

PART 01000 - RIGHT OF WAY AND SITE DEVELOPMENT AND CONTROL

Add new Section 01020 Existing Tree Protection as follows:

Section 01020 – Existing Tree Protection

Description

01020.00 **Scope** - This work consists of protecting existing trees from damage.

01020.02 **Definitions-**

Arborist – A specialist in the care and maintenance of trees certified by the International Society of Arboriculture (ISA).

Caliper - The diameter of the tree trunk measured 6 inches above mean ground level in inches. If caliper is greater than 4 inches, measure as Diameter at Breast Height (DBH).

Critical Root Zone (CRZ) - The area around the trunk of the tree that:

(a) Has a radius of 1.5 feet per inch of tree diameter at breast height of the tree trunk or trunks; or

(b) Encompasses an area determined for an individual tree to be the necessary root area for the trees continued normal growth as demonstrated in a written report by a certified arborist and based on a documented field investigation and non-destructive physical testing, including, but not limited to non-destructive excavation to delineate the root system to a minimum depth of 24 inches below grade, and no more than 48 inches below grade.

(c) For trees 4 inches in diameter or smaller, is an area with a radius of at least 5 feet from the trunk.

Designated Trees – Trees to be protected, as indicated on the plans or by the Engineer.

Diameter at Breast Height (DBH) - The diameter of a tree trunk or trunks measured at 4.5 feet above mean ground level at the base of the trunk or trunks. When there are multiple trunks, the diameter at breast height will be established by considering the two largest trunks measured at 4.5 feet above mean ground level at the base of the trunk or trunks.

Zone of Protection - The area of the Critical Root Zone to be protected by fencing or other means.

Materials

01020.10 **Protective Fencing** – Fence shall consist of wood, chain link, or plastic construction fencing.

Equipment

01020.20 General - Critical Root Zone Excavation requires non-destructive equipment such as a vacuum excavator, an air spade (a device using compressed air sufficient to enable excavation of densely packed soils without the use of a bit or blade), and/or hand tools and additional time to ensure that roots are not damaged and are protected when uncovered. The Engineer will approve the need for the use of these specialized tools and measures in order to qualify an excavation as a Root Zone Excavation pay item.

Construction

01020.30 **General** – Ensure that work meets the following requirements:

01020.31 **Protective Fencing** - Obtain approval of protective fencing from Engineer prior to installation. Install protective fencing according to the Plans. Fencing shall surround the Zone of Protection. Maintain fencing throughout construction. Re-install fencing or replace if damaged. Protective fencing shall be removed following the completion of all construction activities. Obtain approval of the Engineer prior to removing the fencing.

01020.32 **Posting** - When and as directed, post the Zone of Protection with sign provided by the Engineer. Attach sign to the protective fencing. Maintain and protect the sign until completion of the construction. Obtain approval of the Engineer prior to removal of the sign.

01020.33 **Notice** - Notify all workers, including subcontractors, of the requirements to protect Designated Trees using notice provided by the Engineer.

1020.34 **Root Pruning** - The Contractor shall provide a minimum of 72 hour notice to the Project Inspector before work begins in a CRZ.

Prune roots encountered during construction that are outside the Zone of Protection with an approved root-pruning device. Make clean cuts. Do not leave split or frayed ends. Obtain approval from Engineer prior to cutting roots larger than two inches (2") in diameter. Backfill exposed roots as soon as possible with native material, loam, or cover with wet burlap or other approved material.

01020.35 Watering - Water existing trees if required by the plans or directed by the Engineer. When watering is required, place 2"-3" of approved bark mulch within the Zone of Protection for moisture retention purposes. Place one inch of water per week over the entire Zone of Protection, or as otherwise directed by the Engineer.

01020.36 Critical Root Zone Work - Work in the CRZ requires careful execution and may require the use of specialized equipment per 01020.20 and additional time to ensure that roots are not damaged, and protected when uncovered. Use approved equipment to methodically uncover roots and excavate around root as directed by the Certified Arborist. Where roots are to be left in place, do not disturb or damage the bark surrounding the roots.

01020.39 Prohibited Activities - The following activities are prohibited and may result in damage assessments or penalties:

- Cutting or damaging of roots or branches two-inches (2") in diameter or larger without approval by the Engineer.
- Damaging tree bark.
- Removal of protective fencing or notice prior to approval of the Engineer.
- Activities prohibited within the Zone of Protection include, but are not limited to, construction, operation of machinery, storage of materials, paving, grading, cutting, filling, travel within, dumping, disposal of construction waste, and parking of vehicles and equipment.

Measurement

01020.80 General - The quantities and work associated with tree preservation will be measured by the applicable basis as follows:

- Lump Sum Basis - No separate measurement will be made for lump sum items.
- Length Basis - The quantities of tree protective fencing will be measured on the length basis. Measurement will be from center to center of posts, measured along the line and grade of each run of fence constructed.
- Hourly Basis – For consultation, investigation, or pruning work by the project Arborist.
- Root Zone Excavation - The quantities for Root Zone Excavation will be measured on the hourly time basis to the nearest quarter hour (15 minutes) for active excavation time only.
- Unit Basis – The quantity of tree watering will be measured on a per tree per week basis.

Payment

01020.90 General - Payment will be payment in full for furnishing and placing all materials and performing all work, including furnishing all equipment, labor, and incidentals necessary to complete the work as specified.

<u>Pay Item</u>	<u>Unit of Measurement</u>
(a) Tree Protection Fencing.....	Foot
(b) Tree Watering.....	Each
(c) Critical Root Zone Excavation.....	Hour
(d) Arborist.....	Hour

Item (c) includes all equipment, tools and labor to excavate within the CRZ.
Item (d) includes consultation, investigation, or pruning work by the project Arborist.

01020.97 Incidental - When the Schedule of Items does not indicate payment for work items under this Section, it will be considered incidental and no separate payment will be made.

01020.98 Penalties and Damage Assessments - Damages of five hundred dollars (\$500.00) per incident will be assessed for the first violation of these requirements. Subsequent violations may result in application of the City's civil penalty matrix with fines of up to \$5000 per incident.

In addition, actual tree damage such as trunk scoring and broken limbs or damaged roots inside the Zone of Protection will be assessed according to the percentage of loss of tree value per City of Eugene Code.

Section 01030 - Seeding

Description

01030.00 Scope - This Work consists of seeding and associated tasks to develop plant growth for erosion control, lawn establishment, restoration and environmental mitigation, and Roadside development.

01030.01 Contractor's Qualifications - A valid Oregon Landscape Contractor's license and a valid Oregon Landscape Business License are required.

All work of this section, with the exception of placing temporary compost and performing temporary seeding, shall be performed by a single firm specializing in landscape work. Supply and application of landscape materials (topsoil, mulch, seed) by automated equipment may be performed by others under the direction of the Landscape Contractor.

The landscape contractor shall have at least two years prior experience on landscaping projects of similar scope. Submit names, addresses, and dates of previous projects, and owners' contact information, if requested by the Engineer.

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) Protected Areas - Defined areas such as wWetlands, 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 on the City's Invasive Species Prohibited Plant List, 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 53 percent 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
- 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 percent and germination is 90 percent. 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 Plans or 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.
- **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. Submit the seed and seed mixes to be used on the project according to 00150.37.

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 percent nitrogen, 16 percent phosphoric acid, 8 percent soluble potash, and including a minimum of 2 percent sulfur. Furnish fertilizer containing not less than 50 percent 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 percent nitrogen, 10 percent phosphoric acid, 5 percent soluble potash, and including a minimum of 10 percent sulfur. Furnish fertilizer containing not less than 50 percent 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 22-11 low_phosphorus fertilizer analyzing 22 percent nitrogen, 2 percent phosphorus, and 11 percent potassium which releases slowly over an eight to nine month period. Furnish fertilizer containing a minimum of 60 percent 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 percent controlled-release.

(4) Seeded Lawn

- Lawn Starter Fertilizer – Fertilizer containing a minimum percentage by weight of 16 percent nitrogen, 16 percent phosphoric acid and 16 percent potash.
- Lawn Establishment Fertilizer – Ammonium sulfate.

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 materials 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 - 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, ± 5 percent, and labeled with the manufacturer's name and air-dry weight. Include enough green dye tracer so applied mulch is easily visible.

(b) Straw - 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.
- Straw mulch to be used within rain gardens, swales or other surface stormwater facilities or within 50' of a water feature, wetland or other natural resource shall be from a native grass. Straw shall be from a species native to the Southern Willamette Valley ecoregion and shall be appropriate to the hydrology and soil conditions of the site. Native grasses for straw may include: Spiked bentgrass (*Agrostis exarata*), tufted hairgrass (*Deschampsia cespitosa*), blue wild rye (*Elymus glaucus*), Sitka brome (*Bromus sitchensis*), California brome (*Bromus carinatus*), and California oatgrass (*Danthonia californica*).

(c) Compost - Commercially manufactured medium compost material meeting the requirements of Section 03020, unless otherwise approved.

(d) Seeding Soil – Furnish commercially produced material formulated for growing turf grass that is comprised of river sand, aged sawdust, bark, potash, pumice, silica sand, mycorrhizal fungi and specified Lawn Starter Fertilizer.

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 percent 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 1 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*)

(c) Seeding Compost Blanket Tackifier - Furnish commercially produced tackifier and bacteria and fungi nutrient resource which is comprised of natural and biodegradable organic ingredients. Ingredients shall consist of a blend of organic sucrose, hydrophilic powder from natural sources, and seed meal from the genus *Gossypium*, or approved equal.

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 specified, noxious and other weed species commonly seen in Oregon. Some examples of potentially acceptable credentials are at least 1 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.

The weed control coordinator duties include:

- 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 - A valid Oregon Commercial Pesticide Applicator license, a valid Oregon Commercial Pesticide Operator license, and appropriate Chemical Registration are required. Furnish evidence to the Agency that each applicator is licensed for the specific application categories and class of chemical being applied and that Operators license is current. 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.

~~**(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. Notify the Agency of the area to be seeded at least 7 Days before seeding begins. 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 3 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 do not remain or become disburbed 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.
- 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 Contractor'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 2 months or longer before being disturbed again~~ per the timelines in 00280. 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~~15. If new lawn areas are regularly watered, they can be seeded from March 1 through ~~November~~October 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 of 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 3 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.

(c) **Seeded Lawn** - Apply Lawn Starter Fertilizer at the rate of 1.5 lbs actual nitrogen per 1000 sq.ft. Apply the fertilizer either immediately prior to the seeding or during seeding if appropriate to the Seed Application method specified.

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) **Method 1: 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) **Method 2: 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, except when compost material is used, apply them separately. When applied from separate compartments, the application may be done in one operation 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:

a. Straw 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. If straw mulch is applied using a mechanical blower, a tackifier must also be applied over the straw mulch.

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.

b. Compost Material Mulch - Evenly apply compost material mulch with a pneumatic blower or other Equipment that propels the material directly at the Soil surface and achieves direct contact with the Soil. Apply compost at a uniform depth of 2 inches. Apply at least 3 feet over the top of the slope or overlap the material into existing vegetation.

When seed is required, apply it by one of the following methods:

1. Two-Step Pneumatic Application:

- **Step 1** - Apply compost to a uniform depth of 2 inches with a pneumatic blower or other Equipment that propels the material directly at the Soil surface and achieves direct contact with the Soil.
- **Step 2** - Uniformly mix seed with additional compost material and apply the combined seed and compost material over the first layer to a depth of 1/4 inch with a pneumatic blower or other similar methods.

2. Two-Step Pneumatic and Hydroseeding Application:

- **Step 1** - Apply compost to a uniform depth of 2 inches with a pneumatic blower or other Equipment that propels the material directly at the Soil surface and achieves direct contact with the Soil.
- **Step 2** - Hydroseed over the first layer according to 01030.48(a) except do not use fertilizer unless shown.

(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) Method 3: 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) Method 4: 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) Method 5: Seeding Compost Mulch - Evenly apply seeding compost mulch, incorporating seed and fertilizer at the specified rates, with a pneumatic blower or other equipment that propels the material directly at the soil surface and achieves direct contact with the soil. Apply compost at a uniform depth of ½ to 1 inch. Apply at least 1 foot over the top of the slope or overlap the material into existing vegetation when applicable.

(f) Method 6: Seeding Soil - Evenly apply seeding soil material mulch, incorporating seed and fertilizer at the specified rates, with a pneumatic blower or other equipment that propels the material directly at the soil surface and achieves direct contact with the soil. Apply compost at a uniform depth of 1 to 2 inches. Apply at least 1 foot over the top of the slope or overlap the material into existing vegetation when applicable.

(g) Method 7: Seeding Compost Blanket - Evenly apply seeding compost mulch, incorporating seed, fertilizer, and seeding compost blanket tackifier; at the specified rates with a pneumatic blower or other equipment that propels the material directly at the soil surface and achieves direct contact with the soil. Apply compost at a uniform depth of min. 1 inch. Apply at least 1 foot over the top of the slope or overlap the material into existing vegetation when applicable.

(he) 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:**
 - **West of the Cascades** - 70 percent coverage of ground surface.
 - **East of the Cascades** - 30 percent coverage of ground surface.
- **Permanent Seeding:**
 - **West of the Cascades** - 90 percent coverage of ground surface.
 - **East of the Cascades** - 30 percent coverage of ground surface.
- **Wildflower and Wetland Seeding** - 70 percent coverage of ground surface.
- **Water Quality and Lawn Seeding** - 100 percent 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 01030.43 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 and until Third Notification is issued, 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, except at seeded lawns. At seeded lawns: After lawn has reached 1.5" height apply Lawn Establishment Fertilizer at rate of 1.5 lbs actual nitrogen / 1,000 sq.ft. Thoroughly water lawn areas after application.

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. Identify the source of water before seeding.

(3) Weed Control - Weed control includes identifying, killing, and removing Specified Weeds prior to weeds going to seed and keep the seeded areas Weed Free throughout the establishment period. Conduct weeding according to 01040.21 and as approved by the Agency. 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. Mow and maintain lawn areas at 2 inches tall, removing no more than 1/3 of the grass leaf at cuttings. After mowing, leave grass that is approximately 2 inches tall. At each subsequent mowing, leave about 4 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 Cleaning 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. Clean all hardscape surfaces that are impacted by the work of this section. Do not allow fertilizer or other products to stain or mar hardscape surfaces.

01030.71 Waste Disposal - Dispose of 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.
- **Lump Sum Basis** - No separate measurement will be made for lump sum items.

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.....	Each or Lump Sum
b) Seeding Mobilization.....	Each or Lump Sum
c) Temporary Seeding,	Square Foot or Acre
d) Permanent Seeding,	Square Foot or Acre
e) Wetland Seeding,	Square Foot or Acre
f) Water Quality Seeding,	Square Foot or Acre
g) Plant Seeding,	Square Foot or Acre
h) Native Plant Seeding,	Square Foot or Acre
i) Wildflower Seeding,	Square Foot or Acre
j) Lawn Seeding	Acre or Square Yard or Square Foot
k) Fertilizing.....	Square Foot or Acre
l) Mulching.....	Square Foot or Acre

(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.

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.

01040.01 Contractor's Qualifications - For landscape work: A valid Oregon Landscape Contractor's license and a valid Oregon Landscape Business License are required.

The landscaping work, with the exception of subgrade preparation, soil importation and placement, and landscape rough grading, shall be performed by a single firm specializing in landscape work.

The landscape contractor shall have at least two years prior experience on landscaping projects of similar scope. Submit names, addresses, and dates of previous projects, and owners' contact information, if requested by the Engineer.

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).

Co-dominant - Two or more vigorous and upright branches of relatively equal size that originate from a common point, usually where the leader has been lost or removed.

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.

Crown - The above ground part of the tree including the trunk.

Cultivar - A named plant selection from which identical or nearly identical plants can be produced, usually by vegetative propagation or cloning.

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.

Girdling root - A root that partially or entirely encircles the trunk and/or buttress roots, which could restrict growth and downward movement of photosynthate and/or water and nutrients up.

Included bark - Bark embedded within the crotch between a branch and the trunk or between two or more stems that prevents the formation of a normal branch bark ridge.

Kinked root - A primary root(s), which is sharply bent, causing a restriction to water, nutrient, and photosynthate movement.

Leader - The dominant stem which usually develops into the main trunk

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 collar - The flared area at the base of a tree where the roots and trunk merge. Also referred to as the "root crown" or "root flare".

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.

Scaffold branches - Large, main branches that form the main structure of the tree.

Specified Weed - See 01030.02 for specified weed definition.

Temporary branch - A small branch that is retained temporarily along the lower trunk of young trees.

Trunk - The main stem or axis of a tree that is supported and nourished by the roots and to which branches are attached.

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 - A valid Oregon Commercial Pesticide Applicator license, a valid Oregon Commercial Pesticide Operator license, and appropriate Chemical Registration are required. 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 or stormwater management facilities.
- **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 with other trades affecting and being affected by work under this Section.

Coordinate the following elements with the Agency prior to construction:

(a) Submittals - Contractor shall provide the following submittals for the Engineer's approval:

(1) Within 30 days after award of Contract:

- **Documentation of Procurement** - Invoices or other documentation that all plant material for the project has been procured. If substitutions are requested, the request shall be made at this time.
- **Substitutions** - Product data, samples, or other information for any other proposed substitutions shall be made at this time.
- **Contract Growing Plan** – when required by the Special Provisions. See 1040.19(g).

(2) At least 20 days prior to installation:

- 1 gallon sample of each type of mulch to be used on the project.

(3) At least 20 days prior to furnishing any type of topsoil or blended soil:

- Give the Agency notice of intent to use the specified source
- Provide soil test results for each imported topsoil type. Test Reports shall be no more than 12 months old.
- Provide access to the source for Agency inspection
- Provide one 1 gallon representative soil sample of each topsoil type, except for stormwater facility blended soil provide two 5 gallon samples
- Obtain approval of the source before excavation of topsoil begins
- For stormwater facility blended soil submit:

- Documentation for the two analyses described in section 01040.14(d)(2)(1) b. (particle gradation and pH) performed by an accredited laboratory with current certification. The date of the analyses shall be no more than 90 calendar days prior to the date of the submittal. The test results shall include:
 - i. Name and address of the testing laboratory.
 - ii. Phone contact and e-mail address for the laboratory
 - iii. Test data, including date and name of the test procedure performed
- For the compost component of the stormwater facility blended soil, a compost technical data sheet from the vendor. The analysis and report must conform to the sampling and reporting requirements of the US Composting Council Seal of Testing Assurance (STA) program. The analysis shall be performed and reported by an approved independent STA program laboratory and be no more than 90 calendar days prior to the date of the submittal.
- Up to two 5-gallon buckets of the blended material, as requested
- The location/ name of the source of the loamy soil.

(ab) Planting Work Plan - When required by the Special Provisions, wWithin 90 Calendar Days of Award of the Contract, submit a planting Work plan (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.

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

(de) Site Conditions - Ensure that the area is properly prepared prior to the start of the planting operation.

(ed) Utility Locate - Coordinate all existing Utility locations according to Section 00150.

(fe) 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.

(gf) Verification - Verify actual ground dimensions prior to construction. Notify the Agency of any discrepancies before beginning Work.

(h) Required Inspections - At a minimum the following inspections will be required:

- (1) Subgrade preparation and scarification
- (2) Planting area rough grade, after imported soil placement and prior to application of soil amendments
- (3) Shrub bed area finish grade, after placement and incorporation of amendments
- (4) Plant material - after delivery to the site and before planting
- (5) Plant layout - before planting
- (6) Lawn finish grade - prior to laying sod

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 - If required by the Special Provisions, fFFurnish 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, and 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 - If required by the Special Provisions, HhHave 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 X 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.

Twenty days before furnishing any type of Topsoil, furnish submittals in accordance with 1040.04~~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 - Unless otherwise called for in the Plans or Special Provisions, imported topsoil shall be Sandy Loam Topsoil. No imported topsoil shall be placed until the material and the source have been approved. At the Engineer's discretion, a reinspection of the source or additional testing may be required when the quality of the imported topsoil changes significantly during placement. Furnish imported topsoil conforming to the following:

(1) Premium Topsoil – Furnish topsoil which has characteristics similar to Newberg Fine Sandy Loam (95 Newberg), Newberg Loam, (96 Newberg) as defined in Soil Survey of Lane County Area, Oregon, SCS, 1987, Table 13, Physical and Chemical Properties of Soils. Premium topsoil shall be tested using the methods given in Soil Survey Methods Manual Soil Investigations Report No. 42, Version 3.0 NRCS, 1996 or comparable. If native soil is used the Contractor shall submit SCS maps, soil tests, or other additional supporting information documenting the source for approval by the Engineer, along with samples at least 48 hours prior to the start of construction.

Imported topsoil shall be friable and free from: materials toxic to plant growth; noxious weed seeds, rhizomes, roots; subsoil; stones and other debris. The topsoil shall conform to the following:

Clay	7% - 15%
Sand	40% - 50%
Silt	30% - 40%
Organic Matter	2% - 4%
pH Range	5.6 - 6.5

One hundred percent of the imported topsoil shall pass through a 1 inch screen. The maximum percentage retained on a 1/4 inch screen shall not exceed 20 percent by volume. Of the Material passing the 1/4 inch screen, the maximum allowable percentage of gravel retained on a Number 10 screen shall not exceed 10 percent by weight. The Contractor shall submit soil test reports including a nutrient analysis along with samples at least 48 hours prior to placement of the imported topsoil. Test reports shall be no more than twelve months old.

(2) Sandy Loam Topsoil – Furnish a consistent and well-blended mix which conforms to the following standards:

Clay	5% - 15%
Sand	40% - 60%
Silt	35% - 55%
Organic Matter	2% - 4%
pH Range	5.6 - 6.5

(b) Imported Topsoil - Furnish imported Topsoil from non-Agency controlled lands that, when tested according to AASHTO T 88, meet 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 µm	20 - 80 (Retained)
Less than 2 µm	5 - 30 (Passing)

In addition, furnish Topsoil that analyzes at least 2 percent organic matter according to ASTM D2974.

(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.

(d) Stormwater Facility Blended Soil - Following the general provisions for topsoil, and incorporating the following requirements, furnish imported blended soil for all vegetated stormwater facilities conforming to the following:

(1) General Composition - Use a blended material incorporating loamy soil, sand, and compost that is 30-40% compost by volume and meets the other criteria in this specification. The loamy soil shall be subsoil taken from at least 12 inches below vegetative cover.

~~Use material that is any blend of loamy soil, sand, and compost that is 30-40% compost (by volume) and meets the other criteria in this specification. The loamy soil must be subsoil taken from at least one foot below grade to reduce the potential for contaminants such as weed seeds.~~

(2) Analysis Requirements for the Blended Material:

a. Particle Gradation - A sieve analysis of the blended sand and soil, not including compost, shall be conducted in conformance with ASTM C117/C136, AASHTO T11/T27, ASTM D7928/D1140, or ASTM D6913. The analysis shall include the following sieve sizes: 1 inch, 3/8 inch, #4, #10, #20, #40, #60, #100, #200. The gradation of the blend shall meet the following gradation criteria. ~~A sieve analysis of the blended material, including compost, shall be conducted in conformance with ASTM C117/C136, AASHTO T11/T27, ASTM D422/D1140, or ASTM D6913. The analysis shall include the following sieve sizes: 1 inch, 3/8 inch, #4, #10, #20, #40, #60, #100, #200. The gradation of the blend shall meet the following gradation criteria.~~

<u>Sieve Size</u>	<u>Percent Passing</u>
1 inch	100
#4	85 75 – 100
#10	50 40 – 100
#40	20 15 – 60 50
#100	10 5 – 40 25
#200	10 – 20 5 15

b. Acidity - The pH (Power of Hydrogen) of the blended material shall be tested and be between 6 to 8.

(3) General Requirements for the Blended Material:

- The material shall be loose and easily broken into small pieces
- It shall be well mixed and homogenous.
- It shall be free of wood pieces, plastic, and other foreign matter.
- It shall have no visible free water.

(4) Compost –The compost shall be derived from plant material and may include pre- and/ or post-consumer food waste. Compost shall be ~~and~~ provided by a member of the US Composting Council Seal of Testing Assurance (STA) program. ~~Use of compost derived from street sweeping material is not allowed.~~ See www.compostingcouncil.org for a list of local providers.

Use or incorporation of compost derived from street sweeping material, manure, and biosolids is not allowed.

The compost shall be the result of the biological degradation and transformation of plant–derived materials under conditions designed to promote aerobic decomposition. The material shall be well composted, free of viable weed seeds, and stable with regard to oxygen consumption and carbon dioxide generation. The compost shall have no visible free water and produce no dust when handled. It shall meet the following criteria, as reported by the US Composting Council STA Compost Technical Data Sheet provided by the vendor:

- 100% of the material must pass through a 1/2-inch screen.
- The pH of the material shall be between 6 min. and 8.5 max.
- Manufactured inert material (plastic, concrete, ceramics, metal, etc.) shall be less than 1.0% by weight.
- The organic matter content shall be between 30 and 70% (dry weight basis).
- Soluble salt content shall be less than 6.0 mmhos/cm.
- Maturity Indicator shall be greater than 80% for Germination and Vigor.
- Stability shall be 'Stable' to 'Very Stable'.
- Carbon/Nitrogen (C/N) ratio shall be less than 25:1.
- Trace metals test result = "Pass."

(e) Stormwater Facility Blended Soil With Biochar - Following the general provisions for topsoil, and Stormwater Facility Blended Soil, and incorporating the following requirements, furnish biochar and zeolite for all planter soil mix conforming to the following:

(1) General Composition – Use a blended material incorporating ~~that is any blend of~~ loamy soil, sand, 5% biochar, 5% zeolite, and 20 to 25% compost ~~that is 20 to 25%~~ (by volume) and meets the other criteria in this specification. The loamy soil shall be subsoil taken from at least 12 inches below vegetative cover.

(2) Analysis Requirements for the Blended Material:

a. Particle Gradation – Biochar samples shall conform to particle size distribution requirements listed below. This shall be supported by laboratory analysis of particle size distribution by ASTM Method D422 or similar. Sieving and or rinsing shall be conducted as needed to meet these criteria. The gradation of the blend shall meet the following gradation criteria.

Sieve Size	Percent Passing
¼" (6 mm)	95-100
#8 (2 mm)	20 – 80
#50 (.3 mm)	0 – 20
#200 (.07 mm)	0– 5

b. Acidity - The pH (Power of Hydrogen) of the blended material shall be tested and be between 6 to 8.

(3) Suitability requirements for Biochar as an organic amendment

a. Table 3-4. Suitability requirements for biochar as an organic amendment:

Parameter	Test Method ¹	Requirement
Feedstock	None – Contractor certification	Must be produced from either a wood, nut shell, or coconut shell feedstock. May not be produced from grass or other friable feedstocks
Production Temperature Regime	None – Contractor certification	Shall be produced under pyrolysis or oxygen limited conditions and heated to a Highest Treatment Temperature (HTT) of at least 500 degrees Celsius
Post-production treatment	None – Contractor certification	May be treated after production to upgrade or otherwise alter material. All other required parameters must still be met.
Post-production processing	None – Contractor certification	Must be either rinsed or sieved to remove fine and coarse particles
Sieve Analysis	ASTM D422 or similar	See Table 3-5
pH	Saturation extract USDA Agricultural Handbook No. 60. Diagnosis and Improvement of Saline and Alkali Soils, method 21a, pg 102	< 11
Organic Carbon	Methods of Soil Analysis, Part 3 Chemical Methods, Soil Science Society of America, Inc., 1996. Combustion, chapter 34, pgs 965-977 & pgs 1001-2.	> 80%; dry weight basis

(4) Zeolite Amendment – Microporous aluminosilicate minerals commonly used as adsorbents and catalysts.

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. For mushroom compost and Peat moss only, 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) Commercially Manufactured Compost - Commercially manufactured medium compost material meeting the requirements of Section 03020, unless otherwise approved.

(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 or shown for the project:

(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. in tablet form. Mycorrhizal Applications, Inc. or Plant Revolution "MycoApply", or approved equal.

(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) General - Deliver fertilizers to the site in original, unopened containers bearing the manufacturer's guaranteed analysis, including 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 mass (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. All fertilizer products shall be uniform in composition, dry, free-flowing (if granular), or palletized and shall be approved by the Engineer prior to application.

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

(b) Type of Fertilizer – Furnish fertilizer according to the following:

(1) Shrub Planting Fertilizer - Slow release nitrogen form fertilizer with polymer-coated prills and containing a minimum percentage by weight of 14 percent nitrogen, 14 percent phosphoric acid, and 14 percent potash. Osmocote, Apex, or approved equal.

(2) Sod Starter Fertilizer - Conform to 01030.14(b)(3).

(3) Sod Establishment Fertilizer - Conform to 01030.14(b)(3).

~~**(a) Organic** – Organic fertilizer 5-4-3, analyzing 5 percent nitrogen, 4 percent available phosphoric acid, and 3 percent 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 *Flora of Oregon* by ~~Masters~~ Myers et. al., ~~and 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*, ANSI Z60.1 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. All plants shall be well-branched, full foliated when in leaf, with full and evenly spaced canopies and structural branches. The size, color and appearance of leaves shall be typical for the time of year and stage of growth of the species/cultivar. Leaves shall not be stunted, misshapen, tattered, discolored (chlorotic or necrotic) or otherwise atypical. All plants shall be free from weeds and weed roots. No cold-storage stock or over-summered balled and burlapped stock will be acceptable. Roots must be well established in containers, but plants shall not be rootbound.

~~Store all container-grown and balled and burlapped (B&B) plant materials acquired for fall planting a minimum of 3 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.

(1) Tree Quality - Trees shall be free of codominant stems and vigorous, upright branches that compete with the central leader. If the original leader has been headed, a new leader at least 1/2 (one-half) the diameter of the original leader shall be present.

The relationship between caliper, height and root ball size shall meet the American Standard for Nursery Stock standards. Trees shall be able to stand erect without a supporting stake.

If trees are high grafted, graft(s) shall be located at a minimum of 5' above the ground.

All trees shall have a minimum branching height appropriate for its species. The tree canopy shall be symmetrical and free of large voids. Clear trunk should be no more than 40% of tree height unless otherwise specified in the planting specifications. Scaffold branches shall be distributed evenly radially around the trunk and shall typically be minimum 6" apart vertically. The diameter of

scaffold branches shall be less than 2/3 the trunk diameter when measured 1" above the branch junction with the trunk and the attachment of scaffold branches shall be free of included bark.

The tree trunk shall be fairly straight, vertical and free of wounds (except properly made pruning cuts), sunburned areas, conks (fungal fruiting bodies), wood cracks, bleeding areas, signs of boring insects, galls, cankers/lesions and girdling ties. The crown shall show no signs of moisture stress as indicated by wilted, shriveled or dead leaves or branch dieback.

(2) Tree Root Condition at Planting - The trunk, root collar (root crown) and large roots shall be free of circling, and/or kinked roots. The point where the top-most root in the root ball emerges from the trunk shall be within two inches of the soil surface. The root system shall be free of injury from biotic (insects, pathogens, etc.) and abiotic agents (herbicide toxicity, salt injury, excess irrigation, etc.). Root distribution shall be uniform throughout the root system, soil mix or growth medium and growth shall be typical for the species and cultivar. The rootball periphery shall be free of large circling and bottom-matted roots.

Trees shall not be rootbound but shall be rooted into the root ball so that soil or medium remains intact and trunk and root ball move as one when lifted. The trunk shall not be loose but shall be firmly held within the root ball.

Root balls of trees shall be moist throughout and shall not be allowed to dry out at any time from the nursery to final planting. The roots shall show no signs of excess soil moisture conditions as indicated by poor root growth, root discoloration, distortion, death, or foul odor.

- a. Bare Root Trees** – Trees in a bare root condition are not to exceed 1.5" in caliper. Roots shall not to be allowed to dry out and must be kept moist at all times. Roots shall be well established and full of live and vigorous fibrous roots and larger structural roots.
- b. Balled and Burlapped and Trees in Wire Baskets** – Trees shall have a sound ball with a firm attachment of the trunk with the root ball.
- c. Container Grown Trees** - Trees shall have been grown in the current container for a minimum of one growing season and a maximum of two growing seasons.
- d. Trees Grown in In-ground Fabric Bags** – Trees shall have been grown in the bag for a minimum of one year.

(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 the 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~~³⁰ 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 submittals required under 01040.04(a)(1)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 percent (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 2 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 sites 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.

(f) Compost Mulch - Commercially manufactured medium compost material meeting the requirements of Section 03020, unless otherwise approved.

(g) 50/50 Blend Mulch – 50/50 homogenous blend of Bark Mulch and Compost Mulch.

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; All herbicides shall be delivered to the site in original, unopened containers clearly labeled with the manufacturer's brand name and recommended application instructions. The Contractor shall maintain on the site at all times the MSDS sheets for all pesticides used on the site, 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) 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 feet long for trees less than 8 feet tall, and stakes 8 feet 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. Deep Root Partners, L.P' Arbor Tie tree ties or approved equal.~~
- (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 Coarse 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.~~

(a) Pesticide Application - Use only when indicated on Plans or as directed. Notify Engineer prior to application for approval of product and application timing. Follow manufacturer's directions and all local, State and Federal regulations. Follow the current edition of the Oregon Weed Control Handbook, available through the OSU Extension Service. Person(s) applying products shall hold the proper license to apply pesticides and herbicides.

Use extra precautions to ensure that the spraying does not cause public alarm or drift onto adjoining properties.

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

Plant material located within irrigated areas may be planted at other times, upon written Agency approval.

(a) Trees – Perform all tree installation work as follows:

- Balled and burlapped, grow bag grown, and bare root trees shall only be dug, supplied, and planted between November 15 and April 15.
- Container grown trees shall only be planted from September 1 to May 15.

(b) Sod - Planting permitted between March 1 and October 1

(c) Plants:

- Balled and burlapped, grow bag grown, and bare root plants shall only be dug, supplied, and planted between November 15 and April 15.
- Container grown plants shall only be planted from September 1 to May 15.
- Wetland plants and plants in stormwater management facilities shall only be planted from October 15 to April 15.

~~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 ~~rip~~ subsoil that is not loose and friable ~~to a depth of 6 inches~~ according to 00330.48 and obtain approval from the Agency before placing Topsoil. Do not work saturated or Frozen subsoils.

(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~~ specified. If additional topsoil is required to meet final finish grade elevations, notify the Engineer. 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.

(e) Stormwater Facility Blended Soil:

(1) Protection of the Soil - The material shall be protected from all sources of contamination, including weed seeds, while at the supplier, in conveyance, and at the project site.

(2) Wet and Winter Conditions - Hauling and placement of the material will not be allowed when the weather is too wet or the ground is frozen or saturated as determined by the Owners Representative.

(3) Placement of the Soil - The material shall be placed in loose lifts, not to exceed 8 inches each and each lift shall be compacted with a water-filled landscape roller. The material shall not otherwise be mechanically compacted.

~~(4) Timing of Plant Installation - Weather permitting and as approved, plants shall be installed as soon as possible after placing and grading the soil in order to minimize erosion and further compaction.~~

(5)(4) Erosion Control - Temporary erosion control measures are required until permanent stabilization measures are functional. Coordinate erosion control measures with plant installation timing if planting is included in the Contract.

(6)(5) Protection of the Installed Soil - In all cases, the installed material shall be protected from foot or equipment traffic and surface water runoff. Temporary fencing or walkways shall be installed as needed to keep workers, pedestrians, and equipment out of the area. Under no circumstances shall materials and equipment be stored on top of the installation area.

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 ~~specified~~ 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 when specified, 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 is approximately three worms for each 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 1 month after the pesticide or fertilizer was applied.

01040.47 Fertilizers - Incorporate fertilizer based as directed under 01040.50 for each type of planting work 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). Hold finished grades 8 inches below siding around buildings and slope grade away from buildings per code. Do not proceed with soil preparation until rough grades have been approved by Engineer.~~

~~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) - ~~Perform rough grading to within 3" of finish grade and allowing for soil conditioners if specified on the Plans or in the Special Provisions. Grade according to the profiles or contouring shown on Plans. Hold grade 3" below adjacent walks, curbs, or turf areas, to allow for mulching. Spread the pulled-back soil evenly and do not create a mounded effect or low areas.~~

~~Cultivate plant beds and incorporate specified soil amendments and soil conditioners to a minimum depth of 8" Cultivate plant beds to a depth of 12 inches. Thoroughly mix 2 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) - ~~When directed in the Plans or Special Provisions, s~~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 1 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.

Apply lime at 50 lbs. per 1,000 sq.ft. and incorporate into soil to a depth of 4". Fine-grade and roll areas to be seeded or sodded with a 200 pound water-filled roller to provide a fine-textured, smooth, firm surface, free of undulations, irregularities or low areas that could create standing water.

(1) Sod Lawn Areas - 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.

(2) Seeded Lawn Areas - For areas to be seeded, grade so the final soil level, including any settled seed application mulch material, is 1/2 inch to 3/4 inch below edges of sidewalks, curbs, mowing strips, and utility covers. Scarify soil surface to 1/4 inch depth and a friable consistency for good soil seed contact.

(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 - Unless more specific instructions are provided in 01040.50, Plans or Special Provisions, pPlant 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.
- No planting shall occur unless specified irrigation system or other approved watering system is in place and fully automatically operational. If no irrigation system is in the Contract, Contractor's proposed watering method for plantings shall be approved by Engineer prior to planting. Irrigation system zones/heads shall not be used to provide initial watering during planting work. Ensure watering activities do not create erosion of surrounding soil.
- 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.
- 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.~~
- Perform initial watering and continue with the watering frequencies according to 01040.71.

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 tree spade unless otherwise directed. 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 the depth of 1 inch to 2 inches or to the grade~~ they grew naturally or as specified. 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 4 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.

Cuttings shall be planted according to the following instructions:

Use an iron stake, bar or water drill to make a pilot hole in firm soil. Plant the stakes butt-ends into the ground, with the leaf bud scars or emerging buds always pointing up. Do not damage the buds, strip the bark or split the stake during installation.

Rooting hormone may be used to enhance growth of stakes. Submit product information 10 days prior to use.

Set the stake as deep as possible into the soil, with 75 percent of its length into the soil. The stake shall protrude only to a maximum of one-quarter its length above the ground level to prevent it from drying out. At least 2 buds and/or bud scars shall be above the ground after planting. It is essential to have good contact between the stake and soil for roots to sprout. Tamp the soil around the cutting.

(h) Groundcover Plants - Do not allow plants to dry out. All plants shall be thoroughly watered when planting hole is onehalf backfilled and again immediately after planting. Water entire bed after planting.

Keep foliage on top of mulch. Planting of groundcovers may occur after mulching; however, soil from the planting operation may not be left on the mulched surface.

(i) Shrubs and Vines - All plants shall be thoroughly watered when planting hole is onehalf backfilled and again immediately after planting.

Set out plants at specified or shown distances and adjust so the plants fill the bed evenly. Contact Engineer for approval of final locations prior to planting. Make adjustments as directed.

Dig holes as necessary so that mulch will not cover lower branches and so that plant crown will sit minimum 1" and a maximum of 2" above finish grade. Holes shall be a minimum of two times the width of the root ball.

Remove all rock and other debris from plant holes and dispose off site.

Remove stock from container and slice root ball and spread out roots. Adjust plant in hole for proper elevation and best appearance.

Add and incorporate specified shrub planting fertilizer to backfill at the manufacturer=s recommended high rate. Backfill around plant, tamp, and water in so no air pockets are left near root ball.

Train and/or tie vine leaders to the structure on which it is to grow using appropriate means. Set upright growing plants straight and plumb.

(j) Bare-root Plants – Bare root plants shall be planted to the following instructions:

Dig holes to a depth and width that is at least 6" beyond the extent of the roots. Place plants so that the root collar or crown is level with the surrounding soil level.

Place the plant in the hole and straighten it so that it stands upright with no more than 20° of lean. Roots shall be planted straight and evenly in the hole. The main taproot shall be planted straight without "U" roots, "J" roots, or "L" roots. Lateral roots shall not be twisted, wrapped, or balled-up.

Backfill the hole with native soil that is free of debris. Use excess soil to form a berm on the downward slope to retain water.

All bare root plants shall be watered thoroughly immediately upon planting to settle the soil. Sufficient water shall be applied to thoroughly wet the soil around the roots and remove any air pockets.

(k) Trees – Use the following methods for transplanting trees unless otherwise specified:

(1) General - All trees shall be thoroughly watered when planting hole is one-half backfilled and again immediately after planting.

Set the tree on undisturbed solid ground in the center of the hole so that the root ball crown is a minimum of 2" and a maximum of 3" above final grade. Set tree plumb, and faced for best appearance.

No fertilizer will be added as part of tree planting.

For unirrigated trees: Add time release water product described in 01040.22 to the backfill at 1/2 the manufacturer's recommended rate. Spread the initial 1/2 (or 1/4 of manufacturer's rate) of the product under the rootball. Add the second 1/2 (or 1/4 of manufacturer's rate) of the hydrogel product at 6" below finish grade.

Gently backfill the hole full with original soil and flood hole to remove any air pockets.

Add mycorrhizal fungi inoculant product at 1/4 to 1/2 the depth of the root ball at the manufacturer's recommended rate. Place the tablets within 1" of the rootball.

Complete backfilling operation, establishing final grade as shown on Plans or otherwise specified. Thoroughly saturate planting area with water to remove any remaining air pockets.

If an irrigation system is not shown or specified for installation, create a continuous 3" min. (6" max.) high raised earthen berm around the hole to direct water to roots

(2) Bare-root trees - Roots shall not be allowed to dry out at any time.

- Dig tree-planting holes 1' wider than the spread of the root. The hole shall have sufficient depth to allow the trunk flare to be a minimum of 1" and a maximum of 2" above final surrounding grade.
- Leave a mound in the center of the hole and drape and spread roots in their natural position over mound.
- Backfill planting hole with excavated material and lightly compact. Ensure backfill covers all roots and backfill height is equal to the elevation of the trunk flare.

(3) Balled and burlapped trees - Dig a shallow, broad tree planting hole at least 1-1/2 times the diameter of the root ball and to a depth that will allow the root ball crown to be a minimum of 1" and a maximum of 2" above final grade.

- Cut off and remove wire baskets to a depth of 9" from the crown of the root ball.
- Remove tie material and peel back burlap to expose the root ball soil to a minimum depth of 9" from the crown of the root ball.

(4) Container grown trees and in-ground fabric bag-grown trees - Dig a shallow, broad tree planting hole at least 1-1/2 times the diameter of the root ball and to a depth that will allow the root ball crown to be a minimum of 1" and a maximum of 2" above final grade.

- Remove from the container or bag and carefully loosen root mass.
- Inspect roots for a girdling or circling condition. If girdling or circling roots are present, the tree shall not be planted.

(5) Staking and Guying Trees - Stake and guy planted trees as shown or directed. Firmly drive stakes into the ground outside of the planting hole to prevent root damage.

Attach the tree tie to the trunk per manufacturer's directions. For deciduous trees locate the ties 4" under the lowest branches, or at a 4' minimum height, whichever is lowest. For evergreen trees locate the ties at half the height of the tree.

Attach the tree tie to the stakes per manufacturer's directions. Ensure ties will not slide down tree and stakes during tree movement. Secure and tighten the ties so that the tree is able to move but still held firmly in place.

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 and install sod within 48 hours of delivery. Protect sod from effects of severe weather conditions. Immediately before placing sod, water the Soil bed to prevent drying of grass roots. Immediately prior to or after sod installation surface apply lawn starter fertilizer at the rate of 1.5 lbs actual nitrogen per 1000 sq.ft. Lay the first sod row in a straight line, then place subsequent rows parallel to and tightly against each other, staggering lateral joints by at least 6 inches. 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.

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

After placement, diagonally roll with 100 pound (minimum) roller and thoroughly water the sod. Apply a second application of fertilizer when specified. Thoroughly water the new sod. of 22-16-8 fertilizer at the rate of 510 pounds per 100 square yards and thoroughly water.

01040.53 Mulch - Blowing of rock mulch is not permitted 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 ~~specified~~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~~bark mulch planted areas to a ~~nominal uniform~~nominal uniform depth of ~~2~~3 inches with ~~bark~~the specified 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~~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~~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.

For tree plantings, apply 3 inch depth of specified mulch to a 6 feet diameter circle centered on the tree or to the extent shown on the plans for multiple trees. Provide a spaded edge as shown on the Plans. Maintain a mulch-free area within 3 inches of trunk.

For trees in existing lawn or grass areas, remove a 6 foot diameter 3 inch deep circle of sod from around tree prior to mulch placement.

Where trees are planted between the sidewalk and curb, create a squared-off mulched area from curb to sidewalk, six feet long measured along the sidewalk, and centered on the tree. Provide a spaded edge between mulch and lawn areas. Cover entire area, except for within 3 inches of the tree trunk, with 3 inches of mulch.

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

~~Spread compost on top of the Soil to a nominal depth of 3 inches.~~

(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 per 1,000 square feet to neutralize nitrogen loss.~~

(3) Compost Blanket - ~~Spread compost on top of the Soil to a nominal depth of 3 inches.~~

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 percent 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 Periods:

- After plant delivery, during temporary storage, and before planting.
- At 1 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) Moisture Retention Chemicals - ~~When specified, U~~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 - ~~When specified, p~~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 Coarse Debris - ~~When specified, p~~Place woody coarse debris within the stream channel, facing upstream at approximately 45 degrees from the stream bank, or as shown or as directed. Anchor woody coarse debris to the stream channel bottom as shown.

(e) Anti-transpirant - ~~When specified, a~~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 - ~~When specified, a~~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 - ~~When specified, i~~nstall browsing protectors according to the manufacturer's recommendations.

(h) Root Barrier - ~~When specified, i~~nstall 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, according to 01040.49~~

(j) Trunk Wraps - ~~When specified, W~~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 and Maintenance

01040.70 General - The Contractor is responsible for the survival of all plant material until the Third Notification is issued or the end of a plant Establishment Period of 1 calendar year, when included in the Bid Schedule. ~~The Contractor is responsible for the survival of all plant material until the end of the plant establishment period.~~ 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. Plants replaced during the establishment period will be evaluated throughout the remainder of the establishment period. If timing of replacement planting does not allow sufficient observation of the plant material though a growth cycle the Agency may require an additional warranty period for replacement plants as specified in Section 01040.79(b).

If an irrigation system is present the Contractor shall operate and maintain the irrigation system during the plant establishment period. Reference requirements in Section 01120.

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, unless otherwise specified.

- Weeding, cultivating, pruning, and repairing.
- Adjusting tree stakes and guys.
- Controlling weeds before they seed according to 01040.48.
- Controlling pests and noxious and specified 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.

The determination of a successful planting establishment will be made at the periodic inspections. A successful planting establishment is defined as follows:

(a) Sodded Lawn Areas - A thick, even, well-sodded, stand of grass free of specified and noxious weeds and reasonably free of other weeds, as judged by the Engineer. Scattered bare spots, not larger than 6 inches square, may be allowed to a maximum of 3 percent of the lawn area. All work described in 01040.71 shall have been performed as required.

(b) All Other Planted Areas - 100% survival and vigorous growth of all trees, shrubs and other plant materials. Ornamental beds and tree mulch areas shall be free of weeds. All work described in 01040.71 shall have been performed as required.

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 areas, the Agency reserves the right to reject all establishment Work.

01040.72 Periodic Inspections - During the plant establishment period, the Agency may make inspections as necessary to assess compliance with the specifications.

When the schedule of items includes "Plant Establishment Period", dDuring 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 ~~may~~ 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 01030.62(b)(3)04030.42.

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 3 inch depth during establishment, unless otherwise specified. Rake to a smooth and even finish grade.

(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 according to 0130.62(b). A schedule of additional 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 -- Begin vegetation management activities immediately after emergent wetland planting is complete. Remove Specified Weeds from the Project site. 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, Third Notification and Warranty - 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.

(a) Third Notification - The issuance of the Third Notification shall begin the warranty period for all plant materials. When the schedule of items includes "Plant Establishment Period", Third Notification will be issued upon the completion of the establishment period and there shall be no Warranty per 01040.79(b).

(b) Warranty - The warranty period shall run for one year from the date of the Third Notification. During the warranty period the Contractor shall be responsible for replacing, at no cost to the Agency, any plant material which does not exhibit satisfactory growth typical for the species. The Contractor is required to maintain all plants in an upright and plumb condition during the warranty period. At his or her discretion, the Engineer may direct the Contractor to complete warranty work immediately, or may allow the work to be completed at a later time prior to the expiration of the warranty period. During the warranty period the Contractor is not responsible for plant loss or damage caused by extreme weather conditions, vandalism or the Agency's lack of maintenance.

The Contractor shall remove tree stakes and ties and tree watering basins at the end of the warranty period, unless directed otherwise.

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 at the time of placement. Trucking invoices may be used to determine volumes if the quantities are verifiable to the satisfaction of the Engineer.~~ following basis:-

- **Volume Basis** – Topsoil will be measured based on conversion of truck ticket weight in tons converted to cubic yards. The conversion factor will be derived from modified AASHTO T-19 laboratory tests conducted by the Agency.
- **In Place** – Topsoil will be measured in the final position. Measurement will be limited to the lines, grades and slope of the original ground contours before topsoil placement begins.
- **Invoice** – Topsoil will be measured based on material supplier invoices. The invoice shall identify the Project, the material, the date, and the volume.
- **Weight** – Topsoil will be measured by weight from load tickets. The load ticket shall identify the Project, the material, the date, and the net material tonnage.

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 on the area basis, along the ground surface.
 - 1 to 5 percent 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.

(f) Mulch - Mulch will be measured on the volume basis at the time of placement, on the area basis, on the volume basis by supplier invoice, or on the weight basis. Trucking invoices may be used to determine volumes if the quantities are verifiable to the satisfaction of the Engineer.

(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 Coarse Debris** - Woody coarse 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.

01040.81 Plant Establishment Period - No separate measurement will be made for the plant establishment period unless included in the schedule of items. If an irrigation system is present operation and maintenance of the irrigation system shall be considered incidental to the plant establishment work and no separate measurement will be made.

If included in the schedule of items "Plant Establishment" 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) Force Account Basis – Measurement will be made according to 00197.00.

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.....	60%
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.....	10%

~~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
(a) Bark Mulch.....	Cubic Yard <u>or Square Foot</u>
(b) Cinder Mulch.....	Cubic Yard <u>or Square Foot</u>
(c) Compost Mulch.....	Cubic Yard <u>or Square Foot</u>
(d) Wood Chip Mulch.....	Cubic Yard <u>or Square Foot</u>
(e) Grass Straw Mulch.....	Ton <u>or Square Foot</u>
(f) Rock Mulch.....	Ton <u>or Square Foot</u>

(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
(a) Tree Grates.....	Each
(b) Woody Coarse Debris.....	Each
(c) Boulders.....	Each or Ton
(d) Root Barrier.....	Foot
(e) Weed Control Geotextile.....	Square Foot

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
- pressure moisture stress sensors
- mulch materials required as part of replacement planting
- corrective Work during the plant Establishment Period

01040.91 Plant Establishment Period - When the schedule of items includes an item for "Plant Establishment Period," payment will be made as follows:

(a) Lump Sum basis according to the following schedule:

<u>At one-fourth of the establishment period</u>	<u>25%</u>
<u>At one-half of the establishment period</u>	<u>25%</u>

<u>At three-fourths of the establishment period</u>	<u>25%</u>
<u>At completion of the establishment period</u>	<u>25%</u>

Payment will be payment in full for all plant replacement, planting materials, other materials and all equipment, labor, and incidentals necessary to complete the work.

If an irrigation system is present operation and maintenance of the irrigation system shall be considered incidental to the plant establishment period and no separate payment will be made.

(b) Force Account Basis: On a monthly schedule according to 00197.00.

Payment will be payment in full for all equipment, labor, materials and incidentals necessary to complete the work. Payment includes expenses associated to plant replacement, planting materials, or other materials that have failed or require replacement during a Plant Establishment period directed by the Engineer.

Section 01050 - Fences

Description

01050.00 Scope - This Work consists of constructing:

- Fences, gates, and gateways of barbed wire, woven wire fabric, chain link fabric, or combinations, to the lines and grades shown or directed.
- Protective fences, on and off Structure as shown or directed.

All dimensions shown on the Plans are horizontal and vertical measurement. Actual quantities required for the installation may be greater depending on the Slope of the terrain.

01050.01 Definitions:

(a) Fences - Fence, gates, gateways, and appurtenances, regardless of kinds and types.

(b) Gates - Swinging units to provide an opening in the fence line.

(1) Single Gate - A unit of 16 feet or less.

(2) Double Gate - Two single gate units used together.

(c) Gateway - Supported fence wire or fabric stretched between gate posts and fastened by bars, wire hinges and locking devices.

(d) Panel - That portion of fence between adjacent posts.

(e) Run - As used in this specification, run is defined as follows:

- **Fences, gates, and gateways** - The length of fence between end posts, intermediate end posts, corner posts, and gate posts.
- **Bridge protective fence** - A section of fence 150 feet or less in length.

Materials

01050.10 Materials - Furnish Materials meeting the following requirements:

Bar Reinforcement	02510.10
Barbed Wire	03010.10
Chain Link Fabric	03010.30
Commercial Grade Concrete.....	00440
Fence Gates.....	03010.60
Fence Grounding	03010.50(e) and (f)
Fence Posts, Braces, and Appurtenances	02110.30, 03010.50
Guardrail Elements.....	02820.10
Pickets.....	03010.31
Protective Fence Materials, On and Off Structures	03010.75
Vinyl Clad Fabric	03010.40
Wildlife Fencing Fabric.....	03010.21
Woven Wire.....	03010.20

Construction

01050.40 General - Construct the several kinds and types of fences including the assembly and erection of all component parts and materials complete in place at the locations shown or directed. Confine activities and operations to the area immediately adjacent to the Right-of-Way line and within the highway Right-of-Way. Arrange for permits required from adjacent property owners to perform the Work.

Schedule the installation of fencing or provide temporary fencing or other adequate means to prevent livestock from entering the Project Right-of-Way, easements and/or adjoining properties according to 00170.92.

At Bridges, cattle passes and culverts, if shown or directed, connect the new fence to the Structure in a manner that permits free passage of livestock under or through the Structure.

01050.41 Lines, Grades, and Preparation Work - Unless otherwise directed, set fences so the fence fabric and wires are on Right-of-Way lines or Agency property lines, with posts set on Agency property. If directed, center concrete footings and fence posts 1 foot from the Right-of-Way or property line on Agency property.

Clear, grub and prepare the fence line area. Remove all shrubs, brush, snags, downed timber, float Rock, and other obstacles, including trees up to 6 inches in diameter which interfere with fence construction. If directed, preserve trees and geographic features on fence lines by varying the fence alignment to miss them.

Fill or excavate ground surface irregularities which interfere with maintaining specified clearance above ground surface of the bottom wire of the fence. Limit the width as necessary to provide a clear way for the fence.

Excavate for concrete footings to reasonably Neat Lines, but not less than the specified dimensions in Soil, or not less than 18 inches deep in Rock. Prevent disturbance of original ground at the sides and bottom of the excavation.

Clear and grade gate openings to permit the gate to swing in a horizontal plane according to 01050.48.

Dispose of materials removed under these provisions, including excess excavation, in a satisfactory manner.

01050.42 Optional Posts - Use steel or wood posts in barbed, or barbed and woven wire fence construction according to one of the following options, and once an option has been selected, use that option throughout the Project:

Option 1: Steel posts entirely in all types of fence.

Option 2: Treated wood posts entirely in:

- Type 1 fence
- Type 1-5W fence
- Type 2 fence
- Median fence on Median areas exceeding 16 feet in width

Option 3: Steel line post in combination with treated wood end posts, intermediate end posts, corner posts and gate posts in:

- Type 1 fence
- Type 1-5W fence
- Type 2 fence
- Median fence on Median areas exceeding 16 feet in width

01050.43 Installing Posts and Braces:

(a) General - Set all metal end posts, intermediate end posts, corner posts, gate posts, and chain link fence posts in concrete footings. Set all other posts firmly in the ground or in concrete footings as the Contractor elects.

Set posts to the depths shown. Reasonable variation in depths will be allowed and posts may be appropriately shortened or left slightly high, as approved by the Engineer, to:

- Avoid unnecessary penetration or excavation in Rock or other unusually firm material.
- Obtain desired grades along the fence.

Set all posts vertical, except on curved alignment set posts slightly off vertical, as directed, to offset the pull of the fence fabric and wires.

For bridge protective fence only, set all metal end posts, intermediate end posts, and chain link fence posts as shown.

(1) Driven Posts - Posts which are set by driving shall be free of damage when set. Remove and replace any driven posts which are split, twisted or bent, or have a badly misshapen tops.

(2) Dug Holes - Where Rock is encountered, set the posts to depths of not less than 18 inches and backfill with fine Granular Material. Do not exceed the post height shown by more than 3 inches.

When posts are set in dug holes, backfill in 6 inch layers with each layer separately and thoroughly tamped and compacted.

(3) Concrete Footings - Dimensions of footings shall not be less than shown and shall fill the excavated areas. Place the concrete with contact against firm Soil at the sides and bottom and tamp around the posts and brace ends after the posts and braces have been brought to and firmly held in proper position. Strike off, slope or crown and smooth the surface of the concrete at the ground level to shed water. Allow to cure for at least 5 Calendar Days before subjecting the posts and braces to strain.

(b) End Posts - Set end posts:

- At the beginning and end of new fence construction that is not terminating at gate posts.
- At the end of the intersecting line of existing fences just outside the line of the new fence.

(c) Intermediate End Posts - Set intermediate end posts in the line of the new fence:

- At each summit and at each valley in the grade of the fence where the algebraic difference in the grades of adjoining panels of fence exceeds 30 percent.
- At other points located along the new fence line to break the fence construction into approximately equal runs not exceeding the applicable lengths of runs shown.

(d) Corner Posts - Set corner posts as follows:

(1) Barbed and Woven Wire Fences - At angle of deflection exceeding 5 degrees for fences with steel line posts or 15 degrees for fences with wood line posts. Changes in line where the angle of deflection does not exceed the above limitations will be considered alignment angles. The adjacent line posts at alignment angles shall be made fast to the angle post by means of diagonal tension wires.

(2) Chain Link Fences - At angle points in fence alignment where the alignment of adjoining panels of fence changes direction by 20 degrees or more.

(e) Gate Posts - Set gate posts at the beginning or end of runs of fence to provide openings for gates or gateways.

(f) Line Posts - Set line posts along the line of fence, between end, intermediate end, corner, and gate posts, and at the spacings shown. Line posts may be set at spacings not exceeding 25 percent greater than specified or at closer spacings if approved. Set a line post in the new fence line at a point in alignment with each intersecting fence line approximately 1 foot from the end post of the intersecting fence line.

It is intended that the actual number of line posts will average to the number required for normal spacing.

(g) Braces - Construct braces before placing of fence fabric and wires on the posts.

(1) Metal Braces - Provide corner posts and intermediate end posts with two braces, one each direction from the post in the main fence lines. Provide end posts and gate posts with one brace in the line of the fence as shown.

Attach metal braces to the metal end, intermediate end, corner and gate posts and set in concrete footings.

(2) Wood Braces - Assemble and construct treated wood braces in conjunction with treated wood end posts, intermediate end posts, corner posts and gate posts to form units as shown. Fasten the wire brace guys to posts with three staples in each post. By means of a wood lever, twist together the four strands of wire between the posts until the entire assembly is taut and firm. Leave the lever in place. Drive the staples to provide contact with the wires without indentation of the posts.

01050.44 Barbed and Woven Wire Fence:

(a) Placing Fabric and Wire - Place fabric and wire on the face of the post which is away from the Highway or as shown. On curved alignment, place the fabric and wire on the face of the post against which the normal pull of the fabric and wire will be exerted.

Attach fence fabric and barbed wire to each post according to recognized standard practice for fence construction and as shown or directed.

(b) Splicing Fabric and Wire - Splices of fabric and splices of separate lines of wire between posts will be allowed provided that not more than two fabric or separate wire splices, spaced at least 50 feet apart, occur in any one run of fence. Use wrap or telephone type splices for the longitudinal woven wire and barbed wire with each end wrapped around the other wire for not less than six complete turns.

(c) Stretching Fabric - Stretch the barbed wire and woven wire fabric. Use care in stretching woven wire fabric, so the pull is evenly distributed over the longitudinal wires and not more than one-half of the original depth of the tension curves is removed.

(d) Fastening Fabric and Wire:

(1) At End, Intermediate End, Corner, and Gate Posts - Terminate the fence fabric and barbed wire at each end, intermediate end, corner, and gate post in the new fence line. Wrap each line of barbed wire and each longitudinal wire of the fence fabric around the post and then itself with at least four turns.

(2) At Line Posts - Fasten woven wire fabric to the post at top and bottom and at intermediate points not exceeding 12 inches apart. Fasten each line of barbed wire to each line post. Use approved wire ties or clamps to fasten the wires to metal posts. Drive staples, for use with wood posts, crosswise with the grain of the wood and pointed slightly downward. Drive the staples just short of actual contact with the wires to permit free longitudinal movement of those wires and to prevent damage to the protective coating.

(3) At Intersection of New and Existing Fence - Where existing fences intersect the new fence, cut the existing fence materials, or splice basically in kind new materials as necessary, and fasten each longitudinal wire of the fabric and each line of barbed wire to the new end post according to 01050.44(d)(1).

(e) Swinging Panels at Waterway Crossings - At waterway crossings subject to floating debris, if directed, construct wood framed swinging panels of fence fabric, barbed wire or combinations. Attach the panels to the lower wires of the fence to provide fenced closure of the waterway so there will be no unfenced side or bottom openings exceeding 6 inches when the waterway is at its lightest flow or is dry.

(f) Additional Panels at Depressions - If depressions in the ground surface leave unfenced openings greater than 12 inches in height beneath the bottom line of the fence, provide additional panels of fence fabric, barbed wire, or combinations between line posts, as approved, across the opening so no side or bottom openings exceeds 6 inches. If the bottom line of the fence leaves an unfenced opening beneath it of 12 inches or less, pull the fabric and wires down between posts and anchor with pins or posts driven at least 18 inches into the ground so there will be no bottom opening at any point along the fence greater than 6 inches in height.

(g) Stay Wires and Final Adjustments - Free the fabric and barbed wire in final position from warp and sag with stay wires placed approximately vertical to the grade of the fence. Appearance shall reflect first-class work. Retighten brace guys and leave the lever restrained against the fence fabric or fence wires.

01050.45 Chain Link Fence:

(a) Concrete Footings - Construct concrete footings according to 01050.43(a)(3).

(b) Chain Link Fence Rails and Tension Wires - Place longitudinal rails and longitudinal tension wires along the line of chain link fence, except at gates.

(1) Rails - Attach rails to end, gate and corner posts by clamps and sockets, and thread through loop caps on the end of line posts. Provide expansion sleeves or couplings at spacings not exceeding 200 feet in longitudinal top and bottom rails.

(2) Tension Wire - Attach tension wire to end, gate and corner posts by bands and clamps. Either thread the top tension wire through line post loop caps or hold in open slots in a manner

to limit vertical movement. Tie or attach the bottom tension wire to the bottom of line posts by ties or clamps in a manner that prevents vertical movement. Provide tension wires with one turnbuckle or one ratchet take-up in each run of fence.

(c) Chain Link Fence Fabric and Wire - Assemble and install chain link fence fabric and wire according to 01050.44 and the following:

(1) Splicing Fabric - Use spiral pickets of specified chain link fabric material for fabric splices. Use wrap or telephone type splices for tension wire and barbed wire with each end wrapped around the other wire for not less than six complete turns.

(2) Fastening Fabric - Fasten fabric to end, gate and corner posts and to gate frames as shown. Attach fabric to line posts with wire ties at top and bottom and at intermediate spacings not exceeding 18 inches. Fasten fabric to top and bottom rails and to longitudinal tension wires with metal bands or tie wires spaced as shown, but in no case greater than 24 inches apart.

(3) Screening Pickets - If shown, insert the screening pickets vertically in each diamond.

For bridge protective fence only, assemble and install chain link fence fabric and wire according to paragraphs (1), (2), and (3) of this Subsection.

01050.46 Protective Fence for Bridges - If welding of special connections for protective fence is required, prequalification of welders will not be required and inspection of welding will be visual.

01050.47 Fence Grounding:

(a) General - Except for bridge protective fence, provide at least one "ground" for each run of fence and place at any post within the run according to 00960.45(b). Fence grounding for bridge protective fence is not required.

Fasten each line of barbed wire, alternate longitudinal wires of fence fabric, and the rails and tension wire of chain link fences to the ground wire by clamps. Clamp the ground wires to the grounding rods.

(b) At Electrical Lines - Ground the fence directly below the point of crossing at each location where an electric transmission, distribution or secondary line crosses over the fence.

Ground the fence at each end or gate post or at intervals not to exceed 500 feet when an electric transmission, distribution or secondary line runs parallel or nearly parallel to and within 100 feet of the fence.

01050.48 Gate Installation:

(a) Metal Gates - Install metal gates and fittings between gate posts previously set as specified. Firmly attach the fittings to the posts and gates. Hinge each single gate in a manner which will prevent removal of the gate without tools. Set the gate in an approximately horizontal plane to swing freely inward and outward, and so it can be fastened securely in its latch holder, or in the case of double gates, in its latch holder and gate stops. Set double gates on their respective hinge pintles to provide a common horizontal plane in which each single gate swings.

Gates shall swing open at least of 90 degrees in each direction.

(b) Gateways - Construct gateways of the same material as the fence and as shown. Construct wire splices according to 01050.44(b). Provide a taut and well-aligned closure of the opening, capable of being readily opened and closed by hand.

01050.49 Removing and Rebuilding Fence - Remove and rebuild existing fences as shown or directed. Construct fences to approximately the same condition as the original fence. Salvage the materials in existing fences to be removed and rebuilt and incorporate in the rebuilt fences. Replace fence materials damaged beyond reuse at no additional cost to the Agency. Firmly reset posts to the staked alignment. Post spacing and the number of wires to be strung and stapled to the posts shall be the same as the original fence. Furnish and use new staples or clips to fasten the wires to the posts.

01050.50 Wildlife Fence:

- (a) **Concrete Footings** - Construct concrete footings according to 01050.43(a)(3).
- (b) **Line Posts, Braces, End Posts, Corner Posts, and Gate Post** - All post and brace components shall be metal. Do not use wood posts and braces.
- (c) **Braces** - Install braces according to 01050.43(g)(1) and the following:
 - Braces are required at fence starts, ends, and changes of direction. A single straight run of fence requires an intermediate end post and brace at intervals of no more than 600 feet.
- (d) **Wildlife Fence Fabric and Wire** - Install wildlife fence fabric and wire according to 01050.44.
- (e) **Jumpouts** - Construct jumpouts as shown or directed with borrow material conforming to 00330.12 that contains no particles with any dimension greater than 3 inches. Make jumpouts of uniform grade and compact until there is no reaction or yielding under the compactor. Jumpouts will be visually accepted by the Engineer.

Measurement

01050.80 Measurement - The quantities of fences, protective fences, gates, and associated items performed under this Section will be measured according to the following:

- (a) **Barbed and Woven Wire Fence and Gateways** - Barbed wire fence, woven wire fence, and barbed and woven wire fence will be measured on the length basis. Measurement will be from center to center of posts, measured along the line and grade of each separate continuous run of fence as constructed, exclusive of gates. Where existing fences are extended to intersect the new fence, the length of extension, from point of joining to the center of the new end post, will be measured and included for payment, if similar in design or type to a Pay Item, otherwise this Work will be paid for according to 00140.60.
- (b) **Metal Gates for Barbed and Woven Wire Fence** - Metal gates for barbed and woven wire fence will be measured on a unit basis of each size of single gate and of each size of double gate, respectively. The size designation of gates for barbed wire and woven wire fence gates will be by width. The width will be the width of opening the gate is to fit.
- (c) **Chain Link Fence** - Chain link fence will be measured on the length basis. Measurement will be from center to center of posts, measured along the line and grade of each separate continuous run of fence as constructed, exclusive of gates.
- (d) **Metal Gates for Chain Link Fence** - Chain link fence metal gates will be measured on a unit basis of each size of single gate and of each size of double gate, respectively. The size designation of chain link fence gates will be by width and height. The width will be the width of opening the gate is to fit.

(e) Protective Fence for Bridges - Bridge protective fence will be measured on the length basis. Measurement will be between beginning and ending locations as shown.

(f) Removing and Rebuilding Fence - Removing and rebuilding existing fence will be measured on the length basis, including gates. Measurement will be from center to center of posts, measured along the line and grade of fence removed and reconstructed.

(g) Wildlife Fence - Wildlife fence will be measured on the length basis. Measurement will be from center to center of posts, measured along the line and grade of each separate continuous run of fence as constructed, exclusive of gates.

(h) Metal Gates for Wildlife Fence - Metal gates for wildlife fence will be measured on the unit bases of each size of single gate and each size of double gate respectively. The size designation of the gates for wildlife fence gates will be by width. The width will be the opening the gate is to fit.

(i) Jumpouts - Jumpouts will be measured on the unit basis. Additional fence Material used in the jumpouts will be measured as wildlife fence.

Payment

01050.90 Payment - The accepted quantities of fences, protective fences, gates, and associated items performed under this Section will be paid for according to the following:

(a) Barbed and Woven Wire Fence - Barbed and woven wire fence and gates will be paid for at the Contract unit price, per unit of measurement, for the following items:

Pay Item	Unit of Measurement
(a) Type ____ Fence	Foot
(b) ____ Foot Single Gates	Each
(c) ____ Foot Double Gates	Each

In item (a) the type of fence will be inserted in the blank.

In items (b) and (c) the width of the gate opening will be inserted in the blank.

(b) Chain Link Fence - Chain link fence and gates will be paid for at the Contract unit price, per unit of measurement, for the following items:

Pay Item	Unit of Measurement
(a) ____ Chain Link Fence	Foot
(b) ____ Chain Link Fence with _____	Foot
(c) ____ Foot x ____ Inch Chain Link Single Gates	Each
(d) ____ Foot x ____ Inch Chain Link Double Gates	Each

In item (a) the type of fence will be inserted in the blank.

In item (b) the type of fence will be inserted in the first blank and the type of Material or pickets used for screening will be inserted in the second blank.

In items (c) and (d) the width of the gate opening will be inserted in the first blank and the height of gate be inserted in as the second blank.

(c) Protective Fence for Bridges - Bridge protective fence will be paid for at the Contract unit price, per foot, for the item " ____ Foot Type ____ Protective Fence".

The height of the fence will be inserted in the first blank. The type of fence will be inserted in the second blank.

(d) Removing and Rebuilding Fence - Removing and rebuilding fence will be paid for at the Contract unit price, per foot, for the item "Removing and Rebuilding Fence".

New Material necessary to complete the rebuilding of fence will be included in payment made for the removing and rebuilding fence item.

(e) Wildlife Fence - Wildlife fence, gates, and jumpouts will be paid for at the Contract unit price, per unit of measure, for the following items:

Pay Item	Unit of Measure
(a) Wildlife fence.....	Foot
(b) Jumpouts	Each
(c) ____Foot x 96 Inch Wildlife Fence Single Gate	Each
(d) ____Foot x 96 Inch Wildlife Fence Double Gate.....	Each

In items (c) and (d) the width of the gate will be inserted in the blank.

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 for Materials, Equipment, and labor involved in constructing panels of fence additional to normal fence construction at waterways and at ground surface depressions, according to 01050.44(e) and (f), will be paid for according to 00195.20.

Section 01060 – Playgrounds

Description

01060.00 Scope - This work consists of furnishing and installing playground equipment and associated protective surfaces as shown on the Plans and as specified.

01060.01 Coordination - Coordinate with other trades affecting and being affected by work of the subsection.

The contractor shall provide required equipment delivery dates as part of the schedule information under Section 00180. The contractor shall be responsible for any equipment storage costs due to schedule changes that are within their control.

01060.02 Protection – Coordinate installation of temporary protection fencing as shown on the Plans and specified in Section 00270.

Preserve and protect new and existing improvements and vegetation in areas to remain undisturbed for duration of project. Return to condition found if damaged.

Preserve and protect survey monuments, bench marks, and other reference points. If disturbed, or destroyed, replace as directed and at no expense to the Owner.

Preserve and protect active utilities and maintain in continuous operation for duration of project. Repair or replace all damage to known utilities at no expense to the Owner.

Protect persons and property from damage and discomfort caused by dust. Water as necessary and when directed.

Use all means necessary to protect materials and work of this Section and all other Sections before, during, and after installation. In the event of damage, immediately make all repairs and replacements as directed by Project Manager.

01060.03 Submittals:

The following shall be submitted within 45 days of award of Contract for Contractor-furnished equipment and materials:

1. Product Data, including all material to be used, listing manufacturer's name, catalog numbers, catalog cuts, technical data, and manufacturer's installation, and maintenance instructions for each product.
2. Invoices or other documentation that all playground equipment and surfacing materials for the project have been procured.
3. Engineered Wood Fiber - Submit test certificates/ reports not more than 5 years old showing material compliance with the specified standards.

The following shall be submitted after completion of Work and prior to Third Notification:

1. Any remaining hardware and touch-up paint that has been furnished by the manufacturer.

01060.04 Notices for Inspections - Notify the Project Manager a minimum of 48 hours prior to any required inspection.

01060.05 Required Inspections - The following inspections shall be required at a minimum:

1. At time of delivery and unloading of equipment furnished by City.
2. At the time of unboxing/ opening and removal from shipping packaging of equipment furnished by the City.
3. Layout, prior to footing excavation or assembly.
4. After footing excavation and product assembly in-place, but prior to concrete pour.
5. After Second Notification, prior to generation of punch-list.
6. After completion of punch-list items, prior to removal of temporary protection fence and opening playground for public use.

In the event that the Contractor fails to coordinate and provide notification for required inspections the Contractor shall assume full responsibility for any equipment damage expenses or work revisions necessary. After initial delivery and shipping inspection the Contractor shall be responsible for equipment protection until installation is approved by the Agency.

Make any corrections identified at each review prior to proceeding with additional work.

01060.06 Warranty - Warranty all Work for one year after date of Third Notification.

Immediately correct any failure caused by poor material or workmanship during warranty period. "Immediately" shall mean within 72 hours, as determined by the City depending upon the immediacy of the needed repair.

City shall proceed with repairs and bill Contractor for costs and any damages when Contractor fails to comply or if the failure poses an immediate safety hazard or property loss.

Materials

01060.10 General

Use only new materials unless specified otherwise.

Protect against damage.

Store packaged materials in manufacturer's original container with legible labels intact.

Store on firm, level support; protect against direct sunlight.

01060.11 Playground Equipment - See Plans for products and manufacturers.

01060.12 Playground Surfacing – See Plans for products and manufacturers.

Engineered Wood Fiber shall be certified to be compliant with the following ASTM Standards, most current edition:

- F1292 - Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment
- F1951 - Determination of Accessibility of Surface Systems Under and Around Playground Equipment
- F2075 - Engineered Wood Fiber for Use as a Playground Safety Surface Under and Around Playground Equipment*
*(Excluding Sieve Analysis Requirements)

Construction

01060.40 Existing Conditions - Contractor shall assume responsibility for inventory of all play equipment components at time of delivery, including equipment furnished by the City of Eugene. Contractor shall assume additional responsibility for procuring any shortage or missing components from play equipment vendors.

Verify that surfaces and structures to receive work specified herein are accurately sized and located, sound, secure, true, complete, and otherwise properly prepared.

Prior to starting work, notify Project Manager of discrepancies or defects requiring correction.

Do not start work until conditions are satisfactory. Beginning of Work in an area denotes that the Contractor accepts all conditions of that area and the ramifications thereof, with the exception of latent conditions.

01060.41 Field Measurements - Playground layout on Plans is exact and may not be modified. Verify locations prior to installation. Coordinate layout with survey control staking as specified. Verify locations prior to installation. Ensure required use zone setbacks are met. Obtain Project Manager's approval of layout prior to any installation work.

01060.42 Filter Fabric Installation - Install per manufacturer's directions and as detailed. Ensure edges of filter fabric are lapped under adjacent playground edging as detailed. Overlap edges of fabric a minimum of 1'.

01060.43 Playground Equipment Installation - Install per manufacturer's directions. If directions are not provided by the manufacturer verify installation method with manufacturer and Project Manager prior to installation.

01060.44 Protective Surfacing Installation – Install per manufacturer's instructions and ensure compliance with Standards listed under 01060.12. Install to depths shown on Plans, accounting for any compaction requirements and settling.

01060.45 Restoration - Return all disturbed areas to original condition after installation is completed. Repair or replace any materials damaged during installation as directed by the Project Manager.

01060.46 Site Clean-Up - Keep the premises free from accumulation of debris. Maintain a safe clean work area throughout the project.

Remove all debris, equipment and surplus materials, and leave the premises in a neat and orderly condition at the completion of the work.

Clean all walks, streets, etc., affected by the work.

01060.47 Product Cleaning And Repairing - Clean, repair, and touch-up or replace when directed, all facilities and improvements (including work of other Sections) which have been damaged by work of this Section. Pressure wash or otherwise remove tire tracks and other ground-in soil contamination on walks and other hardscape.

Measurement

01060.80 Measurement - The quantities of items constructed under this Section will be measured according to the following:

- **Lump Sum Basis** – Quantities for each type of play equipment, as identified on the plans or bid schedule, will be on the lump sum basis.

- Area Basis – Quantities for play surfacing will be measured on the area basis.

Payment

01060.90 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) _____ (Play Equipment)	Lump Sum
(b) _____ (Play Equipment) - Install Only	Lump Sum
(c) Play Surfacing, _____ (Type)	Square Foot

In item (a and b) the type or name of play equipment, as shown on the plans, will be inserted in the blank.

In item (c) the depth and type of play surfacing (engineered wood fiber, sand, etc.), as shown on the plans, will be inserted in the blank.

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

Section 01065 - Site Furnishings

Description

01065.00 Scope - This work consists of furnishing and installing site furnishings, including but not limited to benches, picnic tables, trash cans, bike racks, and other equipment, as shown on the Plans and as specified.

01065.01 Coordination - Coordinate with other trades affecting and being affected by work of the subsection.

01065.02 Protection - Preserve and protect new and existing improvements and vegetation in areas to remain undisturbed for duration of project. Return to condition found if damaged.

Preserve and protect survey monuments, bench marks, and other reference points. If disturbed, or destroyed, replace as directed and at no expense to the Owner.

Preserve and protect active utilities and maintain in continuous operation for duration of project. Repair or replace all damage to known utilities at no expense to the Owner.

Protect persons and property from damage and discomfort caused by dust. Water as necessary or when directed.

Use all means necessary to protect materials and work of this Section and all other Sections before, during, and after installation. In the event of damage, immediately make all repairs and replacements as directed by Owner's Representative.

01065.03 Submittals –

The following shall be submitted after completion of Work and prior to Third Notification:

1. Any remaining hardware and touch-up paint that has been furnished by the manufacturer.

01065.04 Notices For Inspections - Notify the Project Manager a minimum of 24 hours prior to any required inspection.

01065.05 Required Inspections - The following inspections shall be required at a minimum:

1. Drinking Fountain Layout – After fountain and plumbing layout but prior to excavation or construction.
2. Site Furnishing Layout - After assembly and field placement of site furnishings, but prior to installation.

Make any corrections identified at each review prior to proceeding with additional work.

01065.06 Warranty - Warranty all Work for one year after date of Third Notification.

Correct immediately any failure caused by poor material or workmanship during warranty period. "Immediately" shall mean within 72 hours, as determined by the City depending upon the immediacy of the needed repair.

City shall proceed with repairs and bill Contractor for costs and any damages when Contractor fails to comply.

Materials

01065.10 General

Use only new materials unless specified otherwise.

Protect against damage.

Store packaged materials in manufacturer's original container with legible labels intact.

Store on firm, level support; protect against direct sunlight.

01065.11 Site Furnishings - See Plans for manufacturers and models.

01065.12 Attachment Anchors:

Drinking fountain: Galvanized j-bolts as furnished by the City of Eugene.

Picnic tables, benches, bicycle racks, trash cans: Stainless steel 2" wedge anchors or as recommended by the manufacturer.

Other: As recommended by the manufacturer and approved by the Project Manager.

01065.13 Attachment Nuts:

Drinking fountain: Galvanized nuts as furnished by the City of Eugene.

Trash cans, bicycle racks, benches, tables: Stainless steel nut and washer. Match anchor size.

Other: As recommended by the manufacturer and approved by the Project Manager.

01065.14 Drinking Fountain Drain Conduit And Fittings - Drinking Fountain: Sch. 40 ABS, conforming to ASTM D 2661. 2" size, sweep ells shall be 12" radius.

01065.15 Drinking Fountain Drain Conduit Tracer Wire - Copper, #18 AWG minimum, UL listed, green.

Construction

01065.40 Existing Conditions - Verify that surfaces and structures to receive work specified herein are accurately sized and located, sound, secure, true, complete, and otherwise properly prepared.

Prior to starting work, notify Project Manager of discrepancies or defects requiring correction.

Do not start work until conditions are satisfactory. Beginning of Work in an area denotes that the Contractor accepts all conditions of that area and the ramifications thereof, except for latent conditions.

01065.41 Field Measurements - Furnishing layout on Plans is diagrammatic and may not be exact. Verify locations prior to installation. Obtain Project Manager's approval of layout prior to any installation work.

01065.42 Furnishing Installation - Install per manufacturer's directions. If no directions exist, verify installation method with manufacturer and Project Manager prior to installation. Ensure all attachment anchors protrude a maximum of 1/4" above attachment nut after installation and any burrs are removed.

If surface-mounted trash cans are shown for installation furnish and install a min. 1/8" stainless steel spacer between the mounting flanges and concrete.

01065.43 Drinking Fountain Footing Installation:

- Coordinate final footing location with Project Manager prior to excavation or installation work.
- Excavate and form footing as detailed.
- Install specified conduits and j-bolts as shown. City of Eugene will supply a j-bolt template to aid in layout and installation.
- Ensure conduits and j-bolts are true, plumb and secure and installed as detailed.
- Ensure j-bolts have a maximum of 2" of threaded portion of the bolt exposed.
- Install green tracer wire for the entire length of the drain conduit.

Obtain Project Manager's approval prior to pouring footing.

Ensure all excess concrete is removed from the mounting surface of the footing. Provide a clean, smooth surface around j-bolts and fountain mounting area. Footing shall have a maximum 1/8" deviation from level and flatness across top mounting surface.

01065.44 Restoration - Return all disturbed areas to original condition after installation is completed. Repair or replace any materials damaged during installation as directed by the Project Manager.

01065.45 Site Clean-Up - Keep the premises free from accumulation of debris. Maintain a safe clean work area throughout the project. Remove all debris, equipment and surplus materials, and leave the premises in a neat and orderly condition at the completion of the work. Clean all walks, streets, etc., affected by the work.

01065.46 Product Cleaning And Repairing - Clean, repair, and touch-up or replace when directed, products (including work of other Sections) which have been damaged by work of this Section. Pressure wash or otherwise remove tire tracks and other ground-in soil contamination on walks and other hardscape.

Measurement and Payment

01065.80 Basis - Site furnishings shall be paid on a per unit basis as specified on the bid schedule.

SECTION 01069 - METAL HANDRAIL AND PEDESTRIAN FENCE

Description

01069.00 Scope - This Work consists of furnishing and installing metal handrails and pedestrian rail units as shown or directed.

Materials

01069.10 Materials - Furnish Materials meeting the following requirements:

Commercial Grade Concrete	00440
Metal Handrail.....	02830
Pedestrian Fence.....	02831

Construction

01069.40 Metal Handrail and Pedestrian Fence:

- (a) Handrail** - Fabricate and install imbedded and bolted down metal handrail as shown.
- (b) Pedestrian Fence** - Fabricate and install pedestrian fence units as shown.

01069.41 Welding - Welding, welder qualifications, prequalification of weld details and inspection of welds shall conform to AWS D1.1 or AWS D1.2. Submit all welding procedure specifications 7 Days prior to fabrication to the Engineer for approval.

01069.42 Concrete Footings - Dimensions of footings shall not be less than shown and shall fill the excavated areas. Place the concrete with contact against firm Soil at the sides and bottom and tamp around the posts and brace ends after the posts and braces have been brought to and firmly held in proper position. Strike off, slope or crown and smooth the surface of the concrete at the ground level to shed water. Allow to cure for at least 5 Calendar Days before subjecting the posts to strain.

Excavate for concrete footings to reasonably Neat Lines, but not less than the specified dimensions in Soil, or not less than 18 inches deep in Rock. Prevent disturbance of original ground at the sides and bottom of the excavation.

Dispose of Materials removed under these provisions, including excess excavation, in a satisfactory manner.

01069.43 Bolt Holes:

- (a) Punched Holes** - Use a die with a diameter not exceeding the diameter of the punch by more than 1/16 inch. Ream holes that are required to be enlarged to admit the anchor bolts. Make clean cut holes without torn or ragged edges.
- (b) Accuracy of Punched Holes** - After punching the holes in the plate, stack the plates with the edges even and insert a cylindrical pin, 1/8 inch smaller in diameter than the nominal size of the punched hole, through the punched holes perpendicular to the face of the plate. No drifting of the rod while passing through each of the punched holes in the stack is allowed. Ensure that the edges of the stack stay in alignment. Non-conforming pieces will be rejected.

Measurement

01069.80 Measurement - The quantities of Work performed under this Section will be measured according to the following:

- **Length Basis** - Metal handrail will be measured on the length basis, by measuring along the top rail member, from center of end post to center of end post.
- **Unit Basis** - Pedestrian fence will be measured on the unit basis. Pedestrian fence will be counted for each 62 inch long unit.

Payment

01069.90 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:

<u>Pay Item</u>	<u>Unit of Measurement</u>
(a) Metal Handrail, Rails.....	Foot
(b) Pedestrian Fence.....	Each

In item (a), the number of rails will be inserted in the blank.

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.

Section 01070 - Mailbox Supports

Description

01070.00 Scope - This Work consists of removing and maintaining mailboxes and supports at temporary locations during construction, and reinstalling existing mailboxes and existing supports or installing mailboxes and newspaper boxes affected by construction on new supports at permanent locations as shown or directed.

Materials

01070.10 Reinforcement - Furnish reinforcement for concrete collars meeting the requirements of Section 02510.

01070.11 Concrete - Furnish concrete for concrete collars meeting the requirements of Section 00440.

01070.12 Tube Support Frame - Furnish tube support frames meeting either of the following requirements:

- Requirements of ASTM A500, Grade B, and galvanized according to AASHTO M 111 (ASTM A123).
- Tensile requirements of ASTM A53, Grade B, and galvanized with a minimum 0.9 ounce per square foot coating, as tested according to ASTM A90, on the exterior surface followed by a chromate conversion coating and a cross link polyurethane acrylic coating. A zinc base corrosive resistant interior coating shall also be applied.

01070.13 Mounting Brackets and Hardware - Furnish mailbox mounting brackets, angles, adapter plates, and hardware as shown and galvanize according to AASHTO M 232 (ASTM A153). Furnish mounting brackets for newspaper boxes as shown on the Standard Drawings.

01070.14 Post Mounting Socket - Furnish post anchors from the QPL.

Construction

01070.40 General - Protect and maintain mailboxes and supports at locations accessible to the delivery agent and as convenient as possible for the public being served. This may require removing and relocating the mailboxes and supports more than once to maintain service. When roadway construction is completed, install the mailboxes and newspaper boxes on new supports in their permanent locations as shown or directed.

Repair damaged galvanized surfaces, such as the cut end of the tube support frame or drilled holes, according to 02420.10(d), except add 1 1/2 ounces of leafing aluminum powder to each quart of high zinc dust content paint.

Install mounting brackets of the proper size to fit each existing mailbox.

If multiple supports are furnished for fewer than five mailboxes, install on the support Size 1 mounting brackets for the empty spaces.

If property owners want to keep the original mailbox support, place the support on the owner's property adjacent to the Work. Otherwise, dispose of the original mailbox support according to 00290.20.

Measurement

01070.80 Measurement - The quantities of mailbox supports and concrete collars will be measured on the unit basis of each kind of mailbox support and the number of concrete collars, regardless of size, installed in permanent locations.

The quantities of mailboxes and supports removed, maintained, and reinstalled will be measured on the unit basis, regardless of type, installed in permanent locations.

Payment

01070.90 Payment - The accepted quantities of mailbox supports and collars will be paid for at the Contract unit price, per unit of measurement, for the following items:

Pay Item	Unit of Measurement
(a) Single Mailbox Supports	Each
(b) Multiple Mailbox Supports	Each
(c) Mailbox Concrete Collars	Each
(d) Remove and Reinstall Mailbox Supports	Each

Item (d) includes removing mailboxes and supports, maintaining them at temporary locations, and reinstalling them at their permanent locations.

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 existing mailbox supports
- providing temporary installations
- installing new supports in permanent locations
- installing owner-furnished mailboxes and newspaper boxes

Section 01090 - Gravel Beds and Blankets

Description

01090.00 Scope - This Work consists of preparing areas for gravel beds and gravel blankets, and furnishing and placing Soil sterilant, weed control geotextile, and gravel bed Aggregates or gravel blanket Aggregates at locations shown or directed.

Materials

01090.10 Soil Sterilant - Furnish products with current legal labels listing active ingredients, which may include simazine, diuron, bromacil, sulfometuron-methyl, or from the QPL. Submit a sample of the proposed Soil sterilant's registered label to the Engineer for approval before using.

01090.11 Weed Control Geotextile - Furnish the following weed control geotextiles:

- 3 ounce, UV stabilized, nonwoven, polypropylene fabric
- 3.75 ounce, UV stabilized, needle-punched, polypropylene fabric
- Weed control geotextile from the QPL

01090.12 Aggregates - Furnish clean, uncrushed, nearly round Rock for gravel beds and gravel blankets meeting the following gradation requirements:

Sieve Size	Gravel Bed	Gravel Blanket
	3/4" - 1/2"	1 1/2" - 1/2"
	Percent Passing (by Weight)	
2"		100
1 1/2"		80 - 100
1"	100	0 - 15
3/4"	80 - 100	-
1/2"	0 - 10	0 - 5

The Engineer may accept Aggregates by visual inspection.

Construction

01090.40 General - Prepare gravel bed and gravel blanket areas, and furnish and place Soil sterilant, geotextile, and Aggregates as follows:

(a) Excavation - Excavate and shape the areas for gravel beds and gravel blankets as shown or directed and according to Section 00330.

(b) Soil Sterilant - Furnish and place the approved Soil sterilant at a rate of application recommended by the manufacturer. During use of Soil sterilant strictly adhere to label cautions, especially those concerning existing plants or waterways in the immediate area.

(c) Geotextile - After the area has been treated with Soil sterilant, place the weed control geotextile over the prepared ground surface according to 00350.41(a). Extend or lap the geotextile as follows:

- **Gravel Beds** - Extend the geotextile approximately 2 inches up the sides of the bed and overlap at least 12 inches.

- **Gravel Blankets** - Lap the ends of the sheets 18 inches and the sides 12 inches.

(d) Aggregates - Place Aggregate cover as follows:

- **Gravel Beds** - Cover the geotextile with gravel bed Aggregates to the depth specified then level and roll with a water-filled landscape roller for a minimum of two complete coverages.
- **Gravel Blankets** - Cover the geotextile with gravel blanket Aggregates to the depth specified or directed.

Measurement

01090.80 Measurement - The quantities of gravel beds will be measured on the volume basis.

The quantities of gravel blankets will be measured on the area basis by surface measurement of the Material in place, limited to the established Neat Lines and grades as shown or directed.

Payment

01090.90 Payment - The accepted quantities of gravel beds and gravel blankets will be paid for at the Contract unit price, per unit of measurement, for the following items:

Pay Item	Unit of Measurement
(a) Gravel Beds	Cubic Yard
(b) Gravel Blanket	Square Yard

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 excavation, Soil sterilant, or weed control geotextile.