the written notice of the required corrective work to be taken. The 15 day requirement excludes those days the Agency determines to be impractical for working.

The Contractor will be allowed to replace plants outside the Planting Season to perform corrective work after each periodic inspection.

Provide plant replacements of the same variety, size, and quality as specified for the original plants, unless otherwise approved.

Notify the Agency when the corrective work is complete. When the corrective work has been re-inspected and is completed to the satisfaction of the Agency, the appropriate partial payment due the Contractor will be made.

If the Contractor does not perform the corrective work within the 15 day period after written notification, excluding those days the Agency determines to be impractical for working, the Agency may have the corrective work done by others and deduct the entire cost of the corrective work from monies due or to become due the Contractor under the Contract.

01040.75 Weed Control - Provide weed control according to 01030.42.

01040.77 Plant Establishment (Ornamental Areas) - In addition to these plant establishment requirements, perform the following:

(a) Watering, Fertilizing, and Mulching - Water all plants at the required intervals using the installed permanent or temporary irrigation systems, or such means as has been established for the Project. Avoid excessive watering of shrub areas adjacent to lawns that may leach herbicide and damage the lawn. Repair damaged lawns at no additional cost to the Agency.

If specified for the original planting, re-fertilize plants to promote vigorous growth.

Maintain the plant bed mulch at a 2 inch depth during establishment, unless otherwise specified. Rake to a smooth and even finish grade.

Remove all timed-release water cartons that have not bio-degraded by the end of the establishment period.

(b) Trimming and Pruning - Prune in order to enhance the natural growth of plants, eliminate dead growth and crossing branches, maintain growth within available space, minimize overgrowth onto walks and walls, and minimize tree canopy damage from winds.

Prune during the dormant season unless otherwise specified. Remove and dispose of all dead and critically damaged plant material to maintain the overall appearance of the Project.

(c) Transplanted Specimen Plants - Care for transplanted specimen plants immediately after the planting work is completed. Water, fertilize, and protect specimen plants against disease and infestation as required to ensure the plants remain healthy and vigorous. Final acceptance of transplanted specimen plants will depend on plant health and condition.

(d) Sod Lawn - Mow, cut and fertilize sod lawns as required to maintain a healthy and vigorous condition. A schedule of feeding, mowing, and general treatment, including thatching and aeration will be listed in the Special Provisions. Final acceptance of sod lawn areas will depend on its health and condition. Keep sod lawns mowed to a height between 1 1/2 inches to 2 inches.

Do not perform the first mowing until the sod is firmly rooted and secure in place. Remove no more than one-third of the grass leaf during initial or subsequent cuttings.

01040.78 Plant Establishment (Mitigation or Other Non-Ornamental Areas):

(a) Watering and Mulching - Water all plants as necessary to promote and maintain growth using temporary irrigation methods. Keep planted areas raked to a smooth and even finish grade. Maintain mulch within plant saucers at a 2 inch depth, unless otherwise specified.

(b) Weeding - Perform weed control activities according to 01030.42.

(c) Soil Testing and Corrective Soil Amendments - If specified for the original planting, have a soil test performed by a soil ecology lab between the second and third periodic inspection. Present the recommendations to the Agency at the third inspection. Apply the amendments as recommended by the soil test report and as directed by the Agency.

01040.79 Final Inspection - After plant replacement work and any other required work has been completed, the Agency will make a final inspection. Ensure that all plant materials, planting beds and other facilities are according to the Specifications as a prerequisite for acceptance.

Measurement

01040.80 Measurement - The quantities of plantings and associated work performed under this Section will be measured according to the following:

(a) Soil Testing - Soil testing will be measured on the unit basis for each test that is completed and accepted. Soil testing includes the required sampling, testing, analyses, and reports for one or more of the following:

- Soil particle size range test.
- Soil fertility test and soil amendment report (including chemical analysis, acidity, salinity).
- Soil ecology analysis and soil bio-amendment report.

(b) Topsoil and Wetland Topsoil - Topsoil and wetland topsoil will be measured on the volume basis in the hauling vehicle.

Topsoil taken from the required excavations according to 00330.10 will be measured according to 00330.82.

(c) Soil Conditioners - Soil conditioners will be measured on the volume basis in the hauling vehicle or in containers delivered to the Project site.

(d) Plant Materials - Plant materials will be measured according to one of the following:

- **Unit Basis** - Under this method, plant materials will be measured on a unit basis.
- **Average Area** - This method may be used when a plant bed area is greater than or equal to 3,000 square yards and will be measured as follows:
 - The total plant bed area will be measured along the ground surface by the foot and calculated to the nearest square yard.
 - A total number of 30 square yard plots will be calculated.
 - 1% to 5% of the plant bed area will be selected and staked as 30 square yard representative plots.

- All the plants in each staked representative plot will be counted. Unless otherwise approved, if the number of plants in a plot exceeds the number of required plants of the representative plot, the number of required plants will be used to represent the plot.
- Based on the results of the plant count, the average number of plants per plot will be calculated.
- The quantities of each item will be based on the calculated average number of plants per plot multiplied by the number of plots in the total plant bed area.

(e) Sod Lawn - Sod lawn will be measured on an area basis on the ground surface and calculated to the nearest square yard.

(f) Mulch - Mulch will be measured on the volume basis in the hauling vehicle, or on the weight basis.

(g) Miscellaneous - Miscellaneous items will be measured as follows:

- **Tree Grates** - Tree grates will be measured on a unit basis. One grate includes two half grates, frame, hardware, tree guards, and appurtenances.
- **Woody Course Debris** - Woody course debris will be measure on a unit basis.
- **Boulders** - Boulders will be measured on a unit basis or on the weight basis.
- **Root Barrier** - Root barrier will be measured on the length basis.
- **Weed Control Geotextile** - Weed control geotextile will be measured on the area basis on the ground surface and calculated to the nearest square foot.

Payment

01040.90 Payment - The accepted quantities of plantings and associated work performed under this Section will be paid for according to the following:

(a) Soil Testing - Soil tests will be paid for at the Contract unit price, per each, for the item "Soil Testing".

Payment includes mobilization, soil sampling, testing, analyses, and preparation of the soil amendment and bio-amendment reports.

(b) Topsoil and Wetland Topsoil - Topsoil, not taken from required excavations, will be paid for at the Contract unit price, per cubic yard, for the item "Topsoil".

Wetland topsoil, taken from either the Project excavations or imported from other sites, will be paid for at the Contract unit price, per cubic yard, for the item "Wetland Topsoil".

Topsoil taken from required excavations according to 00330.10 will be paid for according to 00330.94.

No payment will be made for topsoil or wetland topsoil that is placed in nondesignated areas or which is contrary to the Agency's instructions.

(c) Soil Conditioners - Soil conditioners will be paid for at the Contract unit price, per cubic yard, for the item "Soil Conditioner".

(d) Plant Materials - Plants will be paid for at the Contract unit price, per each, for the appropriate items listed in the Contract Schedule of Items. Plant materials will be listed by caliper size, size of container, or other size, or condition shown.

Transplanted plants will be paid for at the Contract unit price, per each, for the item "Transplanted Specimen Plants".

Partial payments for plant materials will be made as follows:

At the time of the original planting.....	30%
After the first plant establishment inspection.....	10%
After the second plant establishment inspection	10%
After the third plant establishment inspection	10%
At completion of the establishment period	40%

Partial payments made throughout the establishment period will be made for all surviving and replaced plants.

Upon completion of the establishment period, full payment will be made for all surviving and replaced plants, except for corrective work performed by others according to 01040.73 The Agency will pay the Contract unit price only once for the specified quantity, whether or not plants are replaced.

If the Contractor requests partial payment for plant materials on hand, payment will be made according to 00195.60.

(e) Sod Lawn - Sod lawn will be paid for at the Contract unit price, per square yard, for the item "Sod Lawn".

(f) Mulch - Mulch will be paid for at the Contract unit price, per unit of measurement, for the following items:

Pay Item	Unit of Measurement
Bark Mulch	Cubic Yard
Cinder Mulch.....	Cubic Yard
Wood Chip Mulch.....	Cubic Yard
Grass Straw Mulch.....	Ton
Rock Mulch	Ton

(g) Miscellaneous - The accepted quantities of miscellaneous items will be paid for at the Contract unit price, per unit of measurement, for the following items:

Pay Item	Unit of Measurement
Tree Grates.....	Each
Woody Course Debris.....	Each
Boulders.....	Each or Ton
Root Barrier.....	Foot
Weed Control Geotextile.....	Square Foot

01040.90(g)

Payment will be payment in full for furnishing and placing all materials, and for furnishing all equipment, labor, and incidentals necessary to complete the work as specified.

No separate or additional payment will be made for:

- soil amendments
- lime, gypsum, or trace minerals
- soil bio-amendments
- fertilizer
- herbicides
- anti-transpirants
- game repellent
- browsing protectors
- pesticides
- trunk wraps
- tree stakes and ties
- water
- timed-released water
- pressure moisture stress sensors
- mulch materials required as part of replacement planting
- corrective work during the plant establishment period