Division 329000
Planting
DESIGN GUIDE

329000 - Planting

1.1 General

1.1 SUMMARY

A. The scope of work includes all labor, materials, appliances, tools, equipment, facilities, transportation and services necessary for, and incidental to performing all operations in connection with furnishing, delivery, and installation of plant (also known as "landscaping") complete as shown on the drawings and as specified herein.

B. The scope of work in this section includes, but is not limited to, the following:

1. Preparing subgrade.
2. Preparation of all planting areas to include discing, amending, incorporating, and mixing to prepare soils for planting.
3. Installation of biofiltration soils in rain garden areas.
4. Testing Prepared Planting Soil and incorporating soil additions as required by test results.
5. Fine grading.
6. Furnishing and installing landscape edging between planting areas and lawn, at crushed rock mulch areas, and at rock mulch areas.
7. Furnishing and installing trees, shrubs and groundcovers in quantities and sizes described on the Contract Drawings.
8. Fertilization and inoculation of all plant material.
9. Staking and guying of trees.
10. Mulching of all plant beds.
11. Installation of crushed rock mulch at utilities pad and rock mulch (cobbles) at building face.
12. Repair and restoration of existing vegetation to reestablish preconstruction condition.
13. Maintaining plantings through Warranty Period.

14. Cleanup.

C. Where possible, street trees at medians or along roads should be kept at a minimum of six feet (6') from the curb to facilitate street sweeping and minimize curb damage. Provide eighteen inches (18") deep minimum, root barriers whenever trees are less than six feet (6') from curbs or hardscaped elements.

D. Plants shall not block or cover buildings' windows, security lighting, or access to utility line switches and cabinets.

E. The landscape design must be an integral component of the project. It shall respect existing site attributes and respond to its surroundings. Site design must provide adequate access, egress, views, and noise buffers.

F. The landscaping vocabulary must be compatible with the University campus-wide elements such as canopies, portals, shaded areas, passageways, and hardscapes. Mature sized plants should be provided whenever possible.

G. Landscape design must help orient visitors and contribute to the legibility of the campus layout.

H. The Architect/Engineer shall consider landscape design concepts that incorporate water and energy conservation methods, including appropriate irrigation equipment, selection of drought-resistant materials and adequate lawn and other maintenance-intensive areas. The Architect/Engineer must take into consideration the need for access to windows, for the purposes of cleaning and/or replacement.

1.2 RELATED DOCUMENTS AND REFERENCES

A. Related Documents:

1. Drawings and general provisions of contract including general and supplementary conditions and Division I specifications apply to work of this section.
    1. Section - Earthwork
    2. Section - Planting Soil
    3. Section - Irrigation
    4. Section - Turf And Grasses
    5. Section - Tree Protection and Plant Protection
    6. Section – Sustainable Design Requirements

B. Plant selection shall be made from the CWU Approved Plant List. Alternative plants may be used with the approval of the Owner’s Representative.

C. References:

1. ASTM: American Society of Testing Materials cited section numbers.
2. ANSI Z60.1, American Standard for Nursery Stock, (ASNS), most current edition, American Nursery and Landscape Association (ANLA)
3. ANSI A300 Tree Care Operations: Standards Practices for Tree, Shrub and Other Woody Plant Maintenance, National Arborist Association (NAA)

4. Glossary of Arboricultural Terms, International Society of Arboriculture, Champaign IL, most current edition.
5. Soil Science Society of America
    1. *Methods of Soil Analysis*, as published by the Soil Science Society of America
    2. North American Proficiency Testing Program (NAPT)
6. U.S. Composting Council
    1. Test Method for the Examination of Composting and Compost (TMECC)

1.3 DEFINITIONS

A. Soils and Mulches

1. Native Soil: Existing, undisturbed soil suitable for sustaining plant growth as determined by soil test. Existing grade beneath demolished pavement or structures is not native soil.
2. Planting Fill: The soil material used to fill above existing grade or other fill material to achieve the final design sub-grade elevations prior to planting soil installation. The planting fill shall be composed of material recovered from the screen tailings of the accepted topsoil described in this Section. The rocks passing through a sieve shall be no greater than one-half inch. The pH range will comply with the range acceptable for the topsoil.
3. Prepared Subgrade: Native soil or planting fill that has been prepared conforming to the requirements of this Section.
4. Compost: Decomposed plant waste as defined herein and used as a soil amendment. Compost is the result of transformation of organic materials and biological degradation under controlled conditions designed to promote aerobic decomposition and is stable with regard to oxygen consumption and carbon dioxide generation.
5. Prepared Planting Soil: Mixture of Native Soil, if available, and Topsoil.
6. Topsoil: Imported soil used as a component of Prepared Planting Soil for planting areas. Bioretention/Rain Garden planting areas do not include topsoil unless otherwise noted.\
7. Planting Backfill: Mixture of Native Soil and Topsoil for filling of tree and shrub planting pits. If native soil as defined herein is unavailable for mixture to create Planting Backfill, use Topsoil only as defined herein.
8. Tree Pit: The open excavated area of soil where the tree root ball is placed for planting, sized in accordance with Contract Drawings.
9. Bioretention Soil: The soil material used in specific planting areas that is intended to provide storm water flow control, water quality treatment, or accept overflow from station structures.

B. Plant Material:

1. Container plant: Plants that are grown in and/or are currently in a container, including boxed trees.
2. Field grown trees (B&B): Trees growing in field soil for at least 12 months prior to harvest.
3. Disfigured plant: Any plant that has die-back over 25% or loses its symmetry or natural habit due to dieback or damage.
4. Defective plant: Any plant that fails to meet the plant quality requirements of this specification
5. Field grown trees (B&B): Trees growing in field soil for at least 12 months prior to harvest.
6. Healthy: Plants that are growing in a condition that expresses leaf size, crown density, color, and with annual growth rates typical of the species and cultivar's horticultural description.
7. Root ball: The mass of roots, including any soil or substrate that is shipped with the tree within the root ball package.
8. Root flare: The area at the base of the trunk where the majority of the structural roots join the plant stem, usually at or near ground level.
9. Stem girdling root: Any root currently touching the trunk, or with the potential to touch the trunk, above the root collar approximately tangent to the trunk circumference or circling the trunk. Roots shall be considered as Stem Girdling that have, or are likely to have in the future, root to trunk bark contact.

C. Integrated Pest Management (IPM):

1. A pest control approach requiring regular monitoring to determine if, and when, treatments are needed. This approach employs physical, mechanical, cultural, biological, and educational tactics to keep weeds and pest numbers low enough to prevent unacceptable damage or annoyance.
2. Additional treatments, such as pesticide applications, are made only when and where monitoring has indicated that the pest will cause unacceptable economic, medical, or aesthetic damage. Treatments are not made according to a predetermined schedule. Treatments are chosen and timed to be most effective and least hazardous to non-target organisms and the general environment.

1.4 QUALITY ASSURANCE

A. Landscape Contractors Qualifications: Washington with at least 5 years of documented experience of performing work of comparable size, scope and quality, be a specialist in installing and planting landscape products including handling and planting of large specimen trees in urban areas and experienced in landscape work of the highest professional quality. Firm shall have equipment and personnel adequate to perform the work specified.

1. Installer's field supervisor shall have a minimum of five years experience as a

field supervisor installing plants and trees of the quality and scale of the proposed project and can communicate with the Owner's Representative.

2. Submit references of past projects, employee training certifications that support that the Contractors meets all of the above installer qualifications and applicable licensures.

   In the event of any discrepancies between the drawings and the specification, the final decision as to which shall be followed, shall be made by the Owner's Representative.

B. In the event of any discrepancies between the drawings and the specification, the final decision as to which shall be followed, shall be made by the Owner's Representative.

C. In the event the installation is contradictory to the direction of the Owner's Representative, the installation shall be rectified by the Contractor at no additional cost to the Owner. The Contractor shall immediately bring any such discrepancies to the attention of the Owner's Representative

1.5 SUBMITTALS

A. Landscape Contractor Qualifications: Submit experience of Landscape Contractor meeting requirements as stated herein.

B. Source of Supply Plan: Submit a complete list of plant material for Project with nursery source information for each plant 60 days after Notice to Proceed and no later than 90 days prior to landscape preconstruction meeting. The list shall include documentation that plants are being contract grown or that deposits have been provided to nurseries to ensure availability.

1. Include in plant list the botanical and common names, size, quantity, form, root ball, limb height (if applicable), other requested data, and source locations for all plant materials.
2. Include names, addresses, and phone numbers of each nursery source associated with each plant item.
3. Plant lists shall clearly identify deviations from the specified plants and any approved substitutions. Where deviations or other changes occur in plant list, identify both the original specified plant item and the new plant item.
4. Should at any time the nursery stock be lost or compromised due to weather or other natural occurrences, notify the Owner's Representative immediately of the need to locate new material.
5. Maintain and re-submit updated Source of Supply Plan as deviations or other changes occur until Substantial Completion.
6. Provide digital color photographs of supplier's representative stock for each tree and plant specified. Label each photograph with species name, container type, size, height, and diameter at breast height if applicable. Each submitted image shall contain a height reference, such as a measuring stick. The approval of plants by the Owner's Representative via photograph does not

preclude the Owner's Representative's right to reject material, per requirements herein, when delivered to site. Submit photographs with Source of Supply Plan.

7. Plant Substitutions: Plant substitutions will not be permitted unless the Contractor furnishes the Owner's Representative with written evidence from no less than three nurseries that the plants specified are not obtainable.

C. Samples: Submit at least 30 days prior to landscape preconstruction meeting.

1. Compost: Two 1-pound bags.
2. Topsoil: Two 1-pound bags.
3. Bioretention Soil: Two 1-pound bags.
4. Planting Fill: Two 1-pound bags.
5. Sand: Two 1-pound bags.
6. Mulch: Two 1-pound bags for each type used.
7. Crushed Rock: Two 1-pound bags.
8. Rock Mulch (cobbles): Two 1-pound bags.
9. Geotextile: two 12-inch square pieces.
10. Tree Ties : Two 12-inch lengths.

D. Certifications for Testing Laboratory, Plants and Materials Testing: Submit prior to landscape preconstruction meeting with certificate names of materials and manufacturer.

1. Soil Analysis and Agricultural Testing Laboratory: Furnish documents confirming testing laboratory is a member of the Soil Science Society of America's North American Proficiency Testing Program (NAPT). The soil-testing laboratory must be accepted by the Owner's Representative in advance of testing.
2. Submit a certified soil analysis report made in accordance with methods established by the Association of Official Agricultural Chemists (AOAC International) from an approved soil-testing laboratory.
    1. Test each of the following before installation:
        1.) Native Soil, if Contractor proposes to use Native Soil in lieu of, or in combination with, imported Topsoil.
        2.) Planting Fill.
        3.) Topsoil.
    2. Test the following after installation:
        1.) Prepared Planting Soil when fully installed as specified
    3. Follow testing laboratory's instructions for soil sample collection.
    4. All test reports shall be dated within 90 days of the Submittal.

5. The Soil Analysis report shall indicate soil fertility, agricultural suitability, and particle size appraisal, including but not limited to:
    1.) pH, nutrient levels by parts per million including nitrogen, phosphorus, potassium magnesium, manganese, iron, zinc, and calcium; soluble salt by electrical conductivity of a 1:2 soil water Sample measured in milliohm per centimeter; and the Cation Exchange Capacity (CEC).
    2.) Salinity, nitrate, ammonium, phosphate, potassium, magnesium, boron, and Sodium Absorption Ratio (SAR) using saturation paste extract, percent organic content by oven dried weight, and USDA Particle size analysis.
    3.) For organic amendments:
        a.) include the list of feed stocks by volume.
        b.) Include any Organic Program Certifications
6. Testing Locations and Frequency for Prepared Planting Soil
    1.) Initial tests shall be conducted for Prepared Planting Soil in three locations: one Sample in the Tree Pit and two other areas as selected by the Owner's Representative.
    2.) Conduct ongoing, onsite Prepared Planting Soil sampling of 1 pound of material for every 100 cubic yards of material placed. Owner's Representative will select locations.
7. If Prepared Planting Soil does not meet approved Submittals and specifications, submit a program of additional amendments based on recommendations of an agricultural chemist or soils testing laboratory. Test report submittals and recommended soil amendments must be approved by the Owner's Representative and incorporated prior to planting.
8. Retest amended material to ensure it meets specifications.

3. Compost Analysis Report
    1. Test Sample of Compost. Follow testing laboratory instructions for Compost Sample collection.
    2. The test shall measure and confirm product requirements as stated herein.
    3. Provide source information to determine carbon-to-nitrogen ratio requirements.
4. Ground Dolomitic Limestone: Include guaranteed analysis and weight of packaged material.
5. Commercial Fertilizers: Include guaranteed analyses.
6. Plant Material:
    1. Furnish certificates of inspection as may be required by Federal, State or other authorities indicating that plant material is free of disease and

hazardous insects.

2. Submit itemized list of plants for each delivery as stated Article herein.

E. Delivery, Storage, and Handling Plan

1. Submit at least 30 days prior to the landscape preconstruction meeting.
2. Indicate:
    1. Method of transportation of plant material to Site.
    2. Proposed location for onsite plant holding and material storage.
    3. Potable water source.
    4. Protection measures to address various seasonal conditions.

F. Temporary Irrigation Plan: Submit a Temporary Irrigation Plan for approval by the Owner's Representative. Indicate proposed temporary irrigation water source, schedule, volume, and equipment.

G. Schedule and Work Plan

1. Submit the proposed planting schedule at least 30 days prior to landscape preconstruction meeting.
2. Indicate:
    1. Name and telephone number of the Supervisors.
    2. Dates for each type of landscape work, Substantial Completion, and Acceptance dates.
    3. Proposed watering schedule, water source, and rates to establish planting areas until Acceptance per Section, Irrigation.
    4. Proposed equipment.
    5. Proposed weed management plan for planting areas through Acceptance.
3. Once accepted, revise dates only after documentation of reasons for changes or delays are approved in writing by the Owner's Representative.

H. Weed and Pest Control Plan (including pesticides, herbicides, insecticides, and fungicides) if determined through the Integrated Pest Management Plan that they are necessary. Prepare a Weed and Pest Control plan signed by a Pesticide Applicator licensed through the Washington State Department of Agriculture (WSDA) when chemicals are proposed.

1. Submit a request to the Owner's representative. If approved, then:
    1. Submit proof of applicator's WSDA license and that pesticide is registered in the State of Washington.
    2. Include methods of Weed and Pest Control and dates of Weed and Pest Control Operations.
    3. Provide manufacturer's literature, copy of current labels, including toxicity levels, for each pesticide, herbicide, and spray adjuvant proposed to be

used. Include all Safety Data Sheets (SDS).

I. Product Data: Submit at least 1 month prior to landscape preconstruction meeting product literature or cut sheets giving name of product, manufacturer's name, and compliance with these Specifications.

1. Commercial fertilizer
2. Anti-desiccant
3. Mycorrhizae Inoculant
4. Landscape Edging

J. Settlement Test: Submit a report documenting results of Settlement Test defined herein.

K. Tree Pit Drainage Test Report: Submit a report on the drainage of water in all Tree Pitts. Fill each Tree Pit with 4 inches of water. Monitor Tree Pit 4 hours later and record water level. Tree Pit Drainage Test shall be overseen by Owner’s Representative. Indicate in report all pits that do not fully drain in 4 hours. For Tree Pits not fully draining within the indicated time, Owner’s Representative will advise if further modifications will be required. Contractor shall repair subgrade to provide adequate drainage**.**

1.6 SEQUENCING AND SCHEDULING

A. Coordinate work in this section with other work. Soil installation and planting work shall not begin until structures, utilities, paving, and other improvements, which require access to or through planting areas, have been installed and accepted by the Owner’s Representative.

B. Planting Time: Plant during seasons conducive to plant and soil health: from May 1 to June 15 and from September 1 to October 15.

1. Planting outside this time frame is dependent upon a fully functioning irrigation system and prior approval by the Owner’s Representative.

C. Coordinate earthwork and soil preparation. Do not expose soil piles for longer than 15 days without temporary or permanent vegetative, or other, cover.

D. Coordinate soil testing and soil amendment incorporation as required with the Project Schedule.

E. Coordinate layout and installation of plant material with installation of irrigation system to ensure that there will be complete and full coverage of the planted areas. Install, test, and accept irrigation systems before planting begins.

1.7 PROTECTION OF WORK, PROPERTY AND PERSON

A. The Contractor shall adequately protect the work, adjacent property, and the public, and shall be responsible for any damages or injury due to the Contractors actions.

1.8 CHANGES IN THE WORK

A. The Owner's Representative may order changes in the work, and the contract sum being adjusted accordingly. All such orders and adjustments plus claims by the Contractor for extra compensation must be made and approved in writing before executing the work involved.

B. All changes in the work, notifications, and Contractor's request for information (RFI) shall conform to the contract general condition requirements.

1.9 CORRECTION OF WORK

A. The Contractor, at their own cost, shall re-execute any work that fails to conform to the requirements of the contract and shall remedy defects due to faulty materials or workmanship upon written notice from the Owner's Representative, at the soonest as possible time that can be coordinated with other work and seasonal weather demands**.**

1.10 OBSERVATION OF THE WORK

A. The Owner's Representative may inspect the work at any time. They may remove samples of materials for conformity. Rejected materials shall be immediately removed from the site and replaced at the Contractor's expense. The cost of testing materials not meeting specifications shall be paid by the Contractor.

1.11 DELIVERY, STORAGE, AND HANDLING

A. Provide temporary site storage plan as stated herein.

B. Bulk material: Coordinate delivery and storage with Owner's Representative and confine materials to neat piles in areas acceptable to Owner's Representative. Protect soil and soil stockpiles from wind, rain and washing that can erode soil or separate fines and coarse material, and contamination by chemicals, dust and debris that may be detrimental to plants or soil drainage. Cover stockpiles with plastic sheeting or fabric at the end of each workday.

C. Packaged Materials: Deliver chemicals, fertilizer, and soil conditioner to the Site in original unopened containers showing weight, manufacturer's guaranteed chemical analysis, trademark and conformance with state law, and name of manufacturer. Biological additives shall be protected from extreme cold and heat. All products shall be freshly manufactured and dated for the year in which the products are to be used. Protect materials from deterioration during delivery, and while stored at the Site.

D. Plant Delivery: Exercise care in transporting, handling, loading, and unloading plant material. Cover all plant materials during transport to protect from wind, sun, heat damage, and drying out. Plant materials damaged in any way from transit or unloading shall be removed immediately from the Site and replaced.

E. Plant Inspection

1. Tagging Plant Material
    1. Attach legible labels to each individual plant or container containing one or more plants. Provide the necessary detailed information as to horticultural name, size, or other data required to identify as conforming to specifications on the label.
    2. Refer to American Standards for Nursery Stock regarding labeling of plant material.
    3. When the label is attached to a container containing more than one plant, mark quantity as well as other required information on the label. The Owner's Representative will reject plant material with illegible or missing tags.
2. Inspection of Plant Material
    1. Allow the Owner's Representative opportunity to inspect plant material at nursery or off-Site holding area prior to arrival on Site.
    2. All plant materials will be inspected by Owner's Representative after arrival on Site.
    3. Notify the Owner's Representative at least 4 days prior to the proposed arrival of plant materials onsite and submit an itemized list of plants in each delivery.
    4. Arrange for adequate labor and equipment onsite at the time of plant material inspection and unload, open, and handle plant material during inspection.
    5. Immediately remove plants from the Site that do not meet the requirements specified herein or do not match approved representative photographs.
    6. The Contractor shall bear all cost related to plant corrections.
3. Plants stored in standing water will be rejected and shall be removed from the Site.
4. Do not prune plants prior to delivery.

F. Temporary Storage

1. Plant all materials within 24 hours of being delivered. If planting is delayed more than 24 hours after delivery, set plants on the ground and protect by covering root ball with soil, wet burlap, or other material acceptable to the Owner's Representative. Protect all plant material from freezing, sun, drying winds, and mechanical damage.
2. Irrigate plants following the Temporary Irrigation Plan until planted.
3. Plants stored under temporary conditions, whether accepted by the Owner's Representative or not, are the sole responsibility of the Contractor.
4. Plants temporarily stored are subject to inspection and approval prior to planting. Immediately remove rejected plant material from the Site

5. Do not heel in plants for more than 1 week.
6. Do not store fertilizer, lime, or other chemicals (herbicides, pesticides, or other deleterious material) within 50 feet any planting material.
7. Protect packaged materials from deterioration during storage.
8. Do not remove container-grown stock from containers until planting time.

1.12 INSPECTIONS:

A. Inspections by the Landscape Architect shall occur at various milestones throughout the Contract. Notify the Owner's Representative 4 working days prior to requested inspection dates, unless noted otherwise.

B. The following inspections will occur:

1. Prior to soil placement, inspect subgrade preparation.
2. When Imported Soil Material is brought on Site.
3. When Prepared Planting Soil is installed, and finish grades are established.
4. When Tree Pit Drainage tests are occurring.
5. When plant material arrives on site, prior to planting.
6. When plant material is laid out in accordance with Contract Drawings and prior to planting.
7. Throughout soil preparation and planting activities.
8. When inoculation of plants is occurring.
9. When work is ready for review for Landscape Substantial Completion.
10. After punch list items are completed and are ready for Final Acceptance after Landscape Substantial Completion.
11. At the conclusion of the Warranty Period.

C. The Landscape Architect will provide inspection field reports.

D. Warranty period site visit record: If there is no maintenance during the warranty period, after each site visit during the warranty period, by the Contractor, as required by this specification, submit a written record of the visit, including any problems, potential problems, and any recommended corrective action to the Owner's Representative for approval.

E. Installation plan submitted a minimum of 14 days prior to the scheduled installation. Plan should describe the methods, activities, materials, and schedule to achieve installation of plants.

1.13 OBSERVATION OF THE WORK

A. The Owner's Representative may observe the work at any time. They may remove samples of materials for conformity to specifications. Rejected materials shall be immediately removed from the site and replaced at the Contractor's expense. The cost of testing materials not meeting specifications

shall be paid by the Contractor.

B. The Owner's Representative shall be informed of the progress of the work so the work may be observed at the following key times in the construction process. The Owner's Representative shall be afforded sufficient time to schedule visit to the site. Failure of the Owner's Representative to make field observations shall not relieve the Contractor from meeting all the requirements of this specification.

1. SITE CONDITIONS PRIOR TO THE START OF PLANTING: review the soil and drainage conditions.
2. COMPLETION OF THE PLANT LAYOUT STAKING: Review of the plant layout.
3. PLANT QUALITY: Review of plant quality at the time of delivery and prior to installation. Review tree quality prior to unloading where possible, but in all cases prior to planting.
4. COMPLETION OF THE PLANTING: Review the completed planting.

1.14 PLANT WARRANTY

A. Plant Warranty:

1. The Contractor agrees to replace defective work and defective plants. The Owner's Representative shall make the final determination if plants meet these specifications or that plants are defective.

   Plant Warranty shall begin on the date of Substantial Completion Acceptance and continue for one (1) year.

2. When the work is accepted in parts, the warranty periods shall extend from each of the partial Substantial Completion Acceptances to the terminal date of the last warranty period. Thus, all warranty periods for each class of plant warranty, shall terminate at one time.
3. All plants shall be warrantied to meet all the requirements for plant quality at installation in this specification. Defective plants shall be defined as plants not meeting these requirements. The Owner's representative shall make the final determination that plants are defective.
4. Plants determined to be defective shall be removed immediately upon notification by the Owner's Representative and replaced without cost to the Owner as soon as weather conditions permit and within the specified planting period.
5. Prior to planting, all plants shall be inspected for root defects and all defects shall be corrected with the approval of the Owner's Representative. Plants installed without inspection and correction to root defects may be rejected at anytime by the Owner's Representative and replaced at the cost of the Contractor.
6. Any work required by this specification or the Owner's Representative during the progress of the work, to correct plant defects including the removal of roots or branches, or planting plants that have been bare rooted during

installation to observe for or correct root defects shall not be considered as grounds to void any conditions of the warranty. In the event that the Contractor decides that such remediation work may compromise the future health of the plant, the plant or plants in question shall be rejected and replaced with plants that do not contain defects that require remediation or correction.

7. The Contractor is exempt from replacing plants, after Substantial Completion Acceptance and during the warranty period, that are removed by others, lost or damaged due to occupancy of project, lost or damaged by a third party, vandalism, or any natural disaster.
8. Replacements shall closely match adjacent specimens of the same species. Replacements shall be subject to all requirements stated in this specification. Make all necessary repairs due to plant replacements. Such repairs shall be done at no extra cost to the Owner.
9. The warranty of all replacement plants shall extend for an additional one (1) year period from the date of their acceptance after replacement. In the event that a replacement plant is not acceptable during or at the end of the said extended warranty period, the Owner’s Representative may elect one more replacement items or credit for each item. These tertiary replacement items are not protected under a warranty period.
10. During and by the end of the warranty period, remove all tree wrap, ties, and guying unless agreed to by the Owner’s Representative to remain in place. All trees that do not have sufficient caliper to remain upright, or those requiring additional anchorage in windy locations, shall be staked or remain staked, if required by the Owner's Representative.

B. End of Warranty Final Acceptance - Acceptance of plants at the end of the warranty period.

1. At the end of the warranty period, the Owner’s Representative shall observe all warranted work, upon written request of the Contractor. The request shall be received at least ten calendar days before the anticipated date for final observation.
2. End of Warranty Final Acceptance will be given only when all the requirements of the work under this specification and in specification sections Planting Soil and Irrigation have been met.

1.15 SELECTION AND OBSERVATION OF PLANTS

A. The Owner’s Representative may review all plants subject to approval of size, health, quality, character, etc. Review or approval of any plant during the process of selection, delivery, installation and establishment period shall not prevent that plant from later rejection in the event that the plant quality changes, or previously existing defects become apparent that were not observed.

B. Plant Selection: The Owner’s Representative reserves the right to select and observe all plants at the nursery prior to delivery and to reject plants that do not

meet specifications as set forth in this specification. If a particular defect or substandard element can be corrected at the nursery, as determined by the Owner's Representative, the agreed upon remedy may be applied by the nursery or the Contractor provided that the correction allows the plant to meet the requirements set forth in this specification. Any work to correct plant defects shall be at the contractor's expense.

1. The Owner's Representative may make invasive observation of the plant's root system in the area of the root collar and the top of the root ball in general in order to determine that the plant meets the quality requirements for depth of the root collar and presence of roots above the root collar. Such observations will not harm the plant.
2. Corrections are to be undertaken at the nursery prior to shipping.

C. The Contractor shall bear all cost related to plant corrections.

D. All plants that are rejected shall be immediately removed from the site and acceptable replacement plants provided at no cost to the Owner.

E. Trees shall be purchased from the growing nursery. Re-wholesale plant suppliers shall not be used as sources unless the Contractor can certify that the required trees are not directly available from a growing nursery. When Re-wholesale suppliers are utilized, the Contractor shall submit the name and location of the growing nursery from where the trees were obtained by the re-wholesale seller. The re-wholesale nursery shall be responsible for any required plant quality certifications.

F. The Contractor shall require the grower or re-wholesale supplier to permit the Owner's Representative to observe the root system of all plants at the nursery or job site prior to planting including random removal of soil or substrate around the base of the plant. Observation may be as frequent and as extensive as needed to verify that the plants meet the requirements of the specifications and conform to requirements.

G. Each tree shall have a numbered seal applied by the Contractor. The seal shall be placed on a lateral branch on the north side of the tree. The seal shall be a tamper proof plastic seal bearing the Contractors name and a unique seven-digit number embossed on the seal.

1. Do not place seals on branches that are so large that there is not sufficient room for the branch growth over the period of the warranty.

H. The Owner's Representative may choose to attach their seal to each plant, or a representative sample. Viewing and/or sealing of plants by the Owner's Representative at the nursery does not preclude the Owner's Representative's right to reject material while on site. The Contractor is responsible for paying any up charge for the Owner's Representative to attach their seal to specific plants.

I. Where requested by the Owner's Representative, submit photographs of plants or representative samples of plants. Photographs shall be legible and clearly depict the plant specimen. Each submitted image shall contain a height

reference, such as a measuring stick. The approval of plants by the Owner's Representative via photograph does not preclude the Owner's Representative's right to reject material while on site.

1.16 PLANT SUBSTITUTIONS FOR PLANTS NOT AVAILABLE

A. Submit all requests for substitutions of plant species, or size to the Owner's Representative, for approval, prior to purchasing the proposed substitution. Request for substitution shall be accompanied with a list of nurseries contacted in the search for the required plant and a record of other attempts to locate the required material. Requests shall also include sources of plants found that may be of a smaller or larger size, or a different shape or habit than specified, or plants of the same genus and species but different cultivar origin, or which may otherwise not meet the requirements of the specifications, but which may be available for substitution.

1.17 SITE CONDITIONS

A. It is the responsibility of the Contractor to be aware of all surface and sub-surface conditions, and to notify the Owner's Representative, in writing, of any circumstances that would negatively impact the health of plantings. Do not proceed with work until unsatisfactory conditions have been corrected.

1. Should subsurface drainage or soil conditions be encountered which would be detrimental to growth or survival of plant material, the Contractor shall notify the Owner's Representative in writing, stating the conditions and submit a proposal covering cost of corrections. If the Contractor fails to notify the Owner's Representative of such conditions, he/she shall remain responsible for plant material under the warranty clause of the specifications.

B. It is the responsibility of the Contractor to be familiar with the local growing conditions, and if any specified plants will be in conflict with these conditions. Report any potential conflicts, in writing, to the Owner's Representative.

C. This specification requires that all Planting Soil and Irrigation (if applicable) work be completed and accepted prior to the installation of any plants.

1. Planting operations shall not begin until such time that the irrigation system is completely operational for the area(s) to be planted, and the irrigation system for that area has been preliminarily observed and approved by the Owner's Representative.

D. Actual planting shall be performed during those periods when weather and soil conditions are suitable in accordance with locally accepted horticultural practices.

1. Do not install plants into saturated or frozen soils. Do not install plants during inclement weather, such as rain or snow or during extremely hot, cold or windy conditions.

1.18 PLANTING AROUND UTILITIES

A. Contractor shall carefully examine the civil, record, and survey drawings to become familiar with the existing underground conditions before digging.

B. Determine location of underground utilities and perform work in a manner that will avoid possible damage. Hand excavate as required. Maintain grade stakes set by others until parties concerned mutually agree upon removal.

C. Notification of *Local Utility Locator Service* is required for all planting areas: The Contractor is responsible for knowing the location and avoiding utilities that are not covered by the *Local Utility Locator Service*.

PART 2 – PRODUCTS

2.1 SOILS

A. Compost

1. Contractor shall use only Compost that has been tested within 90 days of Submittal and meets the requirements in this Section. Compost not conforming tothese requirements or taken from a source other than those tested and accepted shall not be used and shall be removed from Site immediately.
2. Compost shall be pure composted plant waste, a well decomposed, humus-like material derived from the decomposition of grass clippings, leaves, branches, wood and other organic materials, as supplied by Kittitas County Solid Waste, or approved equal.
3. Compost shall be produced at a permitted solid waste-handling Site for Composting facility (Health Permit, Department of Ecology Storm Water Permit, PSCAA Facility and Equipment Registration).
4. Compost shall be mature with regard to its suitability for serving as a soil amendment. Maturity shall be greater than 80 percent in accordance with U.S. Composting Council TMECC 05.05-A, “Germination and Root Elongation”.
5. Compost shall have a moisture content that has no visible free water or dust produced when handling the material.
6. Compost production and quality must be in compliance with WA Department of Ecology’s specifications, which appear in WAC Chapter 173-350 Section 220, plus the following additional requirements.
7. Additional Requirements:
    1. The carbon-to-nitrogen ratio of Compost shall be below 25:1, if non-native, or below 35:1, if the proposed plantings are composed entirely of plants native to the Puget Sound Lowlands region.
    2. Compost shall have a minimum organic matter content of 40 percent dry weight as determined by U.S. Composting Council TMECC 05.07A “Loss-On-Ignition Organic Matter Method (LOI)”
    3. Soluble salt content shall be less than 4.0 mmhos/cm when tested in accordance with U.S. Composting Council TMECC 04.10-A “Electrical Conductivity”.

4. Compost shall meet the following gradation:

	Percent Passing	
Sieve Size	**Minimum**	**Maximum**
2 inch	100	
1 inch	95	100
5/8 inch	90	100
¼ inch	75	100

5. The pH range shall be between 6.0 and 8.8 when tested in accordance with U.S. Composting Council TMECC 04.11-A, “1:5 Slurry pH.”
6. The material shall be certified free of all plant parasitic organisms, viable weed seeds, heavy metals, and parasitic residues. No more than1 percent foreign material (plastic, concrete, ceramics, and metal) on a dry weight basis as determined by U.S. Composting Council TMECC 03.08-A “Classification of Inerts by Sieve Size.”
7. Chemical contaminants, mg/kg (ppm): meet or exceed US EPA Class A standard, 40CFR § 503.13, Tables 1 and 3 levels.
8. Biological contaminants select pathogens fecal coliform bacteria, or salmonella: meet or exceed US EPA Class A standard, 40 CFR § 503.32(a) level requirements.
9. Stability shall be <2 mg CO2-C/g OM/day in accordance with the U.S. Composting Council TMECC 05.08-B “Carbon Dioxide Evolution Rate.”

B. TOPSOIL

1. Where possible, Native Topsoil shall be retained on site, screened, amended if needed, and repurposed on the Project Site in the planting areas.
2. Topsoil for tree and shrub planting beds and lawns: 3-way soil mix composed, by volume, of 65 percent sandy loam and 20 percent Compost amendment, and 15 percent clean sand with 100 percent passing through a 1-inch screen, as supplied by MRM Landscape Supply, Ellensburg WA, or approved equal.
    1. Sandy Loam: as defined by the United States Department of Agriculture Classification System, and documented by a Particle Size Analysis performed by an accredited laboratory.
    2. Topsoil shall have a pH between 6.5 and 7.5

3. Topsoil shall have an organic matter content of at least 5 to 8 percent by dry weight. Organic material shall adhere to requirements stated herein.
4. In addition to meeting the particle size requirements of USDA Sandy Loam, Topsoil mix shall meet the following sieve specifications:

	Percent Passing (weight)	
Sieve Size	**Minimum**	**Maximum**
1 inch	100	
1/2 inch	90	100
No.10	70	100
No. 200		25

5. Sandy loam and compost shall be thoroughly blended off site
6. Topsoil shall be free from materials toxic to plant growth; rocks and debris, visibleseeds, rhizomes or roots, or invasive root-propagating plants including but not limited to horsetail, ivy, clematis, knotweed, morning glory, etc. Soil found to contain these contaminants shall be removed and replaced at the Contractor's expense.

C. Bioretention Soil

1. Bioretention Soil shall consist of three parts Mineral Aggregate for Bioretention Soil (approximately 60 to 65 percent) by volume meeting the requirements of this Section and two parts Compost Material for Bioretention Soil (approximately 45 to 50 percent) by volume meeting the requirements of this Section. The mixture shall be well blended to produce a homogeneous mix, with the final mix to be accepted by the Resident Engineer based on samples and test results submitted.
2. Mineral Aggregate for Bioretention Soil shall be free of wood, waste, coating, or any other deleterious material. All Mineral Aggregate passing the No. 200 sieve size shall be non-plastic. Mineral Aggregate for bioretention soils shall be analyzed by an accredited lab using the sieve sizes noted below, and shall meet the following gradation:

Sieve Size	**Percent Passing**
3/8 inch	100
No. 4	95 - 100

No.10	75 - 90
No. 40	25 - 40
No. 200	2 - 5

Efforts should be made to have the Mineral Aggregate for bioretention soils meet the following gradation coefficients: Coefficient of Uniformity (Cu = D60/D10) equal to or greater than 6; and Coefficient of Curve (Cc = D30 2/D60D10) greaterthan or equal to 1 and less than or equal to 3.

3. Compost Material for Bioretention Soil

1. Compost products shall be the result of the biological degradation and transformation of Type I or III feedstocks under controlled conditions designed to promote aerobic decomposition, per WAC 173-350-220, which is available at http://www.ecy.wa.gov/programs/swfa/compost. Compost shall be stable with regard to oxygen consumption and carbon dioxide generation. Compost shall be mature with regard to its suitability for serving as a soil amendment or an erosion control BMP as defined below. The compost shall have a moisture content that has no visible free water or dust produced when handling the material. Compost production and quality shall comply with Chapter 173-350 WAC, and meet the following physical criteria:

1.) Compost material shall be tested in accordance with Testing Methods for the Examination of Compost and Composting (TMECC) Test Method 02.02-B, “Sample Sieving for Aggregate Size Classification”. Compost shall meet the following:

2 Medium Compost

	Min.	**Max.**
Percent passing 2”		100%
Percent passing 1”	95%	100%
Percent passing 5/8”	90%	100%
Percent passing 1/4”	75%	85%
Maximum particle length of 2 inches		

2.) The pH shall be between 5.5 and 8.0 when tested in accordance with TMECC 04.11-A, “1:5 Slurry pH”.

3.) Manufactured inert material (plastic, concrete, ceramics, metal, etc.) shall be less than 1.0 percent by weight as determined by TMECC 03.08-A "Classification of Inerts by Sieve Size".

4.) Organic matter content should be a minimum of 40 percent dry weight basis as determined by TMECC 05.07A, “Loss-On- Ignition Organic Matter Method”.

5.) Soluble salt contents shall be less than 6.0 mmhos/cm tested in accordance with U.S. Composting Council TMECC 04.10, “Electrical Conductivity”.

6.) Maturity shall be greater than 80% in accordance with TMECC 05.05-A, “Germination and Root Elongation”.

7.) Stability shall be 7 or below in accordance with TMECC 05.08-B, Carbon Dioxide Evolution Rate”.

8.) The compost product must originate a minimum of 65 percent by volume from recycled plant waste as defined in WAC 173-350 as“Type 1 Feedstocks.” A maximum of 35 percent by volume of other approved organic waste as defined in WAC 173-350 as “Type 2 Feedstocks”, source-separated food waste, but not including biosolids, may be substituted for recycled plant waste. The supplier shall provide written verification of feedstock sources.

9.) Carbon to nitrogen ratio shall be less than 25:1 as determined using TMECC 04.01 “Total Carbon” and TMECC 04.02D “Total Kjeldhal Nitrogen”. The Resident Engineer may specify a C:N ratio up to 35:1 for projects where the plants selected are entirelyPuget Sound native species.

10.) The Resident Engineer may also evaluate compost for maturity using TMECC 05.08-E “Solvita® Maturity Index” at time of delivery. Compost shall score a number 6 or above on the Solvita® Compost Maturity Test.

11.) The compost supplier shall test all compost products within 90 Calendar Days prior to application. Samples shall be collected using the Seal of testing Assurance (STA) sample collection protocol.

12.) The sample collection protocol can be obtained from:

U.S. Composting Council

4250 Veterans Memorial Highway, Suite 275

Holbrook, NY 11741

Phone: 631-737-4931

www.compostingcouncil.org.

13.) The sample shall be sent to an independent STA Program approved laboratory. The compost supplier shall pay for the test. Compost not conforming to the above requirements or taken from a source other than those tested and accepted shall be immediately removed from the project and replaced at no cost to the Owner.

D. Planting Fill: Manufactured soil material recovered from the screen tailings of the Topsoil mix. The soil shall have the same base components of the Topsoil. The rocks within the soil shall be no greater than one inch. The pH range shall comply with the acceptable Topsoil pH range. Planting Fill shall be used to raise the subgrade as required toestablish the base elevation prior to the installation of Topsoil.

E. Sand: Clean, sharp, natural, medium to coarse grained in texture, and free from salt and decomposed organic matter like roots, sticks, leaves, paper, and of other undesirable trash like glass, plastic, or metal fragments. 100 percent passing No. 4, 2 to 5 percent passing No. 200 – All US Standard Sieve, ASTM E11.

F. Dolomitic Limestone: Fine ground dolomite, shall contain no less than 10 percent magnesium oxide and 85% calcium and magnesium carbonates, with a minimum of 98 percent passing No. 20 sieve and 50 percent passing No. 100 sieve. Product shall be packaged in new, waterproof, non-overlain bags, and clearly labeled.

G. Water: Potable, clean, fresh, and free from harmful substances or materials injurious to plant life. Furnish all hoses and other irrigation equipment required for the Work.

H. Temporary Irrigation Equipment: Where permanent irrigation is not required by the Contract Documents, Contractor may install temporary irrigation for use during construction and the Warranty and Landscape Establishment Period. If temporary irrigation is used by the Contractor, provide equipment in accordance with approved irrigation plan.

2.2 PLANTS

A. Standards and measurement: Provide plants of quantity, size, genus, species, and variety or cultivars as shown and scheduled in contract documents.

1. All plants including the root ball dimensions or container size to trunk caliper ratio shall conform to ANSI Z60.1 “American Standard for Nursery Stock” latest edition, unless modified by provisions in this specification. When there is a conflict between this specification and ANSI Z60.1, this specification section shall be considered correct.
2. Plants larger than specified may be used if acceptable to the Owner’s Representative. Use of such plants shall not increase the contract price. If

larger plants are accepted the root ball size shall be in accordance with ANSI Z-60.1. Larger plants may not be acceptable if the resulting root ball cannot be fit into the required planting space.

B. Proper Identification: All trees shall be true to name as ordered or shown on planting plans and shall be labeled individually or in groups by genus, species, variety and cultivar.

C. Compliance: All trees shall comply with federal and state laws and regulations requiring observation for plant disease, pests, and weeds. Observation certificates required by law shall accompany each shipment of plants.

D. Balled and Burlapped plants: Provide freshly dug, balled and burlapped stockwith a compact natural ball of earth firmly wrapped and tied in burlap so thatupon delivery, the soil in the ball is still firm and compact about the small feeding roots. Root ball sizes to be in accordance with ASNI Z60.1 standards.

E. Container plants: Provide container grown stock that is healthy, vigorous, and has a well-established root system reaching the sides of container and maintaining a firm ball when removed from the container. The container shall be rigid enough to hold the ball shape, protect root mass during shipping, and be sized according to ANSI Z60.1 for type and size of plant required.

F. Plant Quality:

1. Provide nursery grown stock that is healthy, vigorous, well-branched, and densely foliated when in leaf. Plants shall be free of die-back, disease, insects, eggs, bores, larvae, disfiguring knots, sun scald, abrasions of the bark, broken limbs, and torn roots. At the time of planting all plants shall have a root system, stem, and branch form that will not restrict normal growth, stability, and health for the expected life of the plant

    1.) Plants shall be grown for at least 2 years in climatic conditions and soils similar to those at the Job Site.

2. Plant Quality Above The Soil Line**:**

    1. Plants shall be healthy with the color, shape, size and distribution of trunk, stems, branches, buds and leaves normal to the plant type specified. Tree quality above the soil line shall comply with ANSI Z60.1 standards, and the following:

        1.) Crown: The form and density of the crown shall be typical for a young specimen of the species or cultivar pruned to a central and dominant leader.

            a.) Crown specifications do not apply to plants that have been specifically trained in the nursery as topiary, espalier, multi-stem, clump, or unique selections such as contorted or weeping cultivars.

        2.) Leaves: The size, color, and appearance of leaves shall be typical for the time of year and stage of growth of the species or cultivar. Trees shall not show signs of prolonged moisture stress or over watering as

indicated by wilted, shriveled, or dead leaves.

3.) Branches: Shoot growth (length and diameter) throughout the crown should be appropriate for the age and size of the species or cultivar. Trees shall not have dead, diseased, broken, distorted, or otherwise injured branches.

a.) Main branches shall be distributed along the central leader not clustered together. They shall form a balanced crown appropriate for the cultivar/species.

b.) Branch diameter shall be no larger than two-thirds (one-half is preferred) the diameter of the central leader measured 1 inch above the branch union.

c.) The attachment of the largest branches (scaffold branches) shall be free of included bark.

2. Trees shall have one central leader. If the leader was headed, a new leader (with a live terminal bud) at least one-half the diameter of the pruning cut shall be present.

1.) Form: All trees are assumed to have one central leader trees unless a different form is specified in the plant list or drawings.

2.) Trunk: The tree trunk shall be relatively straight, vertical, and free of wounds that penetrate to the wood (properly made pruning cuts, closed or not, are acceptable and are not considered wounds), sunburned areas, conks (fungal fruiting bodies), wood cracks, sap leakage, signs of boring insects, galls, cankers, girdling ties, or lesions (mechanical injury).

3.) Temporary branches, unless otherwise specified, can be present along the lower trunk below the lowest main (scaffold) branch, particularly for trees less than 1 inch in caliper. These branches should be no greater than 3/8-inch diameter. Clear trunk should be no more than 40% of the total height of the tree.

4.) All graft unions, where applicable, shall be completely closed without visible sign of graft rejection. All grafts shall be visible above the soil line.

5.) Trunk caliper and taper shall be sufficient so that the lower five feet of the trunk remains vertical without a stake. Auxiliary stake may be used to maintain a straight leader in the upper half of the tree.

3. Plant Quality Below The Soil Line:

1. Plant roots shall be normal to the plant type specified. Root observations shall take place without impacting tree health. Root quality at or below the soil line shall comply with ANSI Z60.1 standards, and the following:

1.) The roots shall be reasonably free of scrapes, broken or split wood.

2.) The root system shall be reasonably free of injury from biotic (e.g.,

insects and pathogens) and abiotic (e.g., herbicide toxicity and salt injury) agents. Wounds resulting from root pruning used to produce a high quality root system are not considered injuries.

3.) A minimum of three structural roots reasonably distributed around the trunk (not clustered on one side) shall be found in each plant. Root distribution shall be uniform throughout the root ball, and growth shall be appropriate for the species.

4.) The root collar shall be within the upper 2 inches of the substrate/soil. Two structural roots shall reach the side of the root ball near the top surface of the root ball. The grower may request a modification to this requirement for species with roots that rapidly descend, provided that the grower removes all stem girdling roots above the structural roots across the top of the root ball.

5.) The root system shall be free of stem girdling roots over the root collar or kinked roots from nursery production practices.

a.) The Owner's representative may inspect the root ball for defects, and at the Contractors expense have an ISA Certified Arborist correct the root defects. The Owner's Representative may reject the tree if the defects are not able to be corrected.

6.) At time of observations and delivery, the root ball shall be moist throughout. Roots shall not show signs of excess soil moisture conditions as indicated by stunted, discolored, distorted, or dead roots.

2.3 TREE STAKING AND GUYING MATERIAL

A. Tree guying material to be flat woven polypropylene material, 3/4 inch wide, and 900 lb. break strength. Color to be Green. Product to be ArborTie manufactured by Deep Root Partners, L.P. or approved equal.

B. Stakes shall be lodge pole stakes free of knots and of diameters and lengths appropriate to the size of plant as required to adequately support the plant.

C. Below ground anchorage systems to be constructed of 2 x 2 dimensional untreated wood securing (using 3 inch long screws) horizontal portions to 4 feet long vertical stakes driven straight into the ground outside the root ball.

D. Submit manufacturer's product data for approval.

2.4 ROCK

A. Crushed Rock:

1. Fractured shale consisting of grey to brown tones. Sizing from ¾" to 2 ½" with no fines

B. Cobbles:

1. Washed rock consisting of light grey to brown tones. Sizing from ¾" to 1 ½" with no fines.

2.5 MULCH

A. Mulch shall be Medium Bark supplied by MRM Landscape Supply, Ellensburg, Washington.

2.6 FERTILIZER

A. Commercial grade slow release fertilizer containing no less than 10 percent Nitrogen, 6 percent Phosphorous, and 4 percent Potash by weight.

PART 3 – EXECUTION

3.1 SITE EXAMINATION

A. Prior to soil preparation, confirm the location of all electric cables, conduits, under-drainage systems, and Utility lines.

1. Take proper precautions not to disturb or damage subsurface elements. If subsurface elements are uncovered, promptly notify the Owner's Representative.Contractor is responsible for making requisite repairs to damaged Utilities at theirown expense.
2. Verify that required underground Utilities are available, in proper location, and ready for use. Coordinate with other trades.

B. Verify that subgrades are at lines and grades appropriate to provide specified depth ofsoil before beginning work.

C. Verify that subgrades under landscape areas are free-draining and remediate drainage problems as recommended by Owner's Representative.

D. Verify that subgrade material is free of gravel and construction debris.

E. The Contractor shall not start bioretention cell construction until the project site drainingto the bioretention area has been stabilized and authorization is given by Owner'sRepresentative. The Contractor shall temporarily divert drainage away from the bioretention cell construction work area as needed to protect the accomplished work until the cell is entirely completed.

3.2 DELIVERY, STORAGE, AND HANDLING

A. Protect materials from deterioration during delivery and storage. Adequately protect plants from drying out, exposure of roots to sun, wind or extremes of heat and cold temperatures. If planting is delayed more than 24 hours after delivery, set plants in a location protected from sun and wind. Provide adequate water to the root ball prior to shipping. Use the Temporary Irrigation Plan to provide water to the root ball package during the storage period.

1. All plant materials must be available for observation prior to planting.
2. Using a soil moisture meter, periodically check the soil moisture in the root balls of all plants to assure that the plants are being adequately watered.

Volumetric soil moisture shall be maintained above wilting point and below field capacity for the root ball substrate or soil.

B. Do not deliver more plants to the site than there is space with adequate storage conditions. Provide a suitable remote staging area for plants and other supplies.

1. The Owner's Representative or Contractor shall approve the duration, method and location of storage of plants.

C. Provide protective covering over all plants during transporting.

3.3 PLANTING SEASON

A. Planting shall only be performed when weather and soil conditions are suitable for planting the materials specified in accordance with locally accepted practice. Install plants during the planting time as described below unless otherwise approved in writing by the Owner's Representative. In the event that the Contractor request planting outside the dates of the planting season, approval of the request does not change the requirements of the warranty.

1. Planting Dates: May 1 to June 15 and August 1 to October 15

B. Adverse weather conditions:

1. No planting shall take place during extremely hot, dry, windy or freezing weather.

3.4 COORDINATION WITH PROJECT WORK

A. The Contractor shall coordinate with all other work that may impact the completion of the work.

B. Prior to the start of work, prepare a detailed schedule of the work for coordination with other trades.

C. Coordinate the relocation of any irrigation lines, heads or the conduits of other utility lines that are in conflict with tree locations. Root balls shall not be altered to fit around lines. Notify the Owner's Representative of any conflicts encountered.

3.5 LAYOUT AND PLANTING SEQUENCE

A. Relative positions of all plants and trees are subject to approval of the Owner's Representative.

1. Special attention shall be given to location of trees near intersections. Follow City of Ellensburg visual clearances for Municipal intersections as well and campus parking lot exits.

B. Notify the Owner's Representative, one (1) week prior to layout. Layout all individual tree and shrub locations. Place plants above surface at planting location or place a labeled stake at planting location. Layout bed lines with paint for the Owner's Representative's approval. Secure the Owner's

Representative's acceptance before digging and start of planting work.

C. When applicable, plant trees before other plants are installed.

D. It is understood that plants are not precise objects and that minor adjustments in the layout will be required as the planting plan is constructed. These adjustments may not be apparent until some or all of the plants are installed. Make adjustments as required by the Owner's Representative including relocating previously installed plants.

3.6 SOIL PROTECTION DURING PLANT DELIVERY AND INSTALLATION

A. Protect soil from compaction during the delivery of plants to the planting locations, digging of planting holes and installing plants.

1. Where possible deliver and plant trees that require the use of heavy mechanized equipment prior to final soil preparation and tilling. Where possible, restrict the driving lanes to one area instead of driving over and compacting a large area of soil.
2. Till to a depth of 6 inches, all soil that has been driven over during the installation of plants.

3.7 SOIL MOISTURE

A. Volumetric soil moisture level, in both the planting soil and the root balls of all plants, prior to, during and after planting shall be above permanent wilting point and below field capacity for each type of soil texture within the following ranges.

Soil type	**Permanent wilting point**	**Field capacity**
Sand, Loamy sand, Sandy loam	5-8%	12-18%
Loam, Sandy clay, Sandy clay loam	14-25%	27-36%
Clay loam, Silt loam	11-22%	31-36%
Silty clay, Silty clay loam	22-27%	38-41%

1. Volumetric soil moisture shall be measured with a digital moisture meter. The meter shall be the Digital Soil Moisture Meter, DSMM500 by General Specialty Tools and Instruments, or approved equivalent.

B. The Contractor shall confirm the soil moisture levels with a moisture meter. If the moisture is too high, suspend planting operations until the soil moisture drains to below field capacity.

3.8 PREPARATION OF SOIL IN PLANTING AREAS

A. Subgrade Preparation

1. Completely remove and dispose of all structural fill, gravel, quarry spalls,

construction debris, compressible or biodegradable materials, and other obstructions in the area to receive planting to depths required to install Topsoil. This includes areas where soil has been removed and replaced with structural materials adjacent to buildings and paved areas..

2. Obstructions Below Grade: In the event that roots, rocks, underground construction work, Utilities or obstructions are encountered during discing, scarifying, and tilling operations under this Contract, continue work by hand with shovel or fork. Notify Owner's Representative immediately of root obstructions encountered that may be from trees that are being protected and are to remain.
3. Confirm there are no subgrade conditions present that are detrimental to plant growth. If unsatisfactory conditions are encountered, notify the Owner's Representative immediately to determine corrective action before proceeding.
4. Protect and maintain the integrity of the compacted base and subgrade materialsunder pavements and curbs, and protect all other structures in areas of the soil preparation and excavation.
5. Establish subgrade lines and grades appropriate to provide for specified depth of Prepared Planting Soil.
6. If subgrades need to be raised to establish lines and grades appropriate to provide for specified depth of Prepared Planting Soil, use Planting Fill specified herein.
7. Shape subgrades to lines and grades indicated.
8. After subgrade lines and grades are established, scarify exposed soils to a depthof at least 12 inches. Remove debris and rocks over 3 inches in size that were unearthed during scarification. Moisture condition if necessary. Compact to 85 percent maximum of dry weight density.
9. Finish subgrades will be inspected and approved by Owner's Representative before placement of planting soils or plants, as specified herein.

B. Soils in Planting Areas

1. Prepare subgrade soil as stated herein.
2. Settlement Test: At a location accepted by the Owner's Representative, install 20 square feet of Prepared Planting Soil at specified depth and apply irrigation to induce settlement to determine percent of additional soil required to achieve specified grade conditions of soil after settling. Supplement specified depth of soil in all plant beds with additional Topsoil as needed to achieve specified grade conditions.
3. In planting areas, provide a minimum of depth of Topsoil per the Contract Drawings. Where trees are planted, increase depth of Topsoil depending on size of root ball so that Topsoil is available to the full depth of the root ball.
4. Place Topsoil in 6-inch lifts. Place first lift and rototill soil to incorporate into top 12 inches of subgrade soil. Place second and additional lifts

separately and rototill each lift into the next lower 12 inches of soil.

5. In areas that are protected by vegetation protection fencing or are beneath the canopies of existing trees and shrubs, whichever area is greater, perform soil protection under the direction of the Owner's Representative. Loosen soil byhand using a shovel or fork. Loosen soil with care to avoid loosening or damaging the root systems of existing trees and shrubs. Spread a 2-inch layer of Topsoil over soil. Incorporate Topsoil into soil using a shovel or fork. Feather soil grades into adjacent grades outside existing tree and plant canopies.
6. In areas where dense clay soil material is encountered, spread a 3-inch layer of Compost over subgrade soil and rototill into the top 12 inches of subgrade prior to placement of Topsoil.
7. Prepare the top 4 inches of Topsoil in all cultivated areas free of stones, clods of earth larger than 1 inch in diameter, and other deleterious matter which might be a hindrance to mixing of soil amendments, planting, and maintenance.
8. Phase work such that equipment to deliver or grade soil does not have to operateover previously installed Planting Soil. Work in rows of lifts the width of the extension of the bucket on the loader. Install all lifts in one row before proceedingto the next. Work out from the furthest part of each bed from the soil deliverypoint to the edge of the each bed area.
9. Test Prepared Planting Soil as specified herein.
10. Apply soil amendments to planting areas as determined by the soil test.
11. Add dolomitic limestone required to obtain a pH range of 6.5 to 7.5. Do not apply more than 60 lbs. of lime per 1,000 sq. ft. at one time. Verify pH by test of each major planting area.
12. Incorporate all amendments thoroughly into the top 12 inches of soil to assure uniform distribution.
13. Roll or hand compact soil to achieve compaction of 85 percent of dry weight density.
14. Protect installed Planting Soil from compaction during the delivery of plants to theplanting locations, digging of planting holes and installing plants.
15. Do not pass motorized equipment over previously installed and compacted soil except as authorized below.

    1. Light weight equipment such as trenching machines or motorized wheel barrows is permitted to pass over finished soil work.
    2. If work after the installation and compaction of soil compacts the soil to levels greater than the above requirements, the soil shall be removed to a depth where the compaction is not evident, loosened and reinstalled.

C. Finish Grading

1. After natural settlement and light rolling, complete work to conform strictly to the lines, grades, and elevations indicated. Grading shall be provided for natural runoff of water without low spots or pockets. Flow line grades shall be accurately set and shall not be less than 2 percent gradient unless otherwise indicated or approved by the Owner's Representative.
2. Finish grade of planting soil in landscaped areas shall be 1 inch below the top of adjacent pavement, curbs, headers, utility boxes or structures to allow for 1 inch of mulch dressing, tapered to reach 3 inches required depth within 12 inches of bed edge. See Contract Drawings for tapering of mulch immediately adjacent to pavement. Adjust utility boxes or structures if necessary to conform to grading requirements.
3. Remove all rocks 2 inches or greater from planting areas.
4. Elevations and landform configuration are critical to Project design intent. Supply additional Topsoil as needed to give the specified depths and grade.
5. Toes and tops of slopes shall be rounded to produce a gradual and natural appearing transition, unless otherwise indicated on Contract Drawings.
6. Protect all planting areas against compaction by any construction activities and equipment.

3.9 PLANTING LAYOUT

A. Coordinate layout and timing of installation of plant material with installation of theirrigation system in accordance with Section, Planting Irrigation, to ensure that there will be complete and full irrigation available to the planting areas directly upon finishing planting activities.

B. Do not plant until all settlement testing, soil testing, application of prescribed amendments and drainage testing have been successfully implemented.

C. Stake out locations of trees where shown on Contract Documents and alert the Owner's Representation where obstructions below ground, overhead, or where changes have been made during construction may alter the final location of planting. Location staking shall be the responsibility of the Contractor, subject to approval by the Owner's Representative, before planting or construction of each area begins.

D. Plant trees as specified herein.

E. Locate shrubs on planting beds per Contract drawings. Place plants starting from the perimeter of the bed and progressing to the center so that odd dimensions are adjustedat the centers of planting beds.

F. On slopes greater than 20 percent, trees and shrubs may be staked to indicate layout.

G. Do not plant until the Owner's Representative at Site has reviewed and accepted theplant layout.

3.10 INSTALLATION OF PLANTS

A. Observe each plant after delivery and prior to installation for damage of other characteristics that may cause rejection of the plant. Notify the Owner's Representative of any condition observed.

B. No more plants shall be distributed about the planting bed area than can be planted and watered on the same day.

C. The root system of each plant, regardless of root ball package type, shall be observed by the Contractor, at the time of planting to confirm that the roots meet the requirements for plant root quality in Part 2 Products: Plants General: Plant Quality. The Contractor shall undertake at the time of planting, all modifications to the root system required by the Owner's Representative to meet these quality standards.

1. Modifications, at the time of planting, to meet the specifications for the depth of the root collar and removal of stem girdling roots and circling roots may make the plant unstable or stress the plant to the point that the Owner's Representative may choose to reject the plant rather than permitting the modification.
2. Any modifications required by the Owner's Representative to make the root system conform to the plant quality standards outlined in Part 2 Products: Plants General: Quality, or other requirements related to the permitted root ball package, shall not be considered as grounds to modify or void the plant warranty.
3. The resulting root ball may need additional staking and water after planting. The Owner's Representative may reject the plant if the root modification process makes the tree unstable or if the tree is not healthy at the end of the warranty period. Such plants shall still be covered under the warranty
4. The Contractor remains responsible to confirm that the grower has made all required root modifications noted during any nursery observations.

D. Container Root Ball Shaving: The outer surfaces of ALL plants in containers and boxes, including the top, sides and bottom of the root ball shall be shaved to remove all circling, descending, and matted roots. Shaving shall be performed using saws, knives, sharp shovels or other suitable equipment that is capable of making clean cuts on the roots. Shaving shall remove a minimum of one inch of root mat or up to 2 inches as required to remove all root segments that are not growing reasonably radial to the trunk.

E. Excavation of the Planting Space: Using hand tools or tracked mini-excavator, excavate the planting hole into the Planting Soil to the depth of the root ball measured after any root ball modification to correct root problems, and wide enough for working room around the root ball or to the size indicated on the drawing or as noted below.

1. The area of loosening shall be a minimum of 3 times the diameter of the root ball at the surface sloping to 2 times the diameter of the root ball at the depth of the root ball.

2. Loosening is defined as digging into the soil and turning the soil to reduce the compaction. The soil does not have to be removed from the hole, just dug, lifted and turned. Lifting and turning may be accomplished with a tracked mini excavator, or hand shovels.
3. If an auger is used to dig the initial planting hole, the soil around the auger hole shall be loosened at a diameter twice the diameter of the root ball.
4. If motorized equipment is used to deliver plants to the planting area over exposed planting beds, or used to loosen the soil or dig the planting holes, all soil that has been driven over shall be tilled to a depth of 6 inches.

F. For trees to be planted in prepared Planting Soil that is deeper than the root ball depth, compact the soil under the root ball using a mechanical tamper to achieve compaction of 85 percent of dry weight density to prevent settling of the root ball.

G. Set top outer edge of the root ball at the average elevation of the proposed finish grade. Set the plant plumb and upright in the center of the planting hole. The tree graft, if applicable, shall be visible above the grade. Do not place soil on top of the root ball.

1. Trees: Place trees with the root crown 2 inches above the surrounding finish grade. Take care not to over-excavate.
2. Shrubs, groundcovers, and vines: Place plants so that the soil level of the plant soil is flush with the soil level of the planting bed.

H. The Owner's Representative may request that plants orientation be rotated when planted based on the form of the plant.

I. Backfill the space around the root ball with the same planting soil or existing soil that was excavated for the planting space. See Specification Section Planting Soil, for requirements to modify the soil within the planting bed.

J. Brace root ball by tamping Planting Soil around the lower portion of the root ball. Place additional Planting Soil around base and sides of ball in six-inch (6") lifts. Lightly tamp each lift using foot pressure or hand tools to settle backfill, support the tree and eliminate voids. DO NOT over compact the backfill or use mechanical or pneumatic tamping equipment. Over compaction shall be defined as greater than 85% of maximum dry density, standard proctor or greater than 250 psi as measured by a cone penetrometer when the volumetric soil moisture is lower than field capacity.

1. When the planting hole has been backfilled to three quarters of its depth, water shall be poured around the root ball and allowed to soak into the soil to settle the soil. Do not flood the planting space. If the soil is above field capacity, allow the soil to drain to below field capacity before finishing the planting. Air pockets shall be eliminated and backfill continued until the planting soil is brought to grade level.

K. Where indicated on the drawings, build a 4 inch high, level berm of Planting Soil around the outside of the root ball to retain water. Tamp the berm to reduce leaking and erosion of the saucer.

L. Thoroughly water the Planting Soil and root ball immediately after planting.

M. Remove corrugated cardboard trunk protection after planting.

N. Follow additional requirements for the permitted root ball packages.

3.11 PERMITTED ROOT BALL PACKAGES AND SPECIAL PLANTING REQUIREMENTS

A. The following are permitted root ball packages and special planting requirements that shall be followed during the planting process in addition to the above General planting requirements.

B. BALLED AND BURLAPPED PLANTS

1. Prior to the root ball being backfilled, remove all twine and burlap from the top and sides of the root ball to the depth of the planting pit. Cut the burlap away; do not fold down onto the Planting Soil.
2. If the plant is shipped with a wire basket, remove the wire basket from the top and sides of the root ball to the depth of the planting pit. Cut if free and remove it from the planting soil just before the final backfilling of the tree.
3. Earth root balls shall be kept intact except for any modifications required by the Owner's Representative to make root package comply with the requirement in Part 2 Products.
4. Using a hose, power washer or air excavation device, or by hand, remove the substrate from around the trunk and top of the remaining root ball and find and remove all stem girdling roots within the root ball above the top of the structural roots.

C. CONTAINER (INCLUDES BOXED AND ABOVE-GROUND FABRIC CONTAINERS) PLANTS

1. This specification assumes that most container plants have significant stem girdling and circling roots, and that the root collar is too low in the root ball.
2. Remove the container.
3. Perform root ball shaving as defined in Installation of Plants: General above.
4. Remove all roots and substrate above the root collar and the main structural roots to find the correct finished grade of the root ball.
5. Remove all substrate at the bottom of the root ball that does not contain roots.
6. Using a hose, power washer or air excavation device, or by hand, remove the substrate from around the trunk and top of the remaining root ball and find and remove all stem girdling roots within the root ball above the top of the structural roots.

3.12 GROUND COVER, PERENNIAL AND ANNUAL PLANTS

A. Assure that soil moisture is within the required levels prior to planting. Irrigation, if required, shall be applied at least 12 hours prior to planting to avoid planting in muddy soils.

B. Assure that soil grades in the beds are smooth and as shown on the plans.

C. Plants shall be planted in even, triangularly spaced rows, at the intervals called out for on the drawings, unless otherwise noted.

D. Dig planting holes sufficiently large enough to insert the root system without deforming the roots. Set the top of the root system at the grade of the soil.

E. Schedule the planting to occur prior to application of the mulch. If the bed is already mulched, pull the mulch from around the hole and plant into the soil. Do not plant the root system in the mulch. Pull mulch back so it is not on the root ball surface.

F. Press soil to bring the root system in contact with the soil.

G. Spread any excess soil around in the spaces between plants.

H. Apply mulch to the bed being sure not to cover the tops of the plants with or the tops of the root ball with mulch.

I. Water each planting area as soon as the planting is completed. Apply additional water to keep the soil moisture at the required levels. Do not over water.

3.13 STAKING AND GUYING

A. Do not stake or guy trees unless specifically required by the Contract Documents, or in the event that the Contractor feels that staking is the only alternative way to keep particular trees plumb.

1. The Owner's Representative shall have the authority to require that trees are staked or to reject staking as an alternative way to stabilize the tree.

2. Trees that required heavily modified root balls to meet the root quality standards may become unstable. The Owner's Representative may choose to reject these trees rather than utilize staking to temporarily support the tree.

B. Trees that are guyed shall have their guys and stakes removed after one full growing season or at other times as required by the Owner's Representative.

C. Tree guying shall utilize the tree staking and guying materials specified. Guying to be tied in such a manner as to create a minimum 12-inch loop to prevent girdling. Refer to manufacturer's recommendations and the planting detail for installation.

1. Plants shall stand plumb after staking or guying.

2. Stakes shall be driven to sufficient depth to hold the tree rigid.

3.14 STRAIGHTENING PLANTS

A. Maintain all plants in a plumb position throughout the warranty period. Straighten all trees that move out of plumb including those not staked. Plants to be straightened shall be excavated and the root ball moved to a plumb position, and then re-backfilled.

B. Do not straighten plants by pulling the trunk with guys.

3.15 INSTALLATION OF FERTILIZER AND OTHER CHEMICAL ADDITIVES

A. Do not apply any soluble fertilizer to plantings during the first year after transplanting unless soil test determines that fertilizer or other chemical additives is required. Apply chemical additives only upon the approval of the Owner's Representative.

B. Controlled release fertilizers shall be applied according to the manufacturer's instructions and standard horticultural practices.

3.16 PRUNING OF TREES AND SHRUBS

A. Prune plants as directed by the Owner's Representative. Pruning trees shall be limited to addressing structural defects as shown in details.

B. All pruning shall be performed by a person experienced in structural tree pruning, or guided by an ISA Certified Arborist

C. Except for plants specified as multi-stemmed or as otherwise instructed by the Owner's Representative, preserve or create a central leader.

D. Pruning of large trees shall be done using pole pruners or if needed, from a ladder or hydraulic lift to gain access to the top of the tree. Do not climb in newly planted trees. Small trees can be structurally pruned by laying them over before planting.

E. Remove and replace excessively pruned or malformed stock resulting from improper pruning that occurred in the nursery or after.

F. Pruning shall be done with clean, sharp tools.

G. No tree paint or sealants shall be used.

3.17 MULCHING OF PLANTS

A. Apply 4 inches of mulch before settlement, covering the entire planting bed area. Install no more than 1 inch of mulch over the top of the root balls of all plants. Taper to 2 inches when abutting pavement.

B. For trees planted in lawn areas the mulch shall extend to a 5 foot radius around the tree or to the extent indicated on the plans.

C. Lift all leaves, low hanging stems and other green portions of small plants out of the mulch if covered.

3.18 PLANTING BED FINISHING

A. After planting, smooth out all grades between plants before mulching.

B. Separate the edges of planting beds and lawn areas with a smooth, formed edge cut into the turf with the bed mulch level slightly lower, 1 and 2 inches, than the adjacent turf sod or as directed by the Owner's Representative. Bed edge lines shall be a depicted on the drawings.

3.19 WATERING

A. The Contractor shall be fully responsible to ensure that adequate water is provided to all plants from the point of installation until the date of Substantial

Completion Acceptance. The Contractor shall adjust the automatic irrigation system, if available, and apply additional or adjust for less water using hoses as required.

B. Hand water root balls of all plants to assure that the root balls have moisture above wilt point and below field capacity. Test the moisture content in each root ball and the soil outside the root ball to determine the water content.

3.20 CLEAN-UP

A. During installation, keep the site free of trash, pavements reasonably clean and work area in an orderly condition at the end of each day. Remove trash and debris in containers from the site no less than once a week.

1. Immediately clean up any spilled or tracked soil, fuel, oil, trash or debris deposited by the Contractor from all surfaces within the project or on public right of ways and neighboring property.

B. Once installation is complete, wash all soil from pavements and other structures. Ensure that mulch is confined to planting beds and that all tags and flagging tape are removed from the site. The Owner's Representative's seals are to remain on the trees and removed at the end of the warranty period.

C. Make all repairs to grades, ruts, and damage by the plant installer to the work or other work at the site.

D. Remove and dispose of all excess planting soil, subsoil, mulch, plants, packaging, and other material brought to the site by the Contractor.

3.21 PROTECTION DURING CONSTRUCTION

A. The Contractor shall protect planting and related work and other site work from damage due to planting operations, operations by other Contractors or trespassers. Maintain protection during installation until Substantial Completion Acceptance. Treat, repair or replace damaged work immediately.

B. Damage done by the Contractor, or any of their sub-contractors to existing or installed plants, or any other parts of the work or existing features to remain, including roots, trunk or branches of large existing trees, soil, paving, utilities, lighting, irrigation, other finished work and surfaces including those on adjacent property, shall be cleaned, repaired or replaced by the Contractor at no expense to the Owner. The Owner's Representative shall determine when such cleaning, replacement or repair is satisfactory.

C. Refer to Section - Temporary Tree and Plant Protection for requirements in the areas of Trees and Plants to remain. Do not store materials or equipment, permit burning, or operate or park equipment under the branches or on the root ones of existing plants to remain. Contractor must report and repair, per the Specification, any damage to plants and structures to the Owner's Representative.

1. Damage to existing trees shall be assessed by a certified arborist.

3.22 PLANT MAINTENANCE PRIOR TO SUBSTANTIAL COMPLETION ACCEPTANCE

A. During the project work period and prior to Substantial Completion Acceptance,

the Contractor shall maintain all plants.

B. Maintenance during the period prior to Substantial Completion Acceptance shall consist of pruning, watering, cultivating, weeding, mulching, removal of dead material, repairing and replacing of tree stakes, tightening and repairing of guys, repairing and replacing of damaged tree wrap material, resetting plants to proper grades and upright position, and furnishing and applying such sprays as are necessary to keep plantings reasonably free of damaging insects and disease, and in healthy condition. The threshold for applying insecticides and herbicide shall follow the established Integrated Pest Management (IPM) procedures. Mulch areas shall be kept reasonably free of weeds, grass.

3.23 SUBSTANTIAL COMPLETION ACCEPTANCE

A. Upon written notice from the Contractor, the Owners Representative shall review the work and make a determination if the work is substantially complete.
   1. Notification shall be at least 7 days prior to the date the contractor is requesting the review.

B. The date of substantial completion of the planting shall be the date when the Owner's Representative accepts that all work in Planting, Planting Soil, and Irrigation installation sections is complete.

C. The Plant Warranty period begins at date of written notification of substantial completion from the Owner's Representative. The date of substantial completion may be different than the date of substantial completion for the other sections of the project.

3.24 WARRANTY

A. The warranty period for all plants and related furnishings shall be one (1) year from the date of Substantial completion.

3.25 MAINTENANCE DURING THE WARRANTY PERIOD BY THE PLANT INSTALLER

A. During the warranty period, provide all maintenance for all plantings to keep the plants in a healthy state and the planting areas clean and neat.

B. General requirements:

   1. All work shall be undertaken by trained planting crews under the supervision of a foreman with a minimum of 5 years' experience supervising commercial plant maintenance crews.

   2. All chemical and fertilizer applications shall be made by licensed applicators within the State of Washington for the type of chemicals to be used. All work and chemical use shall comply with all applicable local, state, and federal requirements and be approved by the Owner following the Integrated Pest Management Plan (IPM).

   3. Assure that hoses and watering equipment and other maintenance equipment does not block paths or be placed in a manner that may create tripping hazards. Use standard safety warning barriers and other procedures

to maintain the site in a safe manner for visitors at all times.

4. All workers shall wear required safety equipment and apparel appropriate for the tasks being undertaken.
5. The Contractor shall not store maintenance equipment at the site at times when they are not in use unless authorized in writing by the Owner's Representative.
6. Maintenance vehicles shall not park on the site including walks and lawn areas at any time without the Owner's Representative's written permission.
7. Maintain a detailed log of all maintenance activities including types of tasks, date of task, types and quantities of materials and products used, watering times and amounts, and number of each crew. Periodically review the logs with the Owner's Representative and submit a copy of the logs at the end of each year of the maintenance agreement.
8. Meet with the Owner's Representative a minimum of three times a year to review the progress and discuss any changes that are needed in the maintenance program. At the end of the warranty period attend a hand over meeting to formally transfer the responsibilities of maintenance to the Owner's Representative. Provide all information on past maintenance activities and provide a list of critical tasks that will be needed over the next 12 months. Provide all maintenance logs and soil test data. Make the Contractor's supervisor available for a minimum of one year after the end of the warranty period to answer questions about past maintenance.

C. Provide the following maintenance tasks:

1. Watering; Provide all water required to keep soil within and around the root balls at optimum moisture content for plant growth.
    1. Maintain all watering systems and equipment and keep them operational.
    2. Monitor soil moisture to provide sufficient water. Check soil moisture and root ball moisture with a soil moisture meter on a regular basis and record moisture readings. Do not over water.
2. Soil nutrient levels: Take a minimum of 4 soil samples from around the site in the spring and fall and have them tested by an accredited agricultural soil testing lab for chemical composition of plant required nutrients, pH, salt and % organic matter. Test results shall include laboratory recommendations for nutrient applications. Apply fertilizers at rates recommended by the soil test.
    1. Make any other soil test and/or plant tissue test that may be indicated by plant conditions that may not be related to soil nutrient levels such as soil contaminated by other chemicals or lack of chemical uptake by the plant.
3. Plant pruning: Remove cross over branching, shorten or remove developing co dominant leaders, dead wood and winter-damaged branches. Unless directed by the Owner's Representative, do not shear plants or make heading cuts.
4. Restore plants: Reset any plants that have settled or are leaning as soon as

the condition is noticed.

5. Guying and staking: Maintain plant guys in a taught position. Remove tree guys and staking after the first full growing season unless directed by Owner's Representative.
6. Weed control: Keep all beds free of weeds. Hand-remove all weeds and any plants that do not appear on the planting plan. Chemical weed control is permitted only with the approval of the Owner's Representative. Schedule weeding as needed but not less 4 times per year.
7. Plant pest control: Maintain disease, insects and other pests at manageable levels. Manageable levels shall be defined as damage to plants that may be noticeable to a professional but not to the average person. Use least invasive methods to control plant disease and insect outbreaks.
    1. The Owner's Representative must approve in advance the use of all chemical pesticide applications.
8. Plant replacement: Replace all plants that are defective as defined in the warranty provisions, as soon as the plant decline is obvious and in suitable weather and season for planting as outlined in above sections. Plants that become defective during the maintenance period shall be covered and replaced under the warranty provisions.
9. Bed edging: Check and maintain edges between mulch and lawn areas in smooth neat lines as originally shown on the drawings.
10. Damage from site use: Repair of damage by site visitors and events, beyond normal wear, are not part of this maintenance. The Owner's Representative may request that the Contractor repair damage beds or plantings for an additional cost. All additional work shall be approved in advance by the Owner's Representative.

3.26 END OF WARRANTY FINAL ACCEPTANCE / MAINTENANCE OBSERVATION

A. At the end of the Warranty and Maintenance period the Owner's Representative shall observe the work and establish that all provisions of the contract are complete and the work is satisfactory.
    1. If the work is satisfactory, the maintenance period will end on the date of the final observation.
    2. If the work is deemed unsatisfactory, the maintenance period will continue at no additional expense to the Owner until the work has been completed, observed, and approved by the Owner's Representative.

B. FAILURE TO PASS OBSERVATION: If the work fails to pass final observation, any subsequent observations must be rescheduled as per above. The cost to the Owner for additional observations will be charged to the Contractor at the prevailing hourly rate of the Owners Representative.

END OF SECTION