

City of Tigard
Dirksen Nature Park Improvements - Phase 1

PROJECT MANUAL
CONSTRUCTION DOCUMENTS

August 27, 2015

Prepared for:

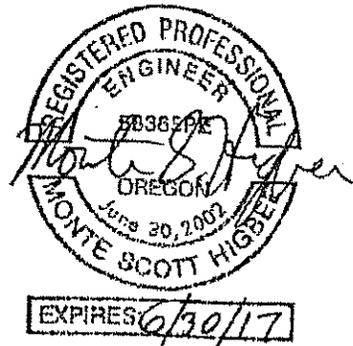
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Phase 1
CSI Technical Specifications
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SECTION 01 10 00

SUMMARY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Contract description.
- B. Work by Owner.
- C. Owner supplied products.
- D. Owner occupancy.
- E. Specification Conventions.

1.2 CONTRACT DESCRIPTION

- A. The Dirksen Nature Park will be developed in Phases. These contract documents cover the Phase 1 project. References to Phase 2 or Future Phases are not part of this project.
- B. The project is to construct deck and covered porch improvements, recladding the outside, new roof and new windows to the Environmental Education Center building, construct a water quality swale and make minor paved trail and park improvements.
- C. Work generally includes demolition, excavation, erosion control, concrete footings, concrete flat work, wood framing, carpentry, roofing, storm sewer installation, and landscaping.

1.3 WORK BY OWNER

- A. The Owner is performing work in the vicinity of this project to restore an oak savanna. This work includes preparation of soils, removal of trees, and planting of shrubs. The restoration contractor is using a couple of parking stalls for their workers. Cooperation with contractors will be necessary to ensure an adequate work area is available for the site contractor.
- B. Items noted NIC (Not in Contract) if any, will be part of a future project or installed by Owner.

1.4 OWNER SUPPLIED PRODUCTS

- A. Owner's Responsibilities:
 - 1. The Owner, through its Engineer, will supply the Contractor with AutoCAD files of the drawings for the Contractors use in layout and construction surveying.
 - 2. The Owner will make the initial submittals for all building and electrical permits. The Contractor will be required to register their name on the permits and be responsible to carry out all requirements of the permits.
 - 3. Owner will pay for all building and electrical permit fees.

4. On delivery, inspect products jointly with Contractor.

B. Contractor's Responsibilities:

1. The Contractor is responsible to comply with the conditions of the erosion control permits and building permits.
2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
3. Handle, store, install and finish products.
4. Repair or replace items damaged after receipt.
5. Protect and keep secure the Environmental Education Building along with the Owner's contents during construction.

1.5 OWNER OCCUPANCY

- A. The Owner intends to close the Environmental Education Center building during construction and discontinue programmed use of the building and site through October 2015.
- B. The Owner's contents will remain in the building. Schedule the Work to accommodate Owner's occasional access.

1.6 SPECIFICATION CONVENTIONS

- A. These specifications are written in imperative mood and streamlined form. This imperative language is directed to the Contractor, unless specifically noted otherwise. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 20 00
PRICE AND PAYMENT PROCEDURES

SECTION 01 20 00
PRICE AND PAYMENT PROCEDURES

Refer to the City of Tigard Public Improvement Contract for Price and Payment Procedures

END OF SECTION

SECTION 01 30 00
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Coordination and project conditions.
- B. Field engineering.
- C. Preconstruction meeting.
- D. Progress meetings.

1.2 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and Work of various sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements.
- B. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements.
- C. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion.
- D. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.3 FIELD ENGINEERING

- A. Employ Land Surveyor registered in State of Oregon and acceptable to Owner's Representative.
- B. Locate and protect survey control and reference points. Promptly notify Owner's Representative of discrepancies discovered.
- C. Control datum for survey is that established by Owner provided survey.
- D. Verify set-backs and easements; confirm drawing dimensions and elevations.
- E. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.
- F. Submit copy of site drawing signed by Land Surveyor certifying elevations and locations of the Work are in conformance with Contract Documents.

- G. Maintain complete and accurate log of control and survey work as Work progresses.
- H. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- I. Promptly report to Owner's Representative loss or destruction of reference point or relocation required because of changes in grades or other reasons.
- J. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Owner's Representative.

1.4 PRECONSTRUCTION MEETING

- A. Owner will schedule meeting after Notice of Award.
- B. Attendance Required: Owner, Owner's Representative, and Contractor.
- C. Agenda:
 - 1. Execution of Owner-Contractor Agreement.
 - 2. Submission of executed bonds and insurance certificates.
 - 3. Distribution of Contract Documents.
 - 4. Submission of list of Subcontractors, list of products, schedule of values, and progress schedule.
 - 5. Designation of personnel representing parties in Contract, and Owner's Representative.
 - 6. Procedures and processing of field decisions, submittals, and substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 - 7. Scheduling.

1.5 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum weekly intervals.
- B. The Owner's representative will make arrangements for meetings, prepare agenda with copies for participants, and preside at meetings.
- C. Attendance Required: Job superintendent, major subcontractors, Owner, Owner's Representative, as appropriate to agenda topics for each meeting.
- D. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of Work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems impeding planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of off-site fabrication and delivery schedules.
 - 7. Maintenance of progress schedule.
 - 8. Corrective measures to regain projected schedules.
 - 9. Planned progress during succeeding work period.
 - 10. Coordination of projected progress.

SECTION 01 30 00
ADMINISTRATIVE REQUIREMENTS

11. Maintenance of quality and work standards.
 12. Effect of proposed changes on progress schedule and coordination.
 13. Other business relating to Work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Owner's Representative, and those affected by decisions made.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Submittal procedures.
- B. Construction progress schedules.
- C. Proposed products list.
- D. Product data.
- E. Shop drawings.
- F. Samples.
- G. Test reports.
- H. Certificates.
- I. Manufacturer's instructions.
- J. Manufacturer's field reports.

1.2 SUBMITTAL PROCEDURES

- A. Transmit each submittal with Owner's Representative accepted form.
- B. Sequentially number transmittal forms. Mark revised submittals with original number and sequential alphabetic suffix.
- C. Identify Project, Contractor, subcontractor and supplier; pertinent drawing and detail number, and specification section number, appropriate to submittal.
- D. Schedule submittals to expedite Project, and deliver to Owner's Representative. Coordinate submission of related items.
- E. For each submittal for review, allow 5 days excluding delivery time to and from Contractor.
- F. Identify variations from Contract Documents and product or system limitations which may be detrimental to successful performance of completed Work.
- G. Allow space on submittals for Contractor and Owner's Representative review stamps.
- H. When revised for resubmission, identify changes made since previous submission.

- I. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.
- J. Submittals not requested will not be recognized or processed.

1.3 CONSTRUCTION PROGRESS SCHEDULES

- A. Submit preliminary outline Schedules within 5 days after date established in Notice to Proceed for coordination with Owner's requirements. After review, submit detailed schedules within 5 days modified to accommodate revisions recommended by Owner's Representative.
- B. Submit revised Progress Schedules with each monthly Application for Payment.
- C. Distribute copies of reviewed schedules to Project site file, subcontractors, suppliers, and other concerned parties.
- D. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.
- E. Submit computer generated horizontal bar chart with separate line for each major portion of Work or operation, identifying first work day of each week.
- F. Indicate estimated percentage of completion for each item of Work at each submission.
- G. Submit separate schedule of submittal dates for shop drawings, product data, and samples, including Owner furnished products, and dates reviewed submittals will be required from Owner's Representative. Indicate decision dates for selection of finishes.

1.4 PROPOSED PRODUCTS LIST

- A. Within 15 days after date of Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

1.5 PRODUCT DATA

- A. Product Data: Submit to Owner's Representative for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
- B. Submit number of copies Contractor requires, plus two copies Owner's Representative will retain.
- C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- D. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 01 70 00.

1.6 SHOP DRAWINGS

- A. Shop Drawings: Submit to Owner's Representative for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
- B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. Submit number of opaque reproductions Contractor requires, plus two copies Owner's Representative will retain.
- D. After review and approval by Owner's Representative, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 01 70 00.

1.7 SAMPLES

- A. Samples: Submit to Owner's Representative for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
- B. Samples For Selection as Specified in Product Sections:
 - 1. Submit to Owner's Representative for aesthetic, color, or finish selection.
 - 2. Submit samples of finishes from full range of manufacturers' standard colors, textures, and patterns for Owner's Representative selection.
- C. Include identification on each sample.
- D. Submit number of samples specified in individual specification sections; Owner's Representative will retain one sample.
- E. Reviewed samples which may be used in the Work are indicated in individual specification sections.
- F. Samples will not be used for testing purposes unless specifically stated in specification section.
- G. After review, produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents purposes described in Section 01 70 00.

1.8 TEST REPORTS

- A. Submit for Owner's Representative's knowledge as contract administrator or for Owner.
- B. Submit test reports for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.9 CERTIFICATES

- A. When specified in individual specification sections, submit certification by manufacturer, installation/application subcontractor, or Contractor to Owner's Representative, in quantities specified for Product Data.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Owner's Representative.

1.10 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Owner's Representative for delivery to Owner in quantities specified for Product Data or as agreed to.

1.11 MANUFACTURER'S FIELD REPORTS

- A. Submit reports for Owner's Representative's benefit as contract administrator or for Owner.
- B. Submit report within 2 days of observation to Owner's Representative for information.
- C. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Quality control and control of installation.
- B. Tolerances
- C. References.
- D. Mock-up requirements.
- E. Testing and inspection services.
- F. Manufacturers' field services.

1.2 QUALITY CONTROL AND CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. When manufacturers' instructions conflict with Contract Documents, request clarification from Owner's Representative before proceeding.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform Work by persons qualified to produce required and specified quality.
- F. Verify field measurements are as indicated on Shop Drawings or as instructed by manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.3 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. When manufacturers' tolerances conflict with Contract Documents, request clarification from Owner's Representative before proceeding.

- C. Adjust products to appropriate dimensions; position before securing products in place.

1.4 REFERENCES

- A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard by date of issue current on date of Contract Documents, except where specific date is established by code.
- C. Obtain copies of standards where required by product specification sections.
- D. When specified reference standards conflict with Contract Documents, request clarification from Owner's Representative before proceeding.
- E. Neither contractual relationships, duties, nor responsibilities of parties in Contract nor those of Owner's Representative shall be altered from Contract Documents by mention or inference otherwise in reference documents.

1.5 MOCK-UP REQUIREMENTS

- A. Tests will be performed under provisions identified in this section and identified in respective product specification sections.
- B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- C. Accepted mock-ups shall be comparison standard for remaining Work.
- D. Where mock-up has been accepted by Owner's Representative and is specified in product specification sections to be removed; remove mock-up and clear area when directed to do so by Owner's Representative.

1.6 TESTING AND INSPECTION SERVICES

- A. Contractor will employ and pay for specified services of a firm to perform testing and inspection.
- B. The firm will perform tests, inspections and other services specified in individual specification sections and as required by Owner's Representative and the Authority having jurisdiction.
 - 1. Laboratory: Authorized to operate in State of Oregon.
 - 2. Laboratory Staff: Maintain full time Engineering Specialist on staff to review services.
 - 3. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to National Bureau of Standards or accepted values of natural physical constants.
- C. Testing, inspections and source quality control may occur on or off project site. Perform off-site testing as required by Owner's Representative or Owner.

- D. Reports will be submitted by contractor's firm to Owner's Representative and Contractor, in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
- E. Cooperate with firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
1. Notify Owner's Representative and independent firm 24 hours prior to expected time for operations requiring services.
 2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.
- F. Testing and employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
- G. Re-testing or re-inspection required because of non-conformance to specified requirements shall be performed by same firm on instructions by Owner's Representative. Payment for re-testing or re-inspection will be at the Contractor's expense.
- H. Agency Responsibilities:
1. Test samples of mixes submitted by Contractor.
 2. Provide qualified personnel at site. Cooperate with Owner's Representative and Contractor in performance of services.
 3. Perform specified sampling and testing of products in accordance with specified standards.
 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 5. Promptly notify Owner's Representative and Contractor of observed irregularities or non-conformance of Work or products.
 6. Perform additional tests required by Owner's Representative.
 7. Attend preconstruction meetings and progress meetings.
- I. Agency Reports: After each test, promptly submit two copies of report to Owner's Representative and to Contractor. When requested by Owner's Representative, provide interpretation of test results. Include the following:
1. Date issued.
 2. Project title and number.
 3. Name of inspector.
 4. Date and time of sampling or inspection.
 5. Identification of product and specifications section.
 6. Location in Project.
 7. Type of inspection or test.
 8. Date of test.
 9. Results of tests.
 10. Conformance with Contract Documents.
- J. Limits On Testing Authority:
1. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 2. Agency or laboratory may not approve or accept any portion of the Work.
 3. Agency or laboratory may not assume duties of Contractor.
 4. Agency or laboratory has no authority to stop the Work.

1.7 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of observer to Owner's Representative 5 days in advance of required observations. Observer subject to approval of Owner's Representative.
- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- D. Refer to Section 01 33 00 - SUBMITTAL PROCEDURES, MANUFACTURERS' FIELD REPORTS article.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

- A. Examine and verify specific conditions described in individual specification sections.
- B. Verify utility services are available, of correct characteristics, and in correct locations.

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary Utilities:
 - 1. Temporary electricity.
 - 2. Telephone service.
 - 3. Facsimile and e-mail service.
 - 4. Temporary water service.
 - 5. Temporary sanitary facilities.

- B. Construction Facilities:
 - 1. Field offices and sheds.
 - 2. Vehicular access.
 - 3. Parking.
 - 4. Progress cleaning and waste removal.
 - 5. Project identification.

- C. Temporary Controls:
 - 1. Barriers.
 - 2. Enclosures and fencing.
 - 3. Security.
 - 4. Water control.
 - 5. Dust control.
 - 6. Erosion and sediment control.
 - 7. Noise control.
 - 8. Pollution control.

- D. Removal of utilities, facilities, and controls.

1.2 TEMPORARY ELECTRICITY

- A. Owner will pay cost of energy used. Contractor to exercise measures to conserve energy. Utilize Owner's existing power service to the site. Contractor to provide material and labor for the placement of temporary facilities and service.

1.3 TELEPHONE SERVICE

- A. Contractor shall make provisions for his key personnel to be reachable by telephone, on site, during the work day.

1.4 TEMPORARY WATER SERVICE

- A. Owner will pay cost of temporary water at the Education Center. Exercise measures to conserve water. Utilize Owner's existing water system, extend and supplement with temporary devices as needed to maintain specified conditions for construction operations.

- B. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing if used during winter weather.
- C. Contractor is responsible for providing temporary water as necessary to construct the concrete pathway from Summer Creek Bridge to the Fanno Creek Trail.

1.5 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide facilities at time of project mobilization.

1.6 FIELD OFFICES AND SHEDS

- A. The CONTRACTOR may opt to install a field office at the Project site. If so, the following conditions shall apply:
 - 1. Maintenance And Cleaning:
 - a. Periodic cleaning and maintenance of office and storage areas.
 - b. Maintain approach walks free of mud, water, and snow.
 - 2. Removal: At completion of Work remove buildings, foundations, utility services, and debris. Restore areas.

1.7 VEHICULAR ACCESS

- A. Construct temporary all-weather access roads from public thoroughfares to serve construction area, of width and load bearing capacity to accommodate unimpeded traffic for construction purposes.
- B. Access to work area:
 - 1. Access to the Environmental Education Center shall be from the existing paved driveway and parking lot.
 - 2. Access to the concrete trail south of the ball field is limited. Concrete trucks, dump trucks or other heavy equipment over a gross vehicle weight of 4 tons will not be allowed on the existing Fanno Creek Trail to avoid damage to the trail. Smaller, lighter weight vehicles will be allowed on the Fanno Creek Trail with access from Tigard Street with prior approval from the Owners Representative. No vehicles will be allowed to cross the Summer Creek Bridge due to structural issues. Concrete trucks may be allowed access through the Fowler Middle school up to the south end of the Summer Creek Bridge, but must stop short of the bridge. Coordinate access with the Owners Representative prior to using access.
- C. All impacts and/or damage to existing facilities, trails, landscape, grassed areas or other existing elements from construction activities shall be repaired back to existing condition or better. Contractor and Owner's Representative to note condition of the existing paved Fanno Creek Trail prior to construction activities involving vehicular access of the trail.
- D. Extend and relocate vehicular access as work progress requires, provide detours as necessary for unimpeded traffic flow.
- E. Location approved by Owner's Representative.

- F. Provide unimpeded access for emergency vehicles. Maintain 20 feet wide driveways with turning space between and around combustible materials.
- G. Provide and maintain access to fire hydrants and control valves free of obstructions.
- H. Provide means of removing mud from vehicle wheels before entering streets.

1.8 PARKING

- A. Tracked vehicles not allowed on paved areas.
- B. Do not allow heavy vehicles or construction equipment on site paths.
- C. Maintenance:
 - 1. Contractor can use the existing parking lot at the Environmental Education Center for construction staging during the month of October. Staging immediately east of the parking lot on a temporary basis will be available if work is not completed by October. Contractor to provide a temporary all-weather access staging area.
 - 2. Maintain traffic and parking areas in sound condition free of excavated material, construction equipment, products, mud, snow, and ice.
 - 3. Maintain existing and permanent paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.
- D. Removal, Repair:
 - 1. Remove temporary materials and construction before Substantial Completion.
 - 2. Remove underground work and compacted materials to depth of 2 feet; fill and grade site as specified.
 - 3. Repair existing facilities damaged by use, to original condition.

1.9 PROGRESS CLEANING AND WASTE REMOVAL

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in clean and orderly condition.
- B. Collect and remove waste materials, debris, and rubbish from site weekly and dispose off-site.
 - 1.

1.10 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.
- B. Provide protection for plants designated to remain. Replace damaged plants.
- C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.11 ENCLOSURES AND FENCING

- A. Construction: Commercial grade chain link fence.

1.12 SECURITY

- A. Security Program:
 - 1. Protect Work from theft, vandalism, and unauthorized entry.
 - 2. Initiate program in coordination with Owner's existing security system at project mobilization.
 - 3. Maintain program throughout construction period until Owner acceptance precludes need for Contractor security.

- B. Entry Control:
 - 1. Restrict entrance of persons and vehicles into Project site.
 - 2. Allow entrance only to authorized persons with proper identification.
 - 3. Maintain log of workers and visitors, make available to Owner on request.
 - 4. Coordinate access of Owner's personnel to site in coordination with Owner's security forces.

1.13 WATER CONTROL

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

- B. Protect site from puddling or running water.

1.14 DUST CONTROL

- A. Execute Work by methods to minimize raising dust from construction operations.

- B. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

1.15 EROSION AND SEDIMENT CONTROL

- A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation. Contractor is responsible to comply with the Erosion Control Permit.

- B. Minimize surface area of bare soil exposed at one time.

- C. Provide temporary measures including berms, dikes, and drains, and other devices to prevent water flow.

- D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.

- E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

1.16 NOISE CONTROL

- A. Provide methods, means, and facilities to minimize noise from construction equipment and noise produced by construction operations.

1.17 POLLUTION CONTROL

- A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.
- B. Comply with pollution and environmental control requirements of authorities having jurisdiction.

1.18 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.
- B. Remove underground installations to minimum depth of 2 feet.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 60 00
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Products.
- B. Product delivery requirements.
- C. Product storage and handling requirements.
- D. Product options.
- E. Product substitution procedures.
- F. Equipment electrical characteristics and components.

1.2 PRODUCTS

- A. Furnish products of qualified manufacturers suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise.
- B. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.
- C. Furnish interchangeable components from same manufacturer for components being replaced.

1.3 PRODUCT DELIVERY REQUIREMENTS

- A. Transport and handle products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

- A. Store and protect products in accordance with manufacturers' instructions.
- B. Store with seals and labels intact and legible.
- C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- D. For exterior storage of fabricated products, place on sloped supports above ground.

- E. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.
- F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- G. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.
- H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.5 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Products of one of manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit request for substitution for any manufacturer not named in accordance with the following article.

1.6 PRODUCT SUBSTITUTION PROCEDURES

- A. City of Tigard Instructions to Bidders, Section 00120 – Bidding Requirements and Procedures specify time restrictions for submitting requests for Substitutions during bidding period to requirements specified in this section.
- B. Substitutions may be considered when a product becomes unavailable through no fault of Contractor.
- C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.
- D. A request constitutes a representation that Bidder:
 - 1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
 - 2. Will provide same warranty for Substitution as for specified product.
 - 3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
 - 4. Waives claims for additional costs or time extension which may subsequently become apparent.
 - 5. Will reimburse Owner and Owner's Representative for review or redesign services associated with re-approval by authorities having jurisdiction.

SECTION 01 60 00
PRODUCT REQUIREMENTS

- E. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals, without separate written request, or when acceptance will require revision to Contract Documents.
- F. Substitution Submittal Procedure:
1. Submit two copies of request for Substitution for consideration. Limit each request to one proposed Substitution.
 2. Submit Shop Drawings, Product Data, and certified test results attesting to proposed product equivalence. Burden of proof is on Proposer.
 3. Owners Representative will notify Contractor in writing of decision to accept or reject request.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 70 00
EXECUTION REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Closeout procedures.
- B. Demonstration and instructions.
- C. Testing, adjusting and balancing.
- D. Protecting installed construction.
- E. Project record documents.
- F. Operation and maintenance data.
- G. Manual for materials and finishes.
- H. Manual for equipment and systems.
- I. Spare parts and maintenance products.
- J. Product warranties and product bonds.

1.2 CLOSEOUT PROCEDURES

- A. Substantial Completion
 - 1. Substantial Completion is the stage in the progress of the work when the work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the work for its intended use.
 - 2. When the Contractor considers that the work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Owner's Representative a comprehensive list of items to be completed or corrected. The Contractor shall proceed promptly to complete and correct items on the list. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all work in accordance with the Contract Documents. Upon receipt of the Contractor's list, the Owner's Representative will make an inspection to determine whether the work or designated portion thereof is substantially complete. If the Owner's Representative's inspection discloses any item, whether or not included on the Contractor's list, which is not in accordance with the requirements of the Contract Documents, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Owner's Representative. The Contractor shall then submit a request for another

inspection by the Owner's Representative to determine Substantial Completion. When the work or designated portion thereof is substantially complete, the Owner's Representative will prepare a Certificate of Substantial Completion which shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion. The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate.

B. Final Completion

1. Submit written request for Final Inspection and Acceptance. Submit certification that the Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents, and ready for Owner's Representative's review.
2. Provide submittals to Owner's Representative required by authorities having jurisdiction, including compliance with all legal construction requirements and inspections required for release of the Occupancy Permits, or Certificate of Occupancy.
3. Submit final Application for Payment per the requirements of Section 8 – Compensation, of the City of Tigard's Public Improvement Contract.

1.3 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to Owner's personnel prior to date of Substantial Completion.
- B. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- C. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed time, at equipment location.
- D. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- E. Required instruction time for each item of equipment and system is specified in individual sections.

1.4 TESTING, ADJUSTING AND BALANCING

- A. Owner may appoint, employ, and pay for services of independent firm to perform testing, adjusting, and balancing.

- B. Reports will be submitted by independent firm to Owner's Representative indicating observations and results of tests and indicating compliance or non-compliance with requirements of Contract Documents.

1.5 PROTECTING INSTALLED CONSTRUCTION

- A. Protect installed Work and provide special protection where specified in individual specification sections.
- B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- F. Prohibit traffic from landscaped areas.

1.6 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed Shop Drawings, Product Data, and Samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress, not less than weekly.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and modifications.
- F. Record Drawings (As-Built): Contractor shall provide to Owner digital As-Built Drawings in AutoCAD ver.14 format or newer upon completion of project. Legibly mark each item to record actual construction including:
 - 1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

2. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 3. Field changes of dimension and detail.
 4. Details not on original Contract drawings.
 5. Items required by other sections of this specification.
- G. Submit documents to Owner's Representative with claim for final Application for Payment.

1.7 MANUAL FOR MATERIALS AND FINISHES

- A. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Include information for re-ordering custom manufactured products.
- B. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- C. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.
- D. Additional Requirements: As specified in individual product specification sections.

1.8 PRODUCT WARRANTIES AND PRODUCT BONDS

- A. Obtain warranties and bonds executed in duplicate by responsible subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
- B. Execute and assemble transferable warranty documents and bonds from subcontractors, suppliers, and manufacturers.
- C. Verify documents are in proper form, contain full information, and are notarized.
- D. Co-execute submittals when required.
- E. Include Table of Contents and assemble in three D side ring binder with durable plastic cover.
- F. Submit prior to final Application for Payment.
- G. Time Of Submittals:
 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
 2. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.
 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

SECTION 01 70 00
EXECUTION REQUIREMENTS

PRODUCTS

Not Used.

PART 2 EXECUTION

Not Used.

END OF SECTION

SECTION 31 05 13
EARTHWORK

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division I Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Excavation, compaction and backfill. Site will be excavated and embanked to approximately one foot below the finish grades indicated on the drawings prior to beginning work.
- B. Trench excavation, bedding and backfill.

1.3 RELATED DOCUMENTS

- A. 312513 - Erosion Control

1.4 QUALITY ASSURANCE

- A. Codes and Standards: Perform excavation and backfill work in compliance with applicable requirements of the City of Tigard.
- B. Soil Testing Service:
 - 1. Contractor to engage a soil testing service, to include testing soil materials proposed for use in the work and for quality control testing during excavation and fill operations.
 - 2. Samples of materials shall be furnished to the testing service by the Contractor.
 - 3. Under this Contract, the Contractor shall smooth out areas for density tests and otherwise facilitate testing work as directed.

1.5 SUBMITTALS

- A. For information, submit description of dewatering methods proposed for use.
- B. For information, submit description of vibratory compactors proposed for use when requesting placement of backfill and fill materials greater than requirement established herein.
- C. Materials for use as "imported fill material", and "pipe bedding and backfill material".

1.6 PROJECT CONDITIONS

- A. Site information: Subsurface conditions were investigated by GeoDesign, Inc., 15575 SW Sequoia Parkway, #100, Portland, Oregon 97224. The geotechnical investigation report is Dated June 12, 2013. Samples, logs and other data may be inspected by contacting them.
1. The data on subsurface conditions are not intended as representations or warranties or accuracy or continuity of such conditions between soil borings. It is expressly understood that the Owner will not be responsible for interpretations or conclusions drawn there from by the Contractor. The data is made available for the convenience of the Contractor.
 2. Additional test borings and other exploratory operations may be made by the Contractor at no additional cost to the Owner.
- B. Disposal of Waste Material:
1. Disposal sites for earth waste materials are not available on Owner's property. Materials that are not suitable for use as topsoil or cannot be used in embankments or construction shall be disposed off-site.
 2. Contractor shall restrict temporary storage of waste materials and materials to be reused to the designated work areas.
 3. Contractor shall arrange and pay for removal and disposal of all waste materials encountered in the work.
- C. Existing Utilities:
1. Locate existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection during excavation operations.
 2. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with the Owner and public and private utility companies in keeping their respective services and facilities in operation. Repair damaged utilities to the satisfaction of the utility owner at no cost to city.
 3. Do not interrupt existing utilities serving facilities occupied and used by the Owner or others, except when permitted in writing by Engineer and then only after acceptable temporary utility services have been provided.
 4. Demolish and completely remove from the site existing underground utilities which are not to remain in service and are located within an excavation area. Coordinate with local utility companies for shut-off services in lines that are active.
- D. Barricade open excavations in compliance with code requirements. Protect structures, utilities, sidewalks, pavement, and other facilities immediately adjacent to excavations, from damages caused by settlement, lateral movement, undermining, washout and other hazards.
- E. Protection of Subgrade: Do not allow equipment to disturb subgrade, stripped areas, or other areas prepared for project. Prevent water from collecting on surface. Repair disturbed subgrade as specified below for unauthorized excavation.
- F. Excavation Safety: The Contractor shall be solely responsible for making all excavations in a safe manner. Provide appropriate measures to retain excavation side slopes and prevent rock falls to ensure that persons working in or near the excavation are protected.
- G. Protection:
1. Protect trees and other features remaining as a portion of the final landscaping.
 2. Protect bench marks, utilities, sidewalks, paving and curbs from equipment, vehicular traffic and general construction activities.

3. Protect above and below grade utilities which are to remain.
4. Notify Engineer of unexpected subsurface conditions and discontinue affected work in the area until notified to resume operations.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. OSHD Specification refers to the State of Oregon Highway Division, Standard Specifications for Highway Construction.
- B. Topsoil: Provide topsoil to accomplish the Work; submit sample of imported topsoil to City Parks Department for review and acceptance. Place topsoil in all planting areas and lawn areas. Refer to Section 329113 – Landscape Grading Topsoil and Soil Preparation.
- C. Stripping: Grass, sod and other types of vegetation removed.
- D. Compacted Fill: Any on-site soil materials free of organic matter, non-plastic (dried), containing no particles larger than 4 inches, capable of compaction as specified, and approved by the soil testing service. Use for trench zone and trench foundation stabilization material in all areas not receiving improvements. Material shall be approved by the soil testing service prior to use in the Work.
- E. Imported Fine-Grained Material: Material approved by the soil testing service for use as embankment material from an off-site source other than imported granular material. The source shall be approved by the soil testing agency prior to use.
- F. Select Granular Fill: Imported granular fill materials should consist of sand, gravel or fragmental rock with a maximum particle size of 6 inches and with not more than 5% passing the #200 sieve (washed analysis).
- G. Pipe Bedding and Backfill Material: Crushed rock with a maximum particle size of 3/4" for pipe zone and 1 1/2"-0 capable of compaction as specified, with not more than 5% passing the #200 sieve (washed analysis) in trench zone. Material shall be approved by the soil testing service prior to use in the Work.
- H. Trench Stabilization Material: Trench stabilization material shall consist of quarry run rock, crushed rock, or crushed gravel and sand and shall meet the requirements set forth by ODOT SS 00330.14 and 00330.15, with a minimum particle size of 2 inches and less than 5 percent passing the U.S. Standard No. 4 Sieve. The material shall be free of organic matter and other deleterious material. Trench stabilization material shall be placed in one life and compacted to a firm condition.
- I. Free Draining Fill: Free-draining material for blanket or wall drains for the subdrainage system shall be crushed rock of 1 1/2"-3/4" gradation with not more than 2% passing the #200 sieve (washed analysis). Drain rock should have at least two fractured faces and be compacted to a well-keyed, firm condition.

PART 3 - EXECUTION

3.1 SITE CLEARING

- A. General:
 - 1. Remove vegetation, improvements, or obstructions interfering with installation of new construction unless otherwise indicated as protected. Remove such items elsewhere on the site or premises as specifically indicated. Removal includes stumps and roots.
- B. Stripping: Strip all organic matter under areas to receive pavement, sidewalks and building pads. Approximate stripping depth is 4-6 inches.

3.2 EXCAVATIONS

- A. Excavation consists of removal and disposal of all material encountered when establishing required grade elevations. All excavation is unclassified. The contours on the drawings indicate finish grade unless otherwise indicated and the Contractor shall provide for the minimum depth of topsoil specified in Part 2.1 of Section 329113. Finish grading and soil preparation is covered in landscaping specifications.
- B. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Engineer. Unauthorized excavation, as well as remedial work directed by the Engineer, shall be at no change in Contract amount.
- C. Additional Excavation: When excavation has reached required subgrade notify the soil testing service who will observe conditions.
 - 1. Proof roll ground surface. Proof rolling will be observed by the testing service. Remove soft areas detected by the proof rolling and replace with compacted fill or imported fill material as directed.
 - 2. If unsuitable bearing materials are encountered at the required subgrade elevations, carry excavations deeper and replace the excavated material as directed.
- D. Stability of Excavations: The stability of excavation slopes will be the responsibility of the Contractor in conformance with the recommendations of the geotechnical investigation.
- E. Shoring and Bracing: Provide shoring and bracing to comply with local codes and authorities having jurisdiction. Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross braces, in good serviceable condition. Maintain shoring and bracing in excavations regardless of the time period excavations will be open. Extend shoring and bracing as the excavation progresses.
- F. Dewatering: Prevent surface water and subsurface or ground water from flowing into excavations and from flooding the project site and surrounding area.
 - 1. Do not allow water to accumulate in excavations. Remove water to prevent detrimental soil changes to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines and other dewatering system components necessary to convey water away from excavations.
 - 2. Convey water removed from excavations and rain water to collection or run-off areas. Establish and maintain temporary drainage ditches and other diversions outside excavation limits for each structure. Do not use trench excavations as temporary drainage ditches.
 - 3. Provide treatment of the water in order to comply with the erosion control permit for the project.

- G. Excavation for Building Pads:
1. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.05', and extend a sufficient distance from footings and foundations to permit placing and removal of concrete form work, installation of services, other construction and for inspection.
 2. In excavating for footings and foundations, take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is to be placed. Trim bottoms to required lines and grades to leave solid base to receive concrete.
- H. Excavation for Pavements: Cut surface under pavements to comply with cross-sections, elevations and grades as shown.
- I. Excavations for Trenches: Performed as part of work installed.
1. Dig trenches to the uniform width required for the particular item to be installed, sufficient minimum width as shown on the Drawings and to provide ample working room.
 2. Excavate trenches to the depth indicated or required. Carry the depth of trenches for piping to establish the indicated flow lines and invert elevations. Beyond the building perimeter, keep bottoms of trenches sufficiently below grade to avoid freeze-ups.
 3. When unstable pipe foundation is encountered, place a minimum of 12 inches of trench stabilization material under the pipe bedding material to stabilize the trench.
 4. Grade bottoms of trenches as indicated, notching under pipe bells to provide solid bearing for the entire body of the pipe.
 5. Backfill trenches prior to tests and inspections. Use care in backfilling to avoid damage or displacement of pipe systems.
- J. Cold Weather Protection: Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.
- K. Dust: Assume full responsibility for all alleviation or prevention of dust nuisance on or about the site in compliance with regulatory requirements.

3.3 COMPACTION

- A. General: Control soil compaction during construction providing minimum percentage of density specified for each area.
- B. Prior to fill placement or aggregate base course placement, the subgrade shall be proof-rolled with a fully-loaded 10 to 12 yard dump truck. Any areas that pump, heave or appear soft shall be over excavated and backfilled a minimum of 12 inches with select granular fill material.
- C. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum dry density for soils which exhibit a well-defined moisture density relationship determined in accordance with ASTM D 1557.
1. Structural Fill: Compact exposed subgrade where disturbed, and each layer of backfill or fill material to 95 percent of maximum dry density (MDD).
 2. Non-Structural Landscape Fill: Compact top 6 inches of subgrade, and each layer of fill material to 85 percent of MDD.
 3. Trench Backfill: Pipe base and pipe zone compacted to 92% of MDD. In pavement areas compact top 24 inches of subgrade shall be compacted to 95%, and each

layer of backfill or fill material to 92 percent of MDD. Outside pavement areas compact fill to 90% MDD.

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

3.4 BACKFILL AND FILL

- A. In all excavations, unless otherwise specified, use satisfactory excavated or imported material for backfill which has been sampled and tested by a soil testing service employed by the Owner. On-site materials may be used in structural fills only during dry conditions when optimum moisture content can be maintained.
- B. Use imported granular material in wet conditions as structural fill.
- C. Backfill excavations as promptly as work permits, but not until completion of the following:
1. Acceptance by Engineer of construction below finish grade including, where applicable, waterproofing, dampproofing, drainage pipe and perimeter insulation.
 2. Inspection, testing, approval and recording of locations of underground utilities.
 3. Removal of shoring and bracing and backfilling of voids with satisfactory materials.
 4. Removal of trash and debris.
- D. **Placement and Compaction:** Place backfill and fill materials in layers not more than 8 inch with native material and not more than 12 inches in loose depth for granular material compacted by heavy compaction equipment, and not more than 8 inches in loose depth for material compacted by hand-operated tampers.
1. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content.
 2. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification.
 3. Do not place backfill or fill material on surfaces muddy, frozen, or containing frost or ice.
 4. Place backfill and fill materials evenly adjacent to structures, to required elevations. Take care to prevent wedging action of backfill against structures by carrying the material uniformly around structure to approximately same elevation in each lift.

3.5 GRADING

- A. **General:** Uniformly grade areas of work including adjacent transition areas. Smooth finished surface within specified tolerances, compact in uniform levels or slopes between points where elevations are shown, or between such points and existing grades.
- B. **Grading Outside Building Lines:** Grade areas adjacent to building lines to be no more than 8 inches from any building siding and to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes. Grading contractor to provide for

placement of top soil, as required, to the finish grades indicated on the drawings (See section 329219 and 329300)

- C. Grading Surface of Fill Under Building Slabs: Grading smooth and even, free from voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of ½-inch when tested with a 10-foot straightedge.

3.6 FIELD QUALITY CONTROL

- A. General: The Contractor is responsible for preparing for and scheduling all required testing activities.
- B. Quality Control Testing During Construction: Allow soil testing service retained by the Contractor to observe, test and approve subgrades and fill layers before further construction work is performed.
- C. If testing reports are below specified density, provide corrective work as required to reach specified density at no additional expense to City.

3.7 PROTECTION

- A. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- B. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, compact to required density and provide other corrective work as specified, prior to further construction.

END OF SECTION

SECTION 31 25 13
EROSION CONTROL

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Section, apply to this Section.

1.2 SECTION INCLUDES

- A. Furnishing, placing and maintaining all erosion control and protective materials.

1.3 RELATED SECTIONS

- A. Section 310513 - Earthwork

1.4 REGULATORY REQUIREMENTS

- A. Conform to the requirements of Clean Water Services, Erosion Prevention and Sediment Control Planning And Design Manual.
- B. Contractor shall adhere to the requirement of the DEQ 1200C permit requirements and shall supplement the erosion control plan requirements to meet the specific site demands to prevent sediment laden water from leaving the site.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Gravel: All material furnished for "Gravel Construction Entrances" shall be clean pit run, or 3"-6" clean crushed rock.
- B. Sediment Fences: Woven construction fabric specifically designed to control sediment runoff. Acceptable material is Amoco 1380 Silt Stop, or equal.
- C. Posts/Stakes:
 - 1. 2"x4" standard or better wood posts (sediment fences).
 - 2. Steel fence posts (sediment fences).
 - 3. 2"x2" standard or better wood stakes (straw bales).
- D. Straw Bales: 40 to 60 pound rectangular bales of cereal grain or seed straw.
- E. Bio-Bags: Clean 100% recycled wood product waste. Size of bag to be 18x8x30-inches and weigh approximately 45 pounds and made of ½-inch plastic mesh.
- F. Hydro-Seeding: Seed, fertilizer and mulch acceptable to the landscape architect.
- G. Wattles: Rice, Coconut or Excelsior type wattles.

PART 3 EXECUTION

3.1 GENERAL

- A. The Contractor shall comply with all regulatory requirements.
- B. Prior to performing any site clearing or earthwork operations, The sediment barrier Shall be in place.

3.2 SEDIMENT BARRIERS

- A. The Contractor shall place the sediment barrier around the site perimeter as shown on the Drawings.
- B. Place sediment barriers at toes of slopes. Embed sediment fences 6 inches below ground.
- C. Provide posts at 6-foot maximum spacing for sediment fences.
- E. Provide filter fabric inlet barrier around the on-site catch basins and area drains per drawing details.

3.3 GRAVEL CONSTRUCTION ENTRANCE

- A. Provide gravel construction entrance pads as shown on the Drawings.
- B. Gravel depth to be 8-inch minimum thickness with the top of the pad to be the same elevation as the bottom of the pavement structural section.

3.4 INLET PROTECTION

- A. Provide inlet protection for all existing and new inlets within the property boundary and within the influence of the work area to protect the existing and new storm sewers from sediment.

3.5 MAINTENANCE OF DEVICES

- A. Depth of sediment accumulated behind barrier shall be less than one foot. Periodically remove excess sediment and regrade onto slopes to maintain fence.
- B. Repair and/or reestablish barriers that are damaged or temporarily removed immediately after such instance occurs.
- C. Remove and replace contaminated gravel with clean gravel as necessary to mitigate mud and dirt transported to public streets. Prior to construction of the asphalt pavement parking area, remove and replace contaminated gravel.
- D. Provide slope protection, seeding, and all other erosion control measures as specified and shown on the Drawings.

END OF SECTION

SECTION 32 11 23
AGGREGATE BASE COURSE

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Coarse aggregate materials.
 - 2. Fine aggregate materials.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division I Specification Sections, apply to this Section.
- B. Section 00641, Aggregate Subbase, Base, and Shoulders Oregon Standard Specifications for Construction 2008

1.3 RELATED SECTIONS

- A. Document - Geotechnical Report
- B. Section 310513 - Earthwork.
- C. Section 321216 - Asphaltic Concrete Paving
- D. Section 331116 - Site Water Distribution.
- E. Section 333100 - Sanitary Sewer System.
- F. Section 334100 - Storm Drainage.

1.4 REFERENCES

- A. ASTM International:
 - 1. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.
 - 2. ASTM D2922 – Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
 - 3. ASTM D3017 – Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.5 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Requirements for submittals.
- B. Samples: Submit, in air-tight containers, 10lb sample of each type of aggregate fill to testing laboratory.

- C. Materials Source: Submit name of imported materials suppliers.
- D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

PART 2 - PRODUCTS

2.1 MATERIALS –

A. COARSE AGGREGATE MATERIALS

Furnish Coarse Aggregate materials in accordance with ODOT Section 00641 for gradation and other specified material requirements.

B. FINE AGGREGATE MATERIALS

Furnish Course Aggregate materials in accordance with ODOT Section 00641 for gradation and other specified material requirements.

C. PERVIOUS CONCRETE AGGREGATE MATERIALS

Aggregate for pervious concrete shall have the following gradation (AASHTO size number 57):
ker base course aggregate for groundwater infiltration beds shall have the following gradation (AASHTO size number 57):

U.S. Standard Sieve Size	Percent Passing
1 ½" (37.5mm)	100
1" (25mm)	95-100
½" (12.5mm)	25-60
4 (4.75mm)	0-10
8 (2.36mm)	0-5

- 1. Non woven geotextile (drainage filter fabric) shall conform to the following:
 - a. Minimum flow rate of 95 gal/min/ft2 ASTM D-4491-85
 - b. Grab tensile strength min 115 lb ASTM D4632-86
 - c. Burst strength min150 psi ASTM D-3786-80a
 - d. Puncture resistance min 45 lb ASTM D-4833-88
 - e. Apparent opening size 60-90 US Standard sieve
 - f. Non-woven geotextile shall be Mirafi 160N, or pre-bid approved equal.

2.3 SOURCE QUALITY CONTROL

- A. Section 01400 - Quality Requirements: Testing and inspection services.
- B. Coarse Aggregate Material - Testing and Analysis: Perform in accordance with Oregon Standard Specifications for Construction 2008 with no more than 5% passing the # 200 sieve (washed analysis).
- C. Fine Aggregate Material - Testing and Analysis: Perform in accordance with Oregon Standard Specifications for Construction 2008 with no more than 5% passing the # 200 sieve (washed analysis).

- D. When tests indicate materials do not meet specified requirements, change material and retest.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify subgrade has been inspected, gradients and elevations are correct, and subgrade is dry.

3.2 PREPARATION

- A. Correct irregularities in subgrade gradient and elevation by scarifying, reshaping, and re-compacting.
- B. Do not place fill on soft, muddy, or frozen surfaces.

3.3 AGGREGATE PLACEMENT

- A. Spread aggregate over prepared subgrade to the total compacted thickness indicated on the Drawings.
- B. Place aggregate in maximum 6 inch layers and compact to specified density.
- C. Level and contour surfaces to elevations and gradients indicated. If thickness is more than 6 inches, spread in two equal lifts.
- D. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.
- E. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.
- F. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.4 TOLERANCES

- A. Flatness: Maximum variation of ½-inch measured with 10-foot (3 m) straight edge.
- B. Scheduled Compacted Thickness: Within ¼-inch.
- C. Variation From Design Elevation: Within ½-inch.

3.5 FIELD QUALITY CONTROL

- A. Compaction testing will be performed in accordance with ASTM D1557, ASTM D2922 and ASTM D3017.
- B. If tests indicate Work does not meet specified requirements, remove Work, replace and retest.
- C. Frequency of Tests: One test every 500 SY.
- D. Furnish each aggregate material from single source throughout the Work.
- E. Perform Work in accordance with City of Tigard standards and these specifications.

- 3.6 F. Maintain one copy of each document on site.
SCHEDULES

- A. Under Structures and Pavement:
1. Compact placed aggregate materials to achieve 95% maximum density per ASTM D1557

3.7 **STOCKPILING**

- A. Stockpile materials on site at locations indicated.
- B. Stockpile in sufficient quantities to meet Project schedule and requirements.
- C. Separate different aggregate materials with dividers or stockpile individually to prevent mixing.
- D. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.
- E. Stockpile unsuitable materials on impervious material and cover to prevent erosion and leaching, until disposed of.

END OF SECTION

SECTION 32 13 14
CONCRETE CURBS AND WALKS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to Work of this Section.
- B. Section 00759-Miscellaneous Portland Cement Concrete Structures, of the Oregon Standard Specifications for Construction, 2008

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Portland cement concrete paving, curbs and sidewalks as shown on Drawings.
 - 2. Portland cement concrete for use in site structures.

1.3 SUBMITTALS

- A. Provide samples, manufacturer's product data – include concrete mix design and reinforcement, test reports, and materials' certifications as required in referenced sections for concrete and joint fillers and sealers.

B.

1.4 QUALITY ASSURANCE

- A. Codes and Standards: Comply with local governing regulations if more stringent than herein specified.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Forms: Steel, wood or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects.
 - 1. Use flexible spring steel forms or laminated boards to form radius bends as required.
 - 2. Coat forms with a nonstaining form release agent that will not discolor or deface surface of concrete.
- B. Reinforcing Materials:
 - 1. Reinforcing Bars: Deformed steel bars, ASTM A 615, Grade 60.
 - 2. Welded Wire Mesh: Welded plain cold-drawn steel wire fabric, ASTM A 185. Furnish in flat sheets, not rolls, unless otherwise acceptable to Engineer.
 - 3. Fabricated Bar Mats: Welded or clip-assembled steel bar or rod mats, ASTM A 184. Use ASTM A 615, Grade 60 steel bars, unless otherwise indicated.
 - 4. Joint Dowel Bars: Plain steel bars, ASTM A 615, Grade 60. Cut bars true to length with ends square and free of burrs.
 - 5. Supports for Reinforcement: Chairs, spacers, dowel bar supports and other devices for spacing, supporting, and fastening reinforcing bars, welded wire fabric, and dowels in place. Use wire bar-type supports complying with CRSI specifications.

- C. Concrete Materials: Comply with requirements of applicable Division 3 sections for concrete materials, admixtures, bonding materials, curing materials and others as required.
1. Portland Cement: ASTM C150, Type IA or IIA.
 - a. Use one brand of cement throughout Project unless otherwise acceptable to Engineer.
 2. Fly Ash: ASTM C 618; Type F.
 3. Normal-Weight Aggregates: ASTM C 33, Class 4, and as follows. Provide aggregates from a single source.
 - a. Maximum Aggregate Size: 1½ inches.
 - b. Do not use fine or coarse aggregates that contain substances that cause spalling.
 - c. Local aggregates not complying with ASTM C 33 that have been shown to produce concrete of adequate strength and durability by special tests or actual service may be used when acceptable to Engineer.
 4. Water: Potable.
 5. Air Entrainment: ASTM C 260.
 6. Chemical Admixture: ASTM C 494.
- D. Expansion Joint Materials: ASTM D 994, preformed asphalt impregnated, ½-inch thick.
- E. Liquid-Membrane Forming and Sealing Curing Compound: Comply with ASTM C 309, Type I, Class A unless other type acceptable to Engineer. Moisture loss no more than 0.055 gr./sq.cm. when applied at 200 sq.ft./gal.
- F. Bonding Compound: Acrylic or styrene butadiene base, rewettable type.
- G. Epoxy Adhesive: ASTM C 881, 2-component material suitable for use on dry or damp surfaces. Provide material "Type", "Grade" and "Class" to suit project requirements.

2.2 CONCRETE MIX, DESIGN AND TESTING

- A. Prepare design mixes for each type and strength of normal-weight concrete by either laboratory trial batch or field experience methods as specified in ACI 301. For the trial batch method, use a qualified independent testing agency for preparing and reporting proposed mix designs.
1. Limit use of fly ash to 25 percent of cement content by weight.
- B. Proportion mixes according to ACI 211.1 and ACI 301 to provide normal-weight concrete with the following properties:
1. Compressive Strength (28-Day):
 - a. Sidewalks and Curbs: 3000 psi.
 - b. Site Structures: 3000 psi.
 2. Slump Limit at Point of Placement: 4 inches.
 - a. Slump limit for concrete containing high-range water-reducing admixture (superplasticizer): Not more than 8 inches.
 3. Air Content: 5 percent ± 1%.
- C. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, project conditions, weather, test results or other

circumstances warrant.

- D. Ready-Mixed Concrete: Comply with requirements and with ASTM C 94.
 - 1. When air temperature is between 85 degrees F (30 degrees C) and 90 degrees F (32 degrees C), reduce mixing and delivery time from 1½ hours to 75 minutes; when air temperature is above 90 degrees F (32 degrees C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

- A. Remove loose material from compacted subbase immediately before placing concrete.
- B. Proof-roll prepared subbase surface to check for unstable areas and need for additional compaction. Do not begin paving work until such conditions have been corrected and are ready to receive concrete mix.

3.2 FORM CONSTRUCTION

- A. Set forms to required grades and lines, braced and secured. Install forms to allow continuous progress of work and so that forms can remain in place at least 24 hours after concrete placement.
- B. Check completed formwork for grade and alignment to following tolerances:
 - 1. Top of forms not more than 1/4-inch in 10 feet.
 - 2. Vertical face on longitudinal axis, not more than 1/2-inch in 10 feet.
- C. Clean forms after each use and coat with form release agent as required to ensure separation from concrete without damage.

3.3 REINFORCEMENT

- A. Comply with Section 00755.43 Placing Reinforcement of the Oregon Standard Specifications for Construction, 2008.
- B. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.4 CONCRETE PLACEMENT

- A. Comply with requirements and with ACI 304R for measuring, mixing, transporting, and placing concrete.
- B. Do not place concrete until subbase and forms have been checked for line and grade. Moisten subbase if required to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- C. Place concrete by methods that prevent segregation of mix. Consolidate concrete along face of forms and adjacent to transverse joints with internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with care to prevent dislocation of reinforcing, dowels and joint devices.

SECTION 32 13 14
CONCRETE CURBS AND WALKS

- D. Use bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- E. Deposit and spread concrete in a continuous operation between transverse joints as far as possible. If interrupted for more than ½ hour, place a construction joint.
- F. Screed paved surfaces with a straightedge and strike off. Use bull floats or darbies to form a smooth surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces prior to beginning finishing operations.
- G. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off and screed.
 - 1. Remove and replace portions of bottom layer of concrete that have been placed more than 15 minutes without being covered by top layer or use bonding agent if acceptable to Engineer.
- H. Curbs and Gutters: When automatic machine placement is used for curb and gutter placement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing as specified for formed concrete. If results are not acceptable, remove and replace with formed concrete.
- I. Slip-Form Pavers: When automatic machine placement is used for paving, submit revised mix design and laboratory test results that meet or exceed requirements. Produce paving to required thickness, lines, grades, finish and jointing as required for formed paving.
 - 1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of paver machine during operations.
- J. When adjoining pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained 85 percent of its 28-day compressive strength.
- K. Cold-Weather Placement: Comply with provisions of ACI 306R and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions or low temperatures.
 - 1. When air temperature has fallen to or is expected to fall below 40 degrees F (4 degree C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 degrees F (10 degrees C) and not more than 80 degrees F (27 degrees C) at point of placement.
 - 2. Do not use frozen materials or materials containing ice or snow.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix design.
- L. Hot-Weather Placement: Place concrete complying with ACI 305R and as specified when hot weather conditions exist.
 - 1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 degrees F (32 degrees C). Mixing water may be chilled or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.
 - 3. Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.5 JOINTS

- A. General: Construct expansion, weakened-plane (contraction), and construction joints true to line with face perpendicular to surface of concrete. Construct transverse joints at right angles to the centerline, unless otherwise indicated.
- B. When joining existing structures, place transverse joints to align with previously placed joints, unless otherwise indicated.
- C. Weakened-Plane (Contraction) Joints: Provide weakened-plane (contraction) joints, sectioning concrete into areas as shown on Drawings. Construct weakened-plane for a depth equal to at least $\frac{1}{4}$ concrete thickness, as follows:
 - 1. Tooled Joints: Form weakened-plane joints in fresh concrete by grooving top portion with a recommended cutting tool and finishing edges with a jointer.
 - 2. Inserts: Use embedded strips of metal or sealed wood to form weakened-plane joints. Set strips into plastic concrete and carefully remove strips after concrete has hardened.
- D. Construction Joints: Place construction joints at end of placements and at locations where placement operations are stopped for more than $\frac{1}{2}$ hour, except where such placements terminate at expansion joints.
 - 1. Construction joints as shown or, if not shown, use standard metal keyway-section forms.
 - 2. Where load transfer-slip dowel devices are used, install so that one end of each dowel bar is free to move.
- E. Expansion Joints: Provide premolded joint filler for expansion joints abutting concrete curbs, catch basins, manholes, inlets, structures, walks and other fixed objects, unless otherwise indicated.
 - 1. Locate expansion joints at 48' o.c. or as shown on Drawings.
- F. Extend joint fillers full width and depth of joint, not less than $\frac{1}{2}$ -inch or more than 1-inch below finished surface where joint sealer is indicated. If no joint sealer, place top of joint filler flush with finished concrete surface.
- G. Finish joint fillers in one-piece lengths for full width being placed wherever possible. Where more than one length is required, lace or clip joint filler sections together.
- H. Protect top edge of joint filler during concrete placement with a metal cap or other temporary material. Remove protection after concrete has been placed on both sides of joint.

3.6 CONCRETE FINISHING

- A. After striking-off and consolidating concrete, smooth surface by screeding and floating. Use hand methods only where mechanical floating is not possible. Adjust floating to compact surface and produce uniform texture.
- B. After floating, test surface for trueness with a 10-foot straightedge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide a continuous smooth finish, true to within $\frac{1}{4}$ -inch in 10 feet.
- C. Work edges of gutters, back top edge of curb, and formed joints with an edging tool, and round to $\frac{1}{2}$ -inch radius, unless otherwise indicated. Eliminate tool marks on concrete

surface.

- D. After completion of floating and when excess moisture or surface sheen has disappeared, complete troweling and finish surface as follows:
 - 1. Scoring pattern and surface finish will be as directed by the City.
- E. Do not remove forms for 24 hours after concrete has been placed. After form removal, clean ends of joints and point-up any minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by Engineer.

3.7 CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with the recommendations of ACI 306R for cold weather protection and ACI 305R for hot weather protection during curing.
- B. Evaporation Control: In hot, dry, and windy weather, protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull floating, but before floating.
- C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- D. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these.

3.8 REPAIRS AND PROTECTION

- A. Repair or replace broken or defective concrete, as directed by Engineer.
- B. Drill test cores where directed by Engineer when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement with Portland cement concrete bonded to pavement with epoxy adhesive.
- C. Protect concrete from damage until acceptance of work. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Sweep concrete pavement and wash free of stains, discolorations, dirt, and other foreign material just before final inspection.

3.9 FIELD QUALITY CONTROL

- A. Four concrete test cylinders will be taken for every 100 or less cu. yds. of each class of concrete placed each day or as directed by Engineer.
- B. One additional test cylinder will be taken during cold weather and cured on site under same conditions as concrete it represents.
- C. One slump test will be taken for each set of test cylinders taken.
- D. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

END OF SECTION

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CONCRETE CURBS AND WALKS

SECTION 32 91 13
LANDSCAPE GRADING, TOPSOIL, AND SOIL PREPARATION

PART 1 GENERAL

1.01 SUMMARY

- A. This section covers all work necessary to furnish and place topsoil mixes, and general preparation of planting areas as denoted on plan.
- B. Related Sections:
 - 1. Section 31 05 13 - Earthwork
 - 2. Section 32 84 00 - Planting Irrigation
 - 3. Section 32 92 19 - Seeding
 - 4. Section 32 93 00 - Plants

1.02 PROTECTION

- A. Protect existing trees to be preserved as denoted on plan, and other features such as fences, roads, sidewalks, paving, and curbs as final work.

1.03 SUBMITTALS

- A. Provide certification that the following materials meet the specified requirements.
 - 1. Compost.
 - 2. Coarse Sand
 - 3. Topsoil test results with recommended soil additives.

PART 2 - PRODUCTS

2.01 TOPSOIL

- A. **IMPORTED TOPSOIL** – The imported topsoil shall be a natural friable sandy loam soil and shall be reasonably free from topsoil, clay lumps, stone, or similar objects larger than ½ inch in greatest diameter, brush, stumps, roots, objectionable weeds or litter, growth or a hindrance to subsequent smooth grading, and maintenance operations.
- B. **NATIVE TOPSOIL** – The native topsoil is taken from the A Horizon of the existing site once the top layer of vegetation has been stripped. To qualify for use in the landscape areas, the topsoil shall be separated from other site soils and stockpiled for later use. It shall be a natural friable soil and shall be reasonably free from sod, grass, subsoil, clay lumps, stone, or similar objects larger than 1 inch in greatest diameter, brush, stumps, roots, objectionable weeds or litter, growth or a hindrance to subsequent smooth grading, and maintenance operations. Screening may be necessary.
- C. If native soils do not meet the definition and quality of "Native Topsoil", then imported topsoil is to be used and will be incidental to the topsoil price.

2.02 COARSE SAND

- A. Coarse Concrete Sand, ASTM C-33 Fine Aggregate, with a Finus Modulus Index between 2.8 and 3.2
- B. Coarse sand shall be clean, sharp, mineral sand.
- C. Coarse sand shall be washed to remove silt and clay particles.
- D. Submit two four liter samples with manufacturer's literature and material testing certification that the product meets the requirements.

2.03 COMPOST - Compost shall be a commercially manufactured material, medium grind, made from dead plant material such as grass clippings, weeds, green and dead dry leaves, garden and vegetable material, and ground branches of trees and shrubs. Furnish a product that is composted under controlled aerobic decomposition, with the internal temperature reaching 57 degrees Celsius (135 degrees F) for 15 days, without exceeding 68 degrees Celsius (155 degrees F). Ensure that it contains less than 10% bacteria and less than 10% fungus, is a mature compost, and does not contain detrimental components. If it contains more than 10% bacteria and/or fungus, it is likely not mature compost and will not be acceptable. Certification by testing is required.

Parameters ^{1,6}	Reported as (units of measure)	General Range
pH ²	pH units	6.0 – 8.5
Soluble Salt Concentration ² (electrical conductivity)	dS/m (mmhos/cm)	Maximum 10
Moisture Content	%, wet weight basis	30 - 60
Organic Matter Content	%, wet weight basis	30 - 65
Particle Size	% passing a selected mesh size, dry weight basis	98% pass through 3/4" screen or smaller
Stability ³ Carbon dioxide Evolution Rate	Mg CO ₂ -C per g OM per day	< 8
Maturity ³ (Bioassay) Seed emergence and Seed Vigor	%, relative to positive control %, relative to positive control	Minimum 80% Minimum 80%
Physical Contaminants (inerts)	%, dry weight basis	< 1
Chemical Contaminants ⁴	Mg/kg (ppm)	Meet or exceed US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3 levels
Biological Contaminants ⁵ Select Pathogens Fecal Coliform Bacteria, or Salmonella	MPN per gram per dry weight MPN per 4 grams per dry weight	Meet or exceed US EPA Class A standard, 40 CFR § 503.32(a) levels

¹ Recommended test methodologies are provided in Test Methods for the Examination of Composting and Compost (TMECC, The US Composting Council)

² It should be noted that the pH and soluble salt content of the amended soil mix is more relevant to the establishment and growth of a particular plant, than is the pH or soluble salt content of a specific compost (soil retainer) used to amend the soil. Each specific plant species requires a specific pH range. Each plant also has a salinity tolerance rating, and maximum tolerable quantities are known. Most ornamental plants and turf species can tolerate a soil/media soluble level of 2.5 dS/m and 4 dS/m, respectively. Seeds,

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young seedlings and salt sensitive species often prefer soluble levels at half the afore mentioned levels. When specifying the establishment of any plant or turf species, it is important to understand their pH and soluble salt requirements, and how they relate to existing soil conditions.

³ Stability/Maturity rating is an area of compost science that is still evolving, and such, other various test methods could be considered.

⁴ US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3 levels = Arsenic 41ppm, Cadmium 39ppm, Copper 1,500ppm, Lead 300ppm, Mercury 17ppm, Molybdenum 75ppm, Nickel 420ppm, Selenium 100ppm, Zinc 2,800ppm.

⁵ US EPA Class A standard, 40 CFR § 503.32(a) levels = Salmonella<3 MPN/4 grams of total solids or Fecal Coliform<1000 MPN/gram of total solids.

⁶ Landscape architects and project (field) engineers may modify the allowable compost specification ranges based on specific field and plant requirements.

Before delivery of the compost, supplier must provide a copy of the lab analysis, performed by a STA Program certified lab, verifying that the compost meets the product parameters listed above. The lab analysis should not be more than 90 days old.

Verifying current participation in the STA program can also be achieved by logging onto the USCC website at www.compostingcouncil.org

2.04 GROWING MEDIUM – Growing medium is a blended soil consisting of the following:

- A. 33% fine compost meeting the requirements of section 2.03.
- B. 34% topsoil (imported or native) meeting the requirements of section 2.01
- C. 33% Coarse sand meeting requirements of section 2.02

2.05 SAND GROWING MEDIUM

- A. To be used as a cap over the under drain trenches and interceptor drain.
- B. 90% washed coarse sand and 10% peat moss, 90/10 Mix, meeting USGA specification for greens, as available from Fazio Brothers Sand Co., Vancouver, WA, (360)693-1837 or approved equal.

2.05 TOPSOIL FERTILITY TEST AND RECOMMENDATION

- A. Section 01 40 00 - Quality Requirements: Testing, inspection and analysis requirements.
- B. Imported Topsoil: Test and analyze imported topsoil by a qualified testing laboratory, to ascertain percentage of nitrogen, phosphorus, potash, soluble salt and organic matter; and pH value. Provide recommendation for fertilizer and soil amendment application rates for specified shrub planting and grass as result of testing.
- C. Native Topsoil: Obtain and submit a minimum of three (3) different soil samples from different locations to a qualified testing laboratory for a soil fertility test and recommendation report. The soil fertility test must evaluate available soil nutrient content and fertility status, NPK, soil pH, salinity, nitrate, ammonium, phosphate, potassium, calcium, and magnesium, and other element necessary to determine soil fertility.
- D. Submit the soil fertility test report(s) and laboratory recommendations for appropriate plant growth for approval before beginning work with the topsoil.

- 2.06 COMMERCIAL FERTILIZER** - All work in this section is incidental to the Contractor's base bid.
- A. Provide Fertilizer that meets the recommendations of the 'Soil Fertility Test' as required in 32 91 13 - 2.05
 - B. Lime: Provide Lime that meets the recommendations of the 'Soil Fertility Test' as required in 32 91 13 - 2.05
 - C. Granular Gypsum

PART 3 - EXECUTION

3.01 EQUIPMENT

- A. CONTRACTOR shall furnish and maintain earth-moving and compaction equipment in satisfactory condition and shall operate such equipment as necessary to control uniform density, and smoothness.

3.02 INSPECTION

- A. Verify site conditions and note irregularities affecting work in this section.
- B. Beginning work of this section means acceptance of existing conditions.

3.03 EXCAVATION HANDLING

- A. Remove all foreign matter obtained from site soil cleaning, screening and/or picking process from the site and legally dispose of as required by the appropriate jurisdiction. Dispose of all waste off-site.

3.04 GRASS AND WEED ERADICATION & SPRAYING

- A. General Site Area – All site area within the project work area.
 - 1. Prior to amending soil in all areas, spray all areas to be planted or seeded where weeds or grass are growing with "Roundup" at a 2% solution. Spray as per manufacturer's directions for area and plant materials involved. Always follow weed control container label directions.
 - 2. Spray work shall be done by a spray applicator licensed in the State where the project resides.
 - 3. Do not do any work on the areas sprayed for a minimum of 7 days after spraying.
 - 4. Protect all existing vegetation to remain from damage from spray application.

3.05 TOPSOIL

- A. Lawn Areas - Lawn areas shall receive native topsoil at the following depth:
 - 1. 6-inches deep.
- C. Shrub Planter Beds – shall receive 'Growing Medium' at the following depth:
 - 1. 12-inches deep
- D. Water Quality Planter Beds – shall receive 'Growing Medium' (Stormwater Facility Topsoil) at the following depth:
 - 1. 18-inches deep

3.06 GROWING MEDIUM INSTALLATION

- A. Prior to installing growing medium, the owner's representative shall approve the sub grade and previously installed sub grade preparation and the installation of subsurface drainage material.
- B. In areas of soil installation above existing subsoil, till the Growing Medium into the bottom layer of subsoil.
 - a. Loosen or till the subsoil of sub grade to a depth of 2-3 inches with a backhoe or other suitable device.
 - b. Spread a layer of the specified Growing Medium 2-3 inches deep over the sub grade. Thoroughly till the Growing Medium and sub grade together.
 - c. Immediately install the remaining Growing Medium in accordance with the following specifications. Protect tilled area from traffic. DO NOT allow the tilled sub grade to become compacted.
 - d. In the event the tilled area becomes overly compacted, re-till the area again prior to installing the growing medium.
- C. The depths and grades shown on the plans are final grades after settlement and shrinkage of the organic material. The contractor shall install Growing Medium at a higher level to anticipate this reduction of Growing Medium volume. Assure that the soil is mounded sufficiently high enough to accommodate this settlement.
- D. Protect Growing Medium from compaction and contamination by dust, debris, and any toxic material harmful to plants or humans after placement. Any area, which becomes compacted, shall be tilled to depth of 6 inches. Any un-even or settled areas shall become filled and re-graded.

3.07 SOIL AMENDMENT - LAWN AREAS

- A. Incorporate the following into the top 6 inches of topsoil in all fine seeded lawn areas and seeded athletic fields. All work in this section is incidental to the Contractor's base bid.
 - 1. Incorporate recommended and approved fertilizer at a rate recommended from the specified 'Soil Fertility Test'.
 - 2. Lime at a rate recommended from the specified 'Soil Fertility Test'.
 - 3. Granular gypsum at a rate of 100 pounds per 1,000 square feet for areas with native topsoil.

3.08 FINAL FINISH GRADING

- A. All Topsoil and Conditioner placement shall not be performed when satisfactory results cannot be obtained due to rain freezing weather, saturated soils or other unsatisfactory conditions.
- B. Rocks, stones, sticks, brush, roots, and other objectionable materials shall be removed and disposed of off-site.
- C. Provide for positive drainage from all areas towards the existing inlets, drainage structures, and or edges of planting beds.

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LANDSCAPE GRADING, TOPSOIL, AND SOIL PREPARATION

- D. Undulations and unsightly variations in grade that will not permit the use of normal mowing equipment without scalping or missing shall be re-graded and floated to smooth surfaces.
- E. Grading tolerance shall be within \pm one inch (1") from finish grades. All areas shall be graded to provide positive drainage. Grading shall be approved prior to CONTRACTOR proceeding with further construction, irrigation or planting.
- F. All planted areas shall be machine or hand worked to eliminate objectionable lumps and soil clods. Tillage shall include the removal of all equipment ruts and tracks, areas of compaction or erosion, and any other undesirable soil conditions which would prevent the proper formation of a finely pulverized seedbed.

3.09 UTILITY PROTECTION

- A. CONTRACTOR shall be responsible for protecting all existing and proposed water lines, underground utilities, and any other subsurface features while excavating and working on the project site.

END OF SECTION

SECTION 32 92 19

SEEDING

PART 1 GENERAL

1.01 SUMMARY

- A. The seeding shall be installed using the materials as shown on the drawings and/or as specified in the Specifications. Seeding shall be installed to grades and conform to areas and locations as shown on the drawings.
- B. Provide seeding as specified. The work included in this specification (whether mentioned or not) shall consist of all labor, tools, materials, tests, permits, and other related items necessary for the installation of all seeded areas in a first quality workmanlike manner.
- C. Section Includes:
 - 1. Soil preparation.
 - 2. Seeding.
 - 3. Mulching.
 - 4. Maintenance.
- D. Related Sections:
 - 1. Section 32 84 00 – Planting Irrigation.
 - 2. Section 32 91 13 – Landscape Grading, Topsoil, and Soil Preparation.
 - 3. Section 32 93 00 – Plants.

1.02 RELATED WORK

- A. Topsoil placed and rough graded to a grade tolerance of ± 0.1 foot, prior to the start of the landscape work.
- B. Grass and weed removal for seeded areas shall be performed per specification, Section 32 91 13 - Soil Preparation

1.03 REFERENCES

- A. ASTM International:
 - 1. ASTM C602 - Standard Specification for Agricultural Liming Materials.

1.04 DEFINITIONS

- A. The term 'CONTRACTOR' as used in this specification section shall refer to the LANDSCAPE CONTRACTOR.

1.05 SUBMITTALS

- A. Section 01 30 00 – Administrative Requirements: Requirements for submittals.
- B. Quantity Certification: Provide certification of quantities of fertilizer and compost delivered to the site. Submit to OWNER.
- C. Seed Certification: Certify grass seed blue tag, stating botanical and common name, percentage by weight, and percentages of purity, germination and weed seed for each

grass seed species. Comply with standards established by the Official Seed Analysts of North America. Submit seed vendor's certified statement of each grass seed required.

- D. Seeding Methods and details.

1.06 QUALITY ASSURANCE

- A. Provide seed mixture in containers showing percentage of seed mix, germination percentage, inert matter percentage, weed percentage, year of production, net weight, date of packaging, and location of packaging.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable.
- C. Deliver fertilizer to the Site in original unopened waterproof containers showing weight, chemical analysis, and name of manufacturer.

1.08 PROTECTION

- A. Barriers: Provide temporary rope barricade at perimeter of area receiving seed. CONTRACTOR is responsible for seed bed areas until desired germination is attained.
- B. Protect utilities, site improvements and underground irrigation system during tilling and related soil work.

1.09 COORDINATION

- A. Existing Conditions: Perform seeding only after preceding Work affecting ground surface is completed and trees, shrubs and groundcover plants have been installed.
- B. Coordinate the removal of grass and weeds for planting areas prior to Work in this section.

PART 2 - PRODUCTS

2.01 COMMERCIAL FERTILIZER

- A. Provide Fertilizer that meets the recommendations of the 'Soil Fertility Test' as required in these specifications.
- B. Lime: Shall be dolomite limestone containing not less than eighty-five (85) percent of total carbonates. Limestone shall be ground to such fineness that one hundred (100) percent will pass a No. 20 sieve, conforming to standards of ASTM C602 agricultural limestone.

2.02 WATER

- A. CONTRACTOR shall make, at the CONTRACTOR'S expense, whatever arrangements are necessary to ensure an adequate supply of water to meet the needs of this contract. CONTRACTOR shall also furnish necessary hose, equipment, attachments, and

accessories for the adequate irrigation of planted areas as may be required to complete the work specified. All costs for water incurred during the contract period shall be borne by the CONTRACTOR unless other arrangements are made with the OWNER.

- B. Water must be clean, fresh and free of substances or matter capable of inhibiting vigorous growth of grass.

2.03 GRASS STRAW MULCH

- A. Grass straw mulch shall be from fields certified for grass straw production of bentgrass, bluegrass, fescue, ryegrass, or grain straw grown singly or in combination. Provide straw that is free of grass or weed seeds and not moldy, caked, decayed or otherwise of low quality. Ensure that the mulch contains no noxious weed seed of any species. Typical noxious weeds are reed canarygrass, thistles, and teasel. Hay or chopped cornstalks are not acceptable.

2.04 TACKIFIER

- A. Shall be J-Tac, M-Binder, or Pam HT Hydroseeding tackifier with the addition of colored fiber mulch to act as a tracer, or approved equal.

2.05 SEED MIXES

- A. Fresh, clean, new crop seeding.
- B. Seed mixes and application rates are specified on the drawings.
- C. All seeds shall conform to the requirements of State Seed Laws and when applicable, the Federal Seed Act.
- D. Seeds shall be packed in clean, sound containers of uniform weight. Seeds shall be labeled as required by law.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify prepared soil base is ready to receive the Work of this section, including the removal of existing grass and weeds per these specifications and as shown on the drawings.
- C. Saturate soil with water to test drainage.
- D. Verify required underground utilities are available, in proper location, and ready for use.

3.02 PREPARATION OF SEEDING AREAS

- A. All areas shall be finished graded and approved by the OWNER'S REPRESENTATIVE before commencement of seeding. All areas shall allow for planting soil amendments added to planting areas as specified. All grades shall flow smoothly into one another and produce positive drainage. The CONTRACTOR is responsible for any adverse drainage

conditions that may affect plant growth and architectural features unless the CONTRACTOR contacts the OWNER'S REPRESENTATIVE immediately, indicating any possible problems.

- B. Incorporate the following into the top 4 inches of topsoil in all seeded lawn areas:
 - 1. Recommended and approved fertilizer at a rate recommended from the specified 'Soil Fertility Test'.
 - 2. Lime at a rate recommended from the specified 'Soil Fertility Test'.
- C. Finish grade all fine and rough seeded areas by floating and hand raking to an acceptable smooth, even grade. Remove high points and fill low pockets to eliminate the possibility of standing water. All areas shall have positive drainage. Bring finished grade even with adjacent curbs, walks, and level with existing grades. Remove all rock greater than 1-inch in diameter from the top 4 inches of soil.
- D. Lightly irrigate soil prior to seeding.

3.03 SEED MIX AND APPLICATION

- A. Seeding shall be accomplished after April 1 or before September 10 of the year.
- B. Lawn areas may be seeded using hydroseeding with mulch, at the CONTRACTOR'S option. Submit details of methods of application to OWNER'S REPRESENTATIVE for review and approval.
- C. Seed mix to be consistent with vegetated corridor plantings as follows:

Western Yarrow, Oregon Bentgrass, Idaho Bentgrass, California Brome, Blue Wildrye, and Sickle Keel Lupin.
- D. The application rates for seeded areas are 30 lbs/acre. Protect all improvements from damage. Provide protective cover and barriers as required to prevent damage.

3.04 SEED MAINTENANCE

- A. Section 01 70 00 - Execution Requirements: Requirements for maintenance service.
- B. The CONTRACTOR shall be responsible for keeping seeded lawn beds moist at all times and to ensure an established, thick, uniform, stand of grass acceptable to the OWNER.
- C. The CONTRACTOR shall be responsible for mowing and fertilization of seed beds until substantial completion of the project. Mowing blades shall be set to cut to 1-1/2 inches in height.
- D. All "washouts" shall be repaired and reseeded. Bare spots shall be reseeded, fertilized and raked to an even grade.
- E. Seed beds must achieve ninety-five percent (95%) establishment and uniformity for approval and substantial completion.
- F. Neatly trim edges and hand clip where necessary.
- G. Immediately remove clippings after mowing and trimming. Do not let clippings lay in clumps.

SECTION 32 92 19
SEEDING

- H. Control growth of weeds in Common Area Lawns and Athletic Fields by applying an approved herbicide per manufacturer's instructions. Remedy damage resulting from improper use of herbicides. Seeded areas must be free of broadleaf weeds to achieve substantial completion.
- I. Protect seeded areas with warning signs during maintenance period.

3.05 CLEAN UP

- A. Pressure Washing of Concrete, Masonry and Asphaltic Paving: Any paved area or surfaces stained or soiled from landscaping materials having been hauled, carried or spilled over or around it shall be cleaned with a power sweeper using water under pressure. Building surfaces shall be washed with proper equipment and materials as approved by the OWNER.
- B. At completion of work, remove all debris, equipment and surplus materials. Leave project site in a neat and orderly condition.

END OF SECTION

SECTION 32 93 00

PLANTS

PART 1 GENERAL

1.01 SUMMARY

- A. The work included in this section, whether mentioned or not, shall consist of all labor, tools, materials, tests, permits, and other related items necessary for the installation of all plant materials as shown on the drawings and/or as specified in the Specifications.
- B. The work in this section includes:
 - 1. Trees, plants, and groundcover.
 - 2. Staking.
 - 3. Mulching.
 - 4. Fertilizer.
 - 5. Pruning.
 - 6. Weed Control.
 - 7. Root Barriers.
 - 8. Maintenance.
- C. Related Sections:
 - 1. Section 31 05 13 - Earthwork
 - 2. Section 32 84 00 - Planting Irrigation
 - 3. Section 32 91 13 - Landscape Grading, Topsoil, and Soil Preparation
 - 4. Section 32 92 19 - Seeding
 - 5. Section 01 35 70 - Tree Preservation and Protection

1.02 RELATED WORK

- A. Topsoil placed and graded to a grade tolerance of + 0.1', prior to start of the landscape work.
- B. Grass and weed removal for planting areas shall be performed per these specifications.

1.03 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI A300 - Tree Care Operations - Tree, Shrub and Other Woody Plant Maintenance - Standard Practices.
 - 2. ANSI Z60.1 - Nursery Stock.

1.04 SUBMITTALS

- A. Section 01 30 00 - Administrative Requirements: Requirements for submittals.
- B. Certified Confirmed Orders: Certify in writing to the OWNER'S REPRESENTATIVE within thirty (30) days of the award of the contract, confirmed orders for plants and provide the quantity, location, phone number and address of the grower who has agreed to provide any plant material. Should the CONTRACTOR neglect to provide this documentation within the allocated time, CONTRACTOR may forfeit any substitution benefits.

- C. Certificates: Certificates required by law shall accompany shipments. Upon completion of the installation, submit certificates to the OWNER'S REPRESENTATIVE.
- D. Quantity Certification: Provide certification of quantities of mulch, fertilizer, herbicide, and planting accessories delivered to the site.

1.05 QUALITY ASSURANCE

- A. Tree Pruning for new trees: ANSI A300 Pruning Standards for Woody Plants. For pruning of existing trees, see section 01 35 70, Tree Preservation and Protection.
- B. Field Superintendent - Provide one person who shall:
 - 1. Be present at all times during execution of work in this section;
 - 2. Be familiar with the materials and best methods for installation; and
 - 3. Direct work performed under this section.
- C. Government Inspection: All plants and planting material shall meet or exceed the specifications of federal, state, and county laws requiring inspection for plant disease and control.
- D. Industry Standards: Quality definitions, size tolerances and caliper-to-height ratios shall be no less than minimums specified in American Standards for Nursery Stock, published by American Association of Nurserymen, Inc., ANSI Z60.1-1990.
- E. OWNER reserves the right to reject any or all plant material at any time until final review and acceptance. Remove rejected plants immediately from site.
- F. Produce upon request, sales receipts for all nursery stock and certificates of inspection from federal, state, and other authorities.

1.06 CHANGE ORDERS AND SUBSTITUTIONS

- A. The CONTRACTOR shall provide all plants of the size, species, variety, and quality noted and specified. If unavailable, the CONTRACTOR shall notify the OWNER'S REPRESENTATIVE in writing immediately and provide the names and telephone numbers of five (5) nursery suppliers that he has contacted. If substitution should be permitted, it can be made only with the prior written approval of the OWNER. The nearest variety, size, and grade as approved by the OWNER'S REPRESENTATIVE shall then be furnished.

1.07 QUALIFICATIONS

- A. Installer: The CONTRACTOR installing work covered by this specification section must be a state licensed and bonded landscape CONTRACTOR. CONTRACTOR must be experienced in landscape work of best-accepted trade practices and have equipment and personnel adequate to perform the work specified. CONTRACTOR must be familiar and comply with American Standard for Nursery Stock published by the American Association of Nurserymen.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

- B. Delivery: Notify OWNER'S REPRESENTATIVE of delivery schedule so plant materials may be inspected upon job site delivery. Remove unacceptable products immediately from job site.
- C. Storage and Handling: Protect products against damage or dehydration. Cover plant roots and root balls with soil or other accepted material upon job site delivery if not to be planted within four hours. Store plant material in light shade and protect against harmful weather until planted. Maintain plant materials not to be planted within four hours.
- D. Plant material damaged as a result of delivery, storage or handling will be rejected.
- E. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

1.09 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Do not install plant life when ambient temperatures may drop below 35 degrees F or rise above 90 degrees F.
- C. Do not install plant life when wind velocity exceeds 30 mph.

1.10 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Install plants after, and coordinate with, installation of underground irrigation system piping and sprinkler heads.
- C. Coordinate the removal of grass and weeds for planting areas prior to work in this section.

1.11 PROTECTION

- A. Protect Existing Site Improvements: Verify location of underground facilities prior to doing work. Protect active service lines whether indicated or not. Repair and make good any damage to service lines or improvements caused by planting operations.
- B. Barricade or Cover Excavations: Barricade or cover as necessary all excavations to protect pedestrians & workers.
- C. CONTRACTOR is responsible for protecting plant material through final acceptance.

1.12 WARRANTY

- A. Section 01 70 00 - Execution Requirements: Requirements for warranties.
- B. Warranty begins at date of substantial completion.
- C. Plant materials must be in healthy condition at end of a one-year warranty period, or for one full growing season from substantial completion, whichever is longer.

- D. CONTRACTOR is responsible to assume liability for all plant material and to warranty plants against disease, insect infestation, desiccation, sun scald, freeze damage, or any other condition that would cause plants to be unhealthy or to die through substantial completion.
- E. Replace all trees, shrubs, and groundcovers when plants are no longer in a satisfactory growing condition as determined by the OWNER for the duration of the Warranty period. Make replacements within seven (7) days of notification from the OWNER. Remove dead plants within two (2) days of notification and mark the planting plan showing the exact location of replaced plants.
- F. CONTRACTOR is not responsible for damage to plants due to vandalism, theft, or accidental damage from pedestrians during the warranty period.

1.13 PERMITS, CODES, AND REGULATIONS

- A. The CONTRACTOR shall keep fully informed and shall comply with all existing laws, codes, ordinances, and regulations which in any way affect the conduct of the work.

PART 2 - PRODUCTS

2.01 TREES, PLANTS, AND GROUNDCOVER

- A. All plants shall be nursery grown, or normal habit of growth, healthy, vigorous and free of disease, insect eggs and larvae. Plants shall not be pruned prior to delivery. Plants shall have all leaders and buds intact. Grading of plant material and root ball / container sizes shall be in accordance with the code of standards of the American Association of Nurserymen.
- B. Provide the number of plants shown graphically on the Landscape Drawing or listed on the Plant Materials List, whichever is greater, or to cover at specified spacings.
- C. Tree with multiple leaders, unless specified, will be rejected. Trees with a damaged or crooked leader, bark abrasions, sunscald, disfiguring knots, insect damage, or cuts of limbs over three quarter (3/4) inch in diameter that are not completely closed will be rejected.
- D. Plants are required to be from stock acclimated to 'Project Site' environmental conditions, having been consistently cultivated and grown under these conditions.
- E. Root Protection: Large plants Balled and Burlapped (B&B) with natural ball of size to ensure healthy growth. Small plants container-grown furnished in removable containers or integral peat pots well rooted to ensure healthy growth. Grow container plants in containers from six months to two years prior to delivery with roots filling container but not root bound.
- F. Plant Names: Plants shall be true to name and one of each bundle or lot shall be tagged with the common and botanical name and size of the plants in accordance with the standards of practice of the American Association of Nurserymen and shall conform to Standardized Plant Names, 1942 Edition, published by J. Horace McFarland Company. In all cases, botanical names shall take precedence over common names.

2.02 FERTILIZER

- A. Fertilizer: Agriform or equal planting tablets, 10 and 21 gram.

2.03 PRE-EMERGENT HERBICIDE

- A. Ronstar G, granular or equal.

2.04 MULCH MATERIALS

- A. Bark Mulch: Commercial product, medium ground bark mulch. Bark shall be ground fir or hemlock bark of uniform color, free from weeds, seed, sawdust, and splinters and shall not contain resin, tannin, wood fiber or other compounds detrimental to plant life. Source shall be from freshwater mill.
- B. Pea Gravel: Clean and graded, washed river-run gravel, 100 percent passing 3/8" sieve.

2.05 ACCESSORIES

- A. Stakes: 2 inch x 2 inch x 8 feet rough, Douglas fir stakes, standard and better grade, free of large knots, pre-stained with one coat oil base wood stain, Olympic Redwood Natural Tone #717 or approved equal.
- B. Cable, Wire and Accessories: 3/32 inch minimum 5 strand galvanized steel wire rope. Install 12 inch length of 3/4 inch PVC pipe flag on evergreen guys. 5/16 inch galvanized turnbuckles and eye hooks.
- C. Tree Ties: Broad belt-type strapping or plastic chain (min. 1.5 inch width). Submit sample for approval.

2.06 WATER

- A. CONTRACTOR shall make, at CONTRACTOR expense, whatever arrangements are necessary to ensure an adequate water delivery system to meet the needs of this Contract. The OWNER will make water available to the CONTRACTOR from the existing domestic water meter on site.
- B. Water for plant irrigation must be clean, fresh, and free of substances or matter capable of inhibiting vigorous growth of plants.

2.07 ANTI-DESICCANT

- A. Anti-desiccant shall be 'Wilt-Pruf', delivered in manufacturer's containers and used in accordance with manufacturer's recommendations.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

- B. Verify prepared subsoil and planting beds are ready to receive the Work of this section, including the removal of grass and weeds per these specifications and as shown on the drawings.

3.02 EXCAVATION

- A. Excavate planting pits or beds for trees, shrubs, and groundcover consistent with good horticultural practices. The inside surfaces of all planting holes are to be rough, not smooth. If the CONTRACTOR encounters any unusual condition which, in his opinion, is detrimental to the new planting, he shall notify OWNER'S REPRESENTATIVE immediately.

3.03 PLANTING

- A. CONTRACTOR shall field stake tree locations for approval. Make required field adjustments as directed without additional cost to the OWNER. The right to make minor adjustments in layout is reserved by the OWNER.
- B. Place all plants as shown on drawings. Plant upright and orient to give best appearance or relationship to adjacent plants and structures. Notify OWNER'S REPRESENTATIVE for review and approval of final orientation.
- C. Tree Base: Place a 2" lightly compacted layer of prepared planting soil under root system.
- D. Set plants in prepared pits or beds. Loosen and remove twine binding and burlap from top one-half of root balls. Weeds in the top of root balls must be removed prior to planting.
- E. Place bare root plant materials so roots lie in natural position.
- F. Cut off cleanly all broken or frayed roots.
- G. Backfill planting hole with prepared planting soil material. When planting hole is one-half backfilled, fill with water and let stand until water is absorbed into soil. Continue topsoil fill and when planting hole is three-fourths filled, place planting tablets evenly spaced around each plant or tree. Provide the following quantities per plant or tree:
 - 1. 4" potted plant: one 10 gram tablet.
 - 2. Container shrubs up to 12-inch spread: two 10 gram tablets.
 - 3. Shrubs 15-inch to 36-inch spread: four 10 gram tablets.
 - 4. Shrubs 36-inch and larger spread: three 21 gram tablets.
 - 5. Evergreen trees: four 21 gram tablets.
 - 6. Deciduous trees up to 1-1/2 inch caliper: three 21 gram tablets.
 - 7. Deciduous trees 1-1/2 inch caliper: four 21 gram tablets.
 - 8. Deciduous trees 2 inch and larger: five 21 gram tablets.
- H. Place and compact topsoil backfill to finish grade and provide two (2) inch depressed water basin at each shrub and tree.
- I. Water each plant thoroughly upon completion of planting. Initial water-in of trees and shrubs by underground sprinkler system is not permitted.
- J. Remove non-biodegradable root containers and all plant pots from site.

3.04 WEED CONTROL

- A. Apply pre-emergent herbicide according to the manufacturer's directions on the planting beds that will not be seeded, **after planting and before mulching**. Herbicide must be applied by a licensed chemical applicator. **WARNING: Pre-emergent herbicide will prevent germination of lawn grass seed.** The CONTRACTOR shall use his best judgment during application procedures to avoid lateral movement of chemical into lawn areas. The CONTRACTOR may elect to skip certain portions of planting beds if lateral movement of chemical cannot be avoided. Notify OWNER'S REPRESENTATIVE of areas that did not receive herbicide. CONTRACTOR is still responsible for weed control until final acceptance.
- B. Only an herbicide labeled as safe to use near water may be applied within the Storm Water Treatment Swales.

3.05 INSTALLATION OF ACCESSORIES

- A. Stake all deciduous trees. Refer to planting details.
- B. Brace plants vertically with plant support(s) specified and per planting details.
- C. CONTRACTOR shall make all possible efforts to provide favorable conditions for healthy plant growth, and should notify the OWNER'S REPRESENTATIVE immediately upon concerns and/or conflicts with design drawings.

3.06 FIELD PRUNING

- A. Prune all new trees and shrubs to remove damaged branches.
- B. Paint all cuts more than 1/2 inch in diameter with tree paint approved by American Association of Nurserymen.

3.07 MULCH

- A. Apply a 2-1/2" layer of specified bark mulch over all planting areas after planting and rake to a smooth finish grade. Do not apply bark mulch on bottom of water quality swales.
- B. Apply a 2 inch layer of pea gravel at bottom of all water quality swales.

3.08 ADJUSTMENT AND CLEANING

- A. Remove and replace plants or materials not meeting specified standards.
- B. Areas are to be kept clean during progress of work until completion.
- C. Pressure Washing of Concrete, Masonry and Asphaltic Paving: Any paved area or surfaces stained or soiled from landscaping materials having been hauled, carried or spilled over or around it shall be cleaned with a power sweeper using water under pressure. Building surfaces shall be washed with proper equipment and materials as approved by the OWNER'S REPRESENTATIVE.

3.09 MAINTENANCE: GENERAL

- A. Maintain plant life immediately after placement. Continue maintenance through Final Acceptance..
- B. Protect and maintain work in this specification section against all defects of materials and workmanship. Maintenance of all the planted areas until shall include, but not be limited to, watering, mowing, weeding, herbicide and insecticide applications, cultivation of beds, mulch replacement, maintaining tree wrapping, guys, turnbuckles, and stakes, and pruning as well as replacement of any plants that appear to be in distress.
- C. Irrigate when necessary to avoid drying out of plant materials, and to promote healthy growth.
 - 1. Maintain plants for 1 year after written notice of Substantial Completion of the Project and until Final Acceptance. Inspect plants at least once a week and perform maintenance promptly.
 - 2. Maintain trees, shrubs and ground covers by watering, pruning, spraying, cultivating, and weeding as required for healthy growth.
 - 3. Water when soil moisture is below optimum level for best plant growth.
 - 4. Remove and replace impaired or dead plants promptly during specified planting season.
 - 5. Tighten and repair stake and guy supports and reset trees and shrubs to proper grades or vertical position as required.
 - 6. Eradicate all weeds,, grasses, and other undesired vegetation growth from planting areas.
 - 7. Remove dead weeds and dispose legally off-site. Remove all perennial weeds completely, including all underground parts.
 - 8. Restore all soil settlement to original grade.
- D. Final Acceptance:
 - 1. The final inspection of all plantings will be made by the Owner, in the presence of the Contractor, following completion and correction of all items on the Punch List, and prior to the expiration of the Maintenance Period. Regarding the water quality facility, at the end of the Maintenance period, replant the water quality facility as necessary to ensure a minimum of 90% survival rate of the required vegetation and 90% facility coverage per city of Tigard.
 - 2. Before Final Acceptance will be granted, the site must be in the condition stipulated all correction items on the Punch List completed to the satisfaction of the Owner.
 - 3. If Final Acceptance is not granted at the end of the Maintenance Period, continue maintaining plantings until Final Acceptance is granted, at no additional cost to the Owner.

3.10 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Testing and inspection services; AND, Section 01 70 00 - Execution Requirements: Testing, adjusting, and balancing.
- B. Plants will be rejected when ball of earth surrounding roots has been disturbed or damaged prior to or during planting.

3.11 SCHEDULE - PLANT LIST

- A. Refer to planting list(s) on drawings

END OF SECTION

