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Plants & Trees – Standard Specifications

A. Plants & Trees

While this document provides comprehensive specifications applicable to both plants and trees, it should be noted that many tree-specific, additional specifications are addressed separately. For tree-specific requirements not covered in this document, please refer to the [Trees - Additional Standard Specifications](#) document.

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Furnish all labor, material, tools, machinery, and equipment necessary to install a complete and finished landscape installation as indicated on the drawings and specified herein.
2. Work includes, but is not limited to:
 - a. Exterior Planting
 - i. Plants
 - ii. Planting Soils
 - iii. Tree Stabilization
 - iv. Mulch
 - v. Fertilizer
 - vi. Finish Grading

1.02 DEFINITIONS

- A. Retain definition(s) remaining after this Section has been edited.
- B. Backfill: The earth used to replace or the act of replacing earth in an excavation.
- C. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.
- D. Balled and Potted Stock: Plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required.
- E. Bare-Root Stock: Plants with a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than minimum root spread according to ANSI Z60.1 for type and size of plant required.

- F. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping, and be sized according to ANSI Z60.1 for type and size of plant required.
- G. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.
- H. Fabric Bag-Grown Stock: Healthy, vigorous, well-rooted plants established and grown in-ground in a porous fabric bag, with well-established root system reaching sides of fabric bag. Fabric bag size is not less than diameter, depth, and volume required by ANSI Z60.1 for type and size of plant.
- I. Finish Grade: Elevation of finished surface, which is top of mulch for planting areas, top of planting soil for hydroseeding and seeding areas, and top of sod for sod areas.
- J. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce planting soil.
- K. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- L. Pests: Living organisms that occur where they are not desired, or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- M. Planting Area: Areas to be planted.
- N. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- O. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.
- P. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.
- Q. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.
- R. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.
- S. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- T. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.03 SUBMITTALS

- A. Submit samples in accordance with Section 013300 and the following:

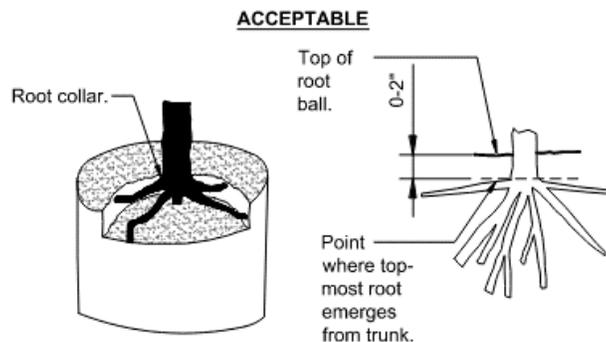
1. Submit one gallon sample of each type of mulch. Provide product name, source, and supplier with sample.
 2. Submit product cut sheets for tree rootball anchor assembly.
 3. Maintenance Instructions:
 - a. Recommended procedures to be established by Contractor for maintenance of landscape and plantings for one (1) calendar year following substantial completion and final acceptance, including completion or negotiated deferral of all landscape, irrigation, and site punchlist items. Submit before start of required maintenance periods.
 - b. Maintenance instructions submittal shall include all notifications
 4. Warranty: Sample of special warranty.
- B. Schedules:
1. Submit a planting schedule prior to beginning work indicating dates, location, and types of work expected to be performed, during normal seasons for such work in areas of the site.
 2. Correlate with specified maintenance periods to provide maintenance from date of substantial completion.
 3. Once accepted, revise dates only as approved in writing, after documentation of reasons for revision.
- C. Certifications:
1. Submit certificates of inspection of plant materials as required by governmental authorities having jurisdiction.
 2. Submit proof of deposit, purchase or other means of securing all plant material for this project including location, quantity, genus, species, and broker or contact person at individual nurseries.
 3. File inspection certificates which are required by law to accompany each shipment of plant materials from out of state with Owner. Five (5) days prior to arrival at project site and before planting, notify Architect for review of plant material. Replace any plants rejected by Architect as not conforming to specified requirements with healthy plant of type specified.

1.04 QUALITY ASSURANCE

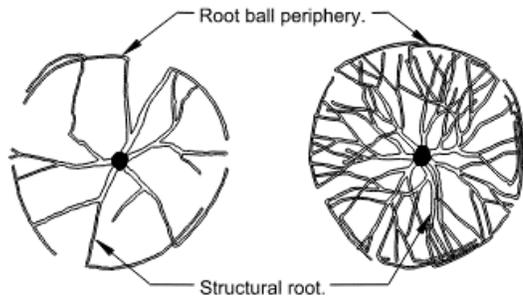
- A. Qualifications: Subcontract the landscaping work to a single firm specializing in landscape work with a minimum 10 years of continuous engagement in landscape construction and a minimum of five projects that are similar in scale and complexity.
- B. Nursery Qualifications:
1. Experience: Landscape nursery to provide a detailed description of total area available for contract growing and history of contract growing for other projects.
 2. Location: All plant material shall be grown at a single site within 50 miles of Seattle to facilitate regular inspections by the Architect.

3. Available nursery space: Total exterior nursery space should correspond appropriately to total planting areas.
- C. Trees, Shrubs, and Plant Production:
1. Containers: All plant material shall be grown with a root pruning system approved by the Architect, such as fabric grow bags or air-pruning containers. Throughout production for given plant sizes, container and fabric bag sizes shall correspond to specifications outlined in the American Standard for Nursery Stock, except where approved by the Architect.
 2. Non-standard containers: To adequately address constrained soil depths in the mid-block plaza, some trees may require non-standard containers, to be agreed upon after discussion between the Architect and the Nursery (e.g. grow bags that are wider and shallower than standard).
 3. Growing media: Specifications for all growing media shall be submitted to the Architect for approval.
 4. Fertilizers: The use of fertilizers shall be limited, meeting only the basic requirements for healthy plant growth. All fertilizer products shall be submitted to the Architect for approval.
 5. Mycorrhizae: All growing media shall be inoculated with appropriate mycorrhizae, as approved by Architect.
 6. Pruning: Pruning of woody plant material shall be performed according to ANSI A300 standards. For all trees, the Project Field Arborist will perform pruning to achieve aesthetic and functional goals.
 7. Tree specification: See illustrations at the end of this section for information on tree rejections
 - a. There shall be no roots greater than 1/10 diameter of the trunk circling more than one-third the way around in the top half of the root ball. Roots larger than this may be cut provided they are smaller than one-third the trunk diameter. There shall be no kinked roots greater than 1/5 the trunk diameter. Roots larger than this can be cut provided they are less than one-third the trunk diameter. See Container Root Structure and Ball and Burlap Root Structure
 - b. Trees should be rooted in to the rootball so that soil or media remains intact and trunk and rootball move as one when lifted, but not root bound. The trunk should bend when gently pushed and should not be loose so it pivots at or below soil line.
 - c. The point where the top-most root in the rootball emerges from the trunk shall be no deeper than one inch of the soil surface.
 - d. The relationship between caliper, height and rootball size shall meet the ANSI Z60.1 standard or the Florida grades and standards for nursery stock.
 - e. There should be one dominant leader to the top of the tree with the largest branches spaced at least 6 inches apart. Low branching trees should not have multiple dominant leaders.
 - f. The tree canopy should be mostly symmetrical and free of large voids. Clear trunk should be no more than 40% of the tree height unless otherwise specified by the Architect.

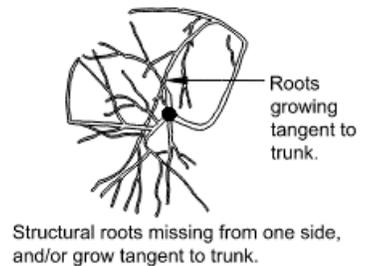
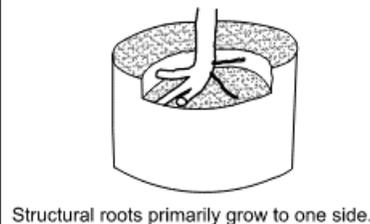
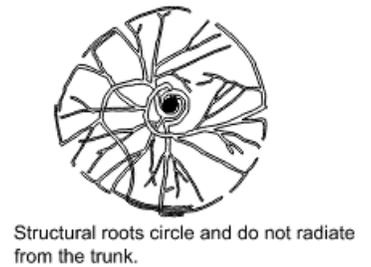
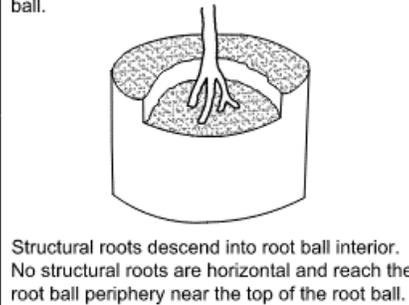
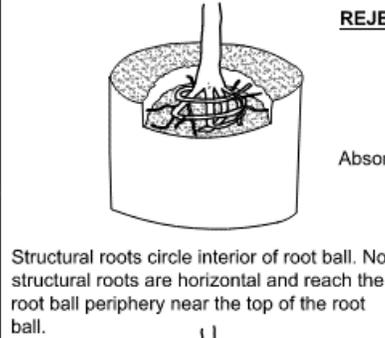
- g. Branches should be less than 2/3 the trunk diameter.
 - h. Trees greater than 1.5 inches caliper should be able to stand erect without a supporting stake.
 - i. Open trunk and branch wounds shall be less than 10% of the circumference at the wound and no more than 1 inch tall. Properly made pruning cuts are not considered open trunk wounds. There should be no conks or bleeding, and there should be no signs of insects or disease on more than 5% of the tree.
- 8. Planting depth: Throughout production, the root flare of wood plant material shall remain visible at or above soil level.
 - 9. Growing durations: Production schedules will vary depending on plant growth rates and propagation methods. Assume that trees for streetscape and plaza areas should be brought in at the earliest possible date to meet the minimum specified size and quality upon installation. Submit production schedule for all plant material, demonstrating ability to provide specified sizes and quantities.
 - 10. Provide quantity, size, genus, species and variety shown and specified, complying with recommendations and requirements of ANSI Z90.1., American Standard for Nursery Stock.
 - 11. Trees and shrubs of larger size than specified may be used if acceptable to Architect and if sizes of roots or balls are increased proportionately.
 - 12. Plants to be in vigorous health, free of all pests, disease, fungus, disfiguring knots, sun scalds, damaged foliage, abrasions of the bark, broken tops, torn roots, and other objectionable features. Plants cut back from larger sizes to meet specified size will not be accepted. Upon arrival to site, all plant material must show no sign of windburn or wilt due to shipping. All plants to be nursery-grown stock unless otherwise approved by Architect. Plants are to be of specimen quality as described by the "American Nursery Stock Standards."
 - 13. Where formal arrangements or consecutive order of trees or shrubs are shown, select stock for uniform height and spread.
 - 14. Reference Standards: "Hortus Third"; Cornell University, (current edition) and "Sunset Western Garden Book", (current edition) for plant nomenclature.
- D. Analysis and Standards: Package standard products with manufacturers or applicable industry standard certified analysis.
 - E. Inspections by Architect: All plant material shall be available for regular inspection by the Architect and owner's representative, who will evaluate whether plant health and quality expectations are being met. Should the Architect or owner's representative determine that the plants are not meeting expectations, adjustments will be made accordingly to the satisfaction of the Architect or owner's representative.
 - F. It is suggested that an additional 15% of plant quantities be produced to allow for replacements of failed stock.



The point where top-most root(s) emerges from the trunk (root collar) should be within the top 2" of substrate. The root collar and the root ball interior should be free of defects including circling, kinked, ascending, and stem girdling roots. Structural roots shall reach the periphery near the top of the root ball.



Roots radiate from trunk and reach side of root ball without deflecting down or around.



Notes:

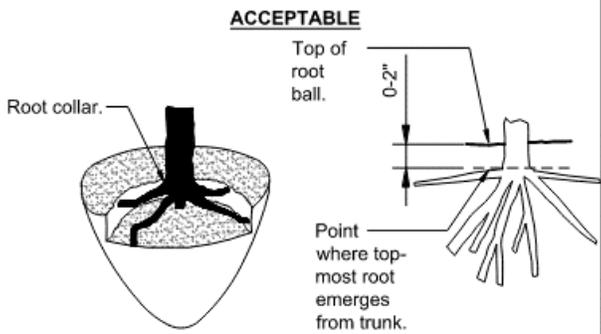
- 1- Observations of roots shall occur prior to acceptance. Roots and substrate may be removed during the observation process; substrate/soil shall be replaced after observation has been completed.
- 2- Small roots ($\frac{1}{4}$ " or less) that grow around, up, or down the root ball periphery are considered a normal condition in container production and are acceptable however they should be eliminated at the time of planting. Roots on the periphery can be removed at the time of planting. (See root ball shaving container detail).
- 3- See specifications for observation process and requirements.

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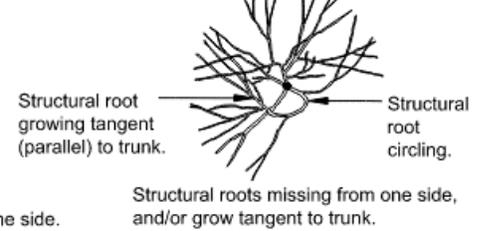
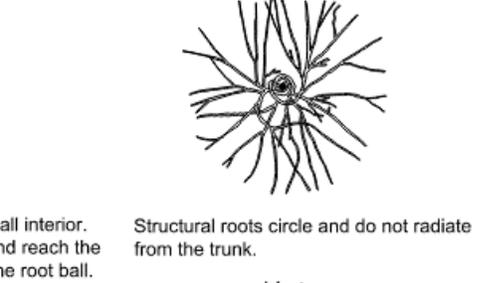
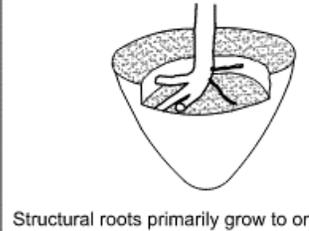
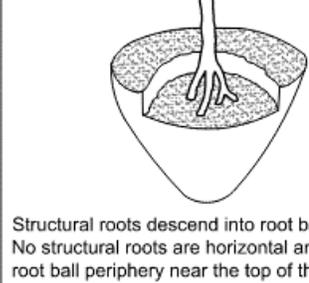
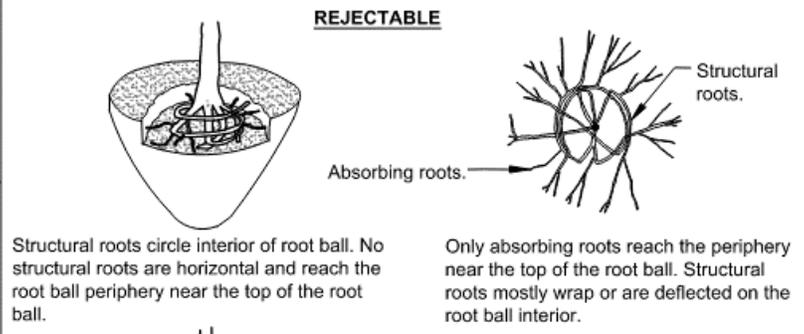
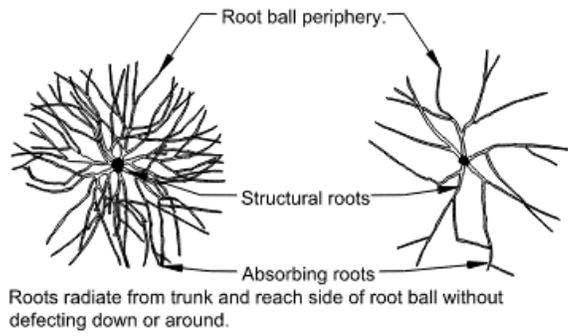
ROOT OBSERVATIONS DETAIL - CONTAINER

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Container Trees Root Structure



The point where top-most root(s) emerges from the trunk (root collar) should be within the top 2" of substrate. The root collar and the root ball interior should be free of defects including circling, kinked, ascending, and stem girdling roots. Structural roots shall reach the periphery near the top of the root ball.



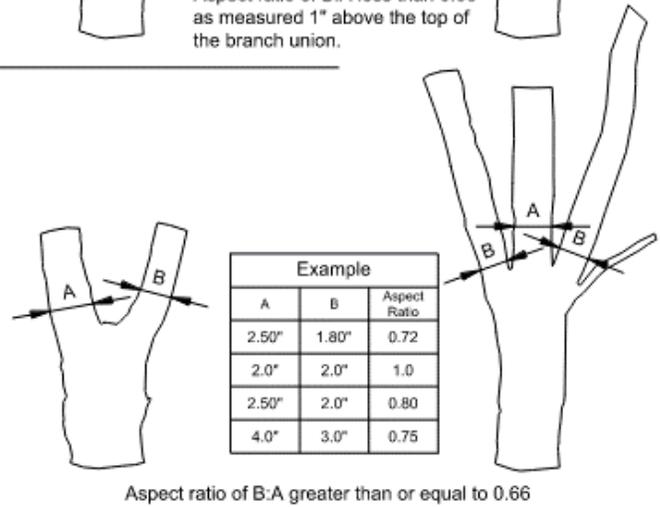
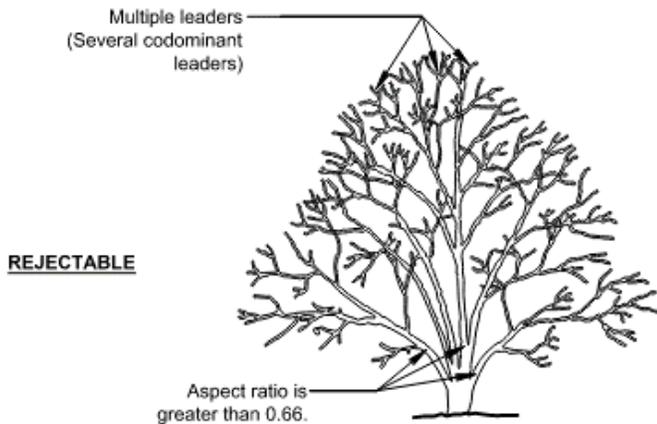
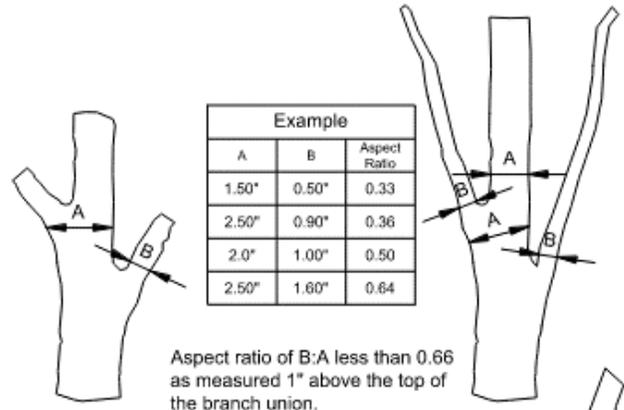
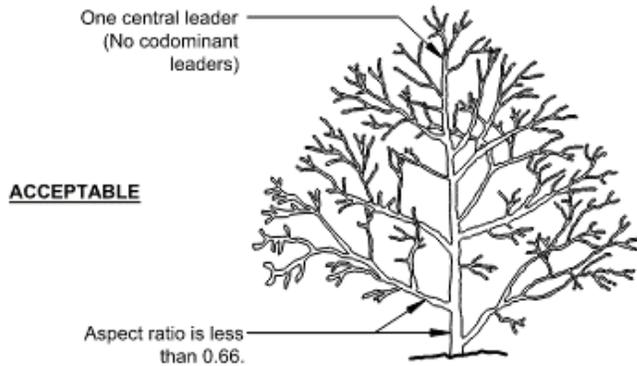
Notes:
1- Observations of roots shall occur prior to acceptance. Roots and soil may be removed during the observation process; substrate/soil shall be replaced after the observations have been completed.
2- See specifications for observation process and requirements.

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ROOT OBSERVATIONS DETAIL - BALLED AND BURLAPPED

Ball and Burlap Root Structure



Notes:

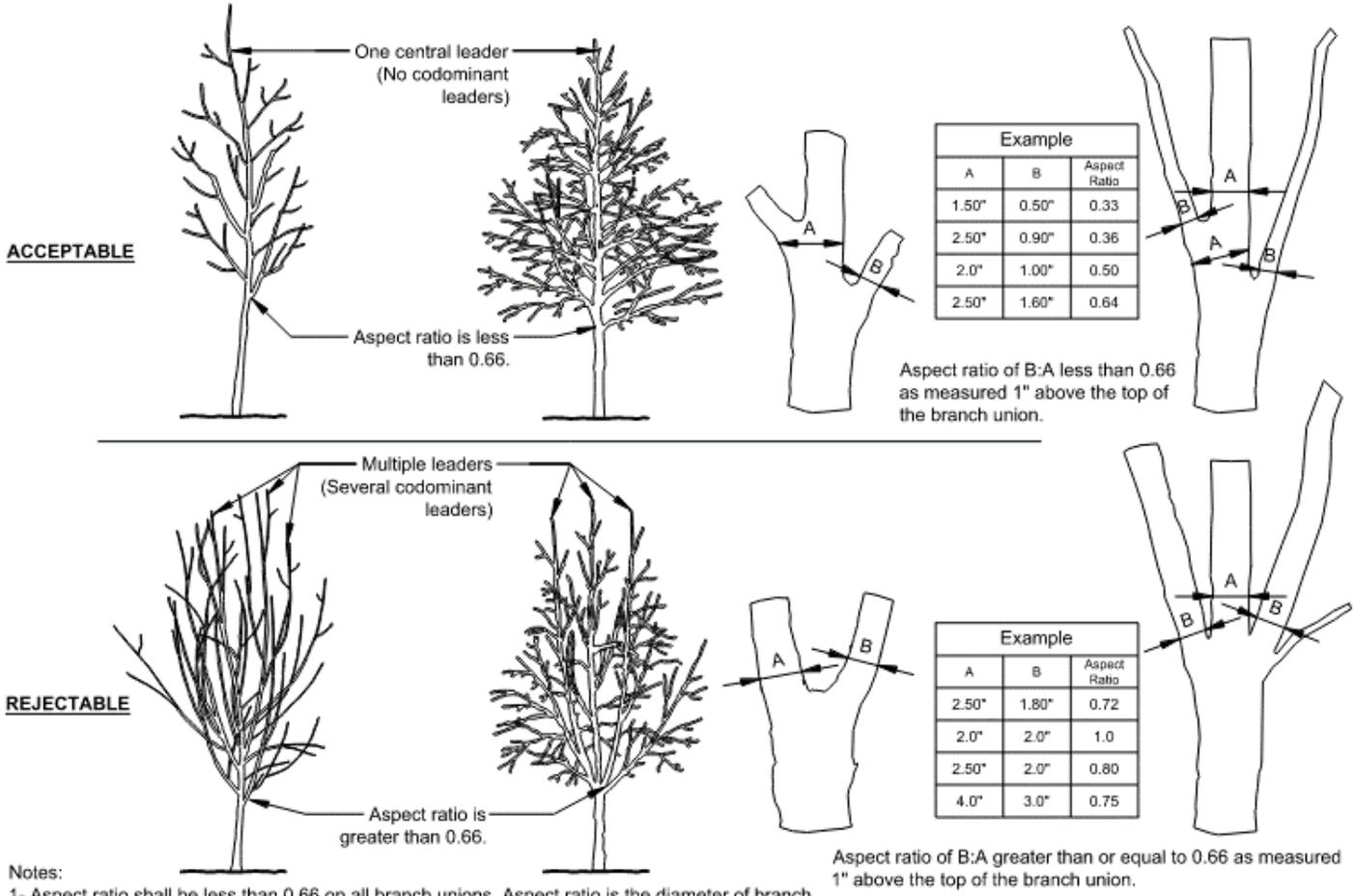
- 1- Aspect ratio shall be less than 0.66 on all branch unions. Aspect ratio is the diameter of branch (B) divided by the diameter of the trunk (A) as measured 1" above the top of the branch union.
- 2- Any tree not meeting the crown observations detail may be rejected.



CROWN OBSERVATIONS - LOW BRANCHED

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Low Branching



Notes:

1- Aspect ratio shall be less than 0.66 on all branch unions. Aspect ratio is the diameter of branch (B) divided by the diameter of the trunk (A) as measured 1" above the top of the branch union.

2- Any tree not meeting the crown observations detail may be rejected.



CROWN OBSERVATIONS - HIGH BRANCHED

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Central Leader

1.05 DELIVERY, STORAGE, & HANDLING

- A. Do not dump or store materials near structures, utilities, walkways, and pavements, or on existing turf areas or plants.
- B. Provide erosion control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
- C. Deliver packaged materials in manufacturer's unopened containers, fully identified by name, brand, type, weight, and analysis.
- D. Deliver and store materials to prevent damage or intrusion of foreign matter.
- E. Deliver trees, shrubs, and groundcovers after preparations for planting have been completed and the irrigation system is operational. Then plant immediately.
 - 1. Protect trunks and branches from damage.
 - 2. Protect root systems from drying out.
 - 3. Label one of each tree and shrub variety with securely attached waterproof tag bearing legible designation, botanical name, and supplier's name.
 - 4. Do not prune prior to delivery unless otherwise approved by Architect. Allow Project Field Arborist one (1) week prior to tree delivery. Allow Field Arborist to perform any necessary structural pruning on trees prior to planting.
 - 5. Provide shade for plant material if planting is delayed more than 6 hours after delivery to site. Water as required to keep rootball moist.
- F. Do not remove container-grown stock from containers until planting time.
- G. Plants that cannot be planted within one day after arrival on site shall be stored in accordance with sound horticultural practice, protecting plant materials at all times from extreme weather conditions and keeping them moist.
 - 1. Place bare root plants in trenches covering roots with moist earth or other suitable material. All broken root material supplied in bundles shall have the bundle broken and be placed in trenches separately.
 - 2. Protect root ball of balled and burlapped plants with moist earth, sawdust or other acceptable material.
 - 3. Protect plant materials at all times from extreme weather conditions and keep moist. All plants that are to be stored longer than one month shall be planted in nursery rows and maintained by contractor at contractor's expense.

1.06 SITE CONDITIONS

- A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.
- B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

- C. Execute all work in an orderly and careful manner with due consideration for surrounding areas, plantings, or structures which are to remain.
 - 1. Protect adjacent property and improvements from work damage.
 - 2. Repair any damage until acceptable to Architect.
- D. Protect pavement, furnishings and other improvements from damage, soiling, or discoloration.
- E. Sub-grade Condition: Compaction of backfill or sub-grade areas that are to be planted shall not exceed 80% compaction.
- F. Examine sub grades, finish grades, verify elevations; observe conditions under which work is to be performed and notify Architect of unsatisfactory conditions.
 - 1. Maintain grade-set stakes until Architect and Contractor mutually agree upon removal.
 - 2. Proceed with work only after unsatisfactory conditions have been corrected.
- G. Excavation: When conditions detrimental to plant growth are encountered, such as adverse drainage conditions and/or contaminated soil, notify Architect before proceeding.
- H. Proceed with and complete the landscape work as rapidly as portions of the site become available, working within the seasonal limitations for each type of planting work required.
- I. Utilities: Determine location of utilities and perform work in manner which will avoid possible damage; hand excavate as required.
- J. Environmental Requirements:
 - 1. Plant or install materials during normal planting seasons for each type of planting required.
 - 2. Planting shall not be permitted during the following conditions:
 - a. Cold weather: less than 32 degrees F.
 - b. Hot weather: greater than 90 degrees F.
 - c. Wet weather: saturated soil.
 - d. Windy weather: wind velocity greater than 30 m.p.h.
- K. Prepare soil only when topsoil is not saturated, muddy or frozen.

1.07 SEQUENCING/SCHEDULING

- A. Provide the following notices to the Architect and Owner:
 - 1. In advance of plant material delivery so that plants may be inspected upon site delivery: 15 days.
 - 2. Before Owner is to assume maintenance responsibility: 15 days.
 - 3. In advance of final surface preparation prior to planting operations: 10 days.
 - 4. Before time requested for inspection for Substantial Completion: 15 days.
 - 5. Architect may choose to waive or shorten the required lead time for project reviews, at their discretion.

1.08 WARRANTY

- A. The warranty for plant materials will extend one year from the date of Final Completion for all work under this contract, except for trees greater than 3" caliper which shall have a warranty of two (2) years.
 - 1. For replaced plant material provide extended warranty for 1-year time of replacement, or from end of standard warranty, whichever is longer.
- B. Remove and replace trees, shrubs, and groundcover that die immediately, show unsatisfactory growth, or are in unhealthy condition, except for defects resulting from neglect, damage, or abuse by owner.
- C. Materials not meeting quality, condition, size, or other specification requirements will be rejected and immediately removed from the site.
- D. At the completion of the warranty period, the owner will inspect the site to determine the condition of materials provided under this contract.
- E. Another inspection will be conducted at the end of the extended warranty period, if any, to determine acceptance or rejection.

1.09 MAINTENANCE SERVICE

- 1. Initial Maintenance Service for Trees, Shrubs, Groundcovers, and other plants and planting elements: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance the period below.
- 2. Maintenance Period: 1 year from date of Final Completion and Acceptance.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Water: Suitable for irrigation, free from ingredients harmful to plant life.
- B. Plants:
 - 1. Provide plants free of disease, injury, and insect infestation, and full-foliaged when in leaf.
 - 2. Container stock: Grown in container at least 6 months without root bind.
 - 3. Provide trees and shrubs in approved root-control container, unless otherwise indicated.
- C. Mulch:
 - 1. All mulch, except at Seattle Parks and Recreation property, shall be medium-fine bark mulch, unless otherwise indicated. Submit sample for Architect's approval.
 - 2. Provide Arborist Woodchip mulch at Seattle Parks and Recreation property only.

3. Install UW provided Arborist Woodchip mulch at UW property (confirm availability), or commercially available Arborist Woodchip mulch if approved by owner and UW representative.
 4. At curbs, hold mulch at 2" below top of back of curb. At hardscape edges, provide mulch flush to ½" below finish grade of hardscape. Provide 3" soil taper across 15" horizontally, to maintain full depth of mulch profile.
- D. Fertilizer: Controlled release commercial fertilizer, tablets or granular form. Complete fertilizer of neutral character, with some elements derived from organic sources and containing the following percentages of available plant nutrients:
1. For trees and shrubs, provide fertilizer with not less than 10% total nitrogen and 10% soluble potash, unless otherwise directed by the Architect.
 2. Application of all chemical additives shall follow the Salmon-Safe Urban Standards. No chemicals on the Salmon-Safe Urban High Risk Pesticide List shall be used on this project.
- E. Tree Rootball Anchor System: See Details.
1. Basis of Design: RF2 Special I Rooftop Fixing System – Plati-Mat
- F. Anti-Desiccant: Emulsion type, film-forming agent design to permit transpiration but retard excessive loss of moisture from plants, manufactured by "Wilt-Pruf".

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine for site conditions that will adversely affect execution, permanence, quality of work, and survival of plants.
- B. Begin work required under this section after conditions are satisfactory; start of work denotes acceptance by Contractor and he/she assumes responsibility for final results.
- C. Verify that subgrades and slopes of planting areas ensure positive drainage, and that they are acceptable to Architect prior to commencing work of this Section.
- D. Install plantings only after fine grading soil testing, soil preparation, and amendments have been installed.
- E. Install plantings only in areas where the irrigation system is installed and fully operational.
- F. Proceed with and complete the planting work as rapidly as portions of the site become available, working within the seasonal limitation for each kind of planting work required.
- G. Plant trees and shrubs after final grades are established.

3.02 PREPARATION

- A. Protection: Protect all adjacent property and site improvements from work damage, including staining, soiling, or discoloring, and replace portions damaged through this operation.
- B. Surface Preparation:

1. Ensure clear and grub within disturbance limits has removed all vegetation, including weeds, that has been designated for removal. If additional clearing and grubbing, weed removal, or other cleanup is required, perform required work before proceeding with planting preparation.
2. Locate, and securely mark or flag irrigation sprinkler heads, area drains, catch basins, cleanouts, manholes, valve boxes, and other site improvements not extending more than 6 inches above finish grade.
3. Grading:
 - a. Limit fine grading to areas ready for planting.
 - b. Bring shrub and groundcover planting areas to relatively smooth, even grades, and slopes by dragging, hand raking, and other appropriate methods. Water thoroughly to assure settlement.
 - c. Establish vertical curves or rounding at abrupt changes in slope to provide a smooth and gradual grade transition.
4. Lay out individual tree and shrub locations and areas for multiple planting. Stake or flag tree locations, outline shrub areas and secure Architect's acceptance before start of planting work. Make minor adjustments as may be required.
 - a. Architect will approve staking, layout of trees and shrubs, and approve all other site plant layout before plant installation. Contractor assumes risk of final plant locations for planting prior to layout and staking approval by Architect.
 - b. Make location and facing adjustments as requested by Architect.
5. Remove gravel, sand, debris, and other deleterious materials from planting areas. Remove existing soil as necessary to place planting soil mixes to the depths specified.

C. Finish Grade of Planting Areas:

1. Planting Beds: Refer to plans for finish grade at planting beds.
2. Planting Beds at R.O.W: Fill planters and shrub beds to meet required grades. Finish grade including mulch to be no more than 1/2" below adjacent paved walks.

3.03 INSTALLATION - PLANT MATERIALS

A. Planting Trees and Shrubs:

1. Oversight:
 - a. Project arborist shall be on-site on planting day to execute any needed pruning prior to planting or warranty plant replacements. The project arborist will inspect trees for damage and disease as outlined in [Section 1.04 QUALITY ASSURANCE](#) Section C. Best practice calls to limit structural pruning until after the 1st year, however, double leaders, dead/crossing branches or branches that will be in conflict (such as roads or pedestrians) should be addressed at planting.
2. Placing:

- a. Set plant root crowns 2 inches above soil surface on 6 inches of compacted prepared topsoil or compacted subgrade (scarified); deep planting not permitted. Planting depth shall allow for mulch layer and settling to position of nursery soil level.
 - b. Set plants plumb and faced for best appearance.
 - c. Remove any burlap, cords, and fasteners from rootball tops and sides. Remove rootball containers with nursery industry can cutter, cut cans on two sides.
 - d. If wire baskets are used to support the root ball, carefully remove the entire basket without allowing the root ball to fall apart. If the wire basket cannot be removed without damaging the root ball the project arborist may allow partial removal of the top and sides of the wire basket
 - e. Cleanly cut off broken and frayed roots, as well as roots circling more than 1/3 of rootball.
 - f. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.
3. Backfilling:
- a. Carefully tamp soil under and around rootballs; eliminate voids and air pockets.
 - b. Water thoroughly before placing remainder of backfill.
 - c. Complete backfilling firming to surface grade as required.
 - d. Thoroughly water each plant and entire bed immediately after planting.
 - e. Stake or guy trees immediately after planting as specified or shown on drawings.

3.04 INSTALLATION – MISCELLANEOUS

- A. Tree Staking: As shown on drawings.
- B. Metal Edging:
 1. Install after concrete paving, concrete unit paving, and concrete site walls are installed.
 2. Prior to installation, layout all steel edging by paint or string line for review and approval.
 3. All steel edging to be installed plumb, true, and in straight lines as shown on plans.
 4. Steel edging interfaces with planter corners, and adjacent edging shall be flush and aligned.
 5. Top of steel to be level without variation.
 6. Steel edging at unit paving shall not protrude above paver surface.
- C. Mulching: Provide three-inch depth over entire plant bed and planter areas, within two days after planting, unless otherwise indicated.
- D. Anti-desiccant:
 1. Use anti-desiccant spray at nursery on deciduous trees or shrubs that are moved in full-leaf before moving, and again 2 weeks after planting.
 2. Apply anti-desiccant using power spray to provide an adequate film over trunks, branches, stems, twigs, and foliage.
 3. Application of all chemical additives shall follow the Salmon-Safe Urban Standards. No chemicals on the Salmon-Safe Urban High Risk Pesticide List shall be used on this project.

3.05 ADJUSTING

- A. Pruning: Prune, thin out, and shape trees and shrubs in accordance with standard horticultural practice established by the International Society of Arborists. Do no pruning prior to approval by Architect.
 - 1. Prune trees to retain required height and spread, and at no time more than 1/5 of the plant.
 - 2. Unless otherwise directed by Architect, do not cut tree leaders, and remove only injured, broken or dead branches from trees.
 - 3. Remove and replace excessively pruned or malformed stock resulting from improper pruning.
 - 4. Prune without distorting basic character form of all plants and only to the extent necessary for each plant.
- B. Adjust final locations of plants and/or irrigation system to maintain proper system operation from time of planting until final acceptance.

3.06 PLANT MAINTENANCE - GENERAL

- A. Maintain plantings by pruning, cultivation, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing and removing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease.
- B. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch material damaged or lost in areas of subsidence.
- C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.
- D. Application of all chemical additives shall follow the University of Washington Integrated Pest Management Plan for Outdoor Landscapes Guidelines for Contractors: 2019 publication including, Salmon-Safe Urban Standards. No chemicals on the Salmon-Safe Urban High Risk Pesticide List shall be used on this project.

3.07 LANDSCAPE MAINTENANCE

- A. For the duration of the Maintenance Period, the Contractor shall maintain planting areas installed by the [Project] on University of Washington Property, per the requirements of the general 32 93 00 specifications, and as follows:
 - 1. General:
 - a. This framework identifies the methodology and processes for The Landscape Contractor ("The Contractor") to provide Maintenance tasks described below, including but not limited to, watering, weed removal, mulching, litter removal, sweeping, blowing, fall/winter leaf removal, and irrigation maintenance. The

Contractor, will maintain this property to assure the highest quality, promoting health of turf and plant material while ensuring a neat and clean appearance. Maintenance visits must be performed at least twice-monthly, but tasks and frequency (i.e. weekly weeding as needed to maintain a weed-free site) may vary based on season.

2. Submittals:

- a. Schedule: Contractor to provide a spreadsheet showing the timing, frequency and an overview of maintenance tasks to be performed throughout the year. The spreadsheet shall include the number of workers assigned to each task, and estimated time to complete each task.
- b. Team QA/QC Meetings: Team QA/QC meetings are intended to provide mutual inspection of the work, documentation, and a feedback loop with the contractor, consulting landscape architect, and UW on a bi-monthly basis for the first 3-months with the option to change to monthly meetings thereafter. Also, monthly meetings may suffice in the non-growing season months from November through February. Such meetings may be combined with the following required meetings and documentation, including pre-work check-ins with the consulting landscape architect and UW to confirm proposed tasks, post-work site observation reports submitted to the UW by the consulting landscape architect to confirm satisfactory condition of planting areas, and follow-up visits and check-ins with UW and the consulting landscape architect as required to meet the requirements outlined herein. Provide schedule to Owner at least four (4) weeks prior to Substantial Completion for review, revision, and approval by owner, consulting landscape architect, and UW. Service will be rendered as quantified, but is subject to weather conditions and may change at the discretion the contractor and without notice. Additional documentation may include plant replacement tracking in a format to be reviewed and approved by UW as part of the maintenance proposal.

3. Contractor Personnel:

- a. The contractor will have an experienced supervisor responsible for the site. This supervisor will have a minimum of three (3) years of experience in landscape services.
- b. The contractor will have only properly trained personnel on site to perform all functions. They will be trained in proper horticultural and mechanical procedures to ensure that all operations are performed safely and effectively.
- c. All contractor personnel will be required to wear a clean company uniform. The supervisory personnel's uniform will be easily distinguished from other personnel. All contractor personnel will be familiar with management regulations and will conduct themselves in a safe, courteous, and professional manner while on site. The supervisor will hold weekly safety meetings.
- d. Contractor to provide qualifications for each.

4. Scope of Work:

- a. The contractor will provide all necessary labor, material, equipment, and fully-trained supervisory personnel to properly maintain all developed land areas within the contract limits, including lawns, shrubs, groundcover, landscape trees, vines, perennials, and flowers.
5. Mulching:
- a. Replenish mulch throughout entire site to maintain consistent depth per 2.1 C 4.
 - b. The 3" mulch profile shall only include intact mulch and not material that has decomposed into the soil profile.
 - c. Any disruptions to the mulch from work, nature, or other factors after initial mulching shall be corrected, including the protection of existing mulch to avoid contamination with soil and other debris, and the removal and replacement of any contaminated mulch with new mulch.
6. Weed Control:
- a. Maintain a weed-free condition within the planting areas. Preferred weeding should be accomplished by manual means over chemical means.
 - b. Site inspections, weather depending, will be carried out year-round. Weeding shall occur at least twice-monthly and at times may require weekly visits.
 - c. Weeds are to be removed from the beds in compliance with the University of Washington Integrated Pest Management Plan (UW IPMP) for Outdoor Landscapes, 2019, and Salmon Safe practices. UW Grounds IPM Coordinator to communicate program requirements.
 - d. Contractor shall keep the site weed free by hand removing the whole weed including roots, within 1 week of germination, prior to going to seed.
 - e. Upon written approval from UW, a selective, pre-emergent weed control labeled for broadleaf and grassy weeds in ornamental beds may be applied two (2) times per year prior to seed germination at the appropriate label rate necessary, to provide weed control.
 - f. Upon written approval from UW, a non-selective, post-emergent weed control labeled for broadleaf and grassy weeds in ornamental beds will be applied as necessary to provide weed control.
 - g. Herbicides shall only be applied by a licensed applicator and in strict accordance with manufacturer's direction.
7. Shrub Management:
- a. This specification will cover all items of shrub management.
 - i. Pruning:
 - (a) Shrubs should not be pruned and should maintain their natural form, except as follows: Selective pruning will include the removal of dead wood, diseased wood, wood that is infested with insects, weak wood that is not productive of bloom, excess suckers-shoots, and irregular growth.

- (b) Ornamental shrubs, excluding formal hedges, will be selectively pruned. DO NOT SHEAR SHRUBS. If no direction is given Contractor will perform pruning in keeping the most uniform, natural appearance and consistency of the overall site area.
 - ii. Fertilization:
 - (a) The fertilization program for ornamental trees, shrubs and ornamental beds will include one application per season.
 - (b) Fertilizer will be distributed by hand or hand held broadcast spreader around the drip-line of the plant.
 - (c) Fertilizer will be a professional grade, balanced, slow release ornamental fertilizer.
 - (d) Do not fertilize unless there is a deficiency demonstrated through soil nutrient testing.
 - iii. Shrub and Groundcover Disease and Insect Control:
 - (a) Quality Control personnel trained in the recognition, diagnosis and treatment of plant damaging diseases and insects will monitor site conditions. The Customer will be notified immediately of an outbreak. Notification will include recommended treatment and potential costs. Treatment will not be performed without prior authorization. Additional work to be completed and billed separately from maintenance contract.
 - (b) Herbicides and fungicides will be applied by a State of Washington “certified” pesticide applicator. Application will be as often as necessary to prevent insect and disease damage to shrubs. Rates and timing will follow manufacture’s recommendations.
 - (c) The UW IPMP will be followed at all times. The pest management program will introduce the least amount of chemical into the landscape as is necessary to achieve accepted levels of control of pest populations.
- 8. Tree Management:
 - a. This section covers landscape tree management. Landscape trees are defined as trees with a caliper of 8" or less when measured 24" from ground level. The contractor will be responsible for normal maintenance up to 12' as specified below. Landscape and ornamental tree pruning is limited to work that can be reached from the ground with hand pruners, pole saws, or pole clips.
 - b. Pruning:
 - i. Landscape trees will be pruned to remove over-extended, dead, dangerous, or broken branches.
 - ii. Other crossed or otherwise unsightly branches shall only be removed upon direction from a UW representative.
 - iii. Ornamental trees will be pruned to remove dead or damaged branches.
 - iv. Other pruning to develop the natural form of the plant shall only be performed upon direction from a UW representative.

- v. Sucker growth from the base at soil level or below will be removed.
 - vi. Landscape trees will be pruned throughout the season to remove all dead, damaged, and low-hanging branches.
- c. Insect and Disease Control:
- i. The UW IPMP will be followed at all times. Quality Control personnel trained in the recognition, diagnosis and treatment of plant damaging diseases and insects will monitor site conditions. The Customer will be notified immediately of an outbreak. Notification will include recommended treatment and potential costs. Treatment will not be performed without prior authorization. Additional work to be completed and billed separately from maintenance contract.
9. Perennial Care:
- a. All deciduous perennials, grasses, etc., are to be cut back by March to allow new growth to develop freely.
10. Disposal:
- a. Provisions may be made for the on-site disposal of leaves and organic waste with client agreement.
11. Other Trash:
- a. The contractor will remove all litter and debris from common area turf, curb lines, ornamental beds and tree rings each visit. The contractor is responsible for disposal.
12. Plant Material Replacement:
- a. For plant mortality replacement, establish process for identifying, tracking, and replacing plant materials, and submit plan to UW for approval at least four (4) weeks prior to substantial completion.
 - i. Unless directed otherwise by UW, submit inventory of plant mortality on March 1 and on September 1 of each warranty year, along with proposed replacement stock, nursery source, and timing, for review and approval by UW.
 - ii. All planting replacement must be complete between March 1 and May 1, and between September 1 and November 1.
 - iii. Provide post-replacement report to UW on replaced plants and track plant replacement throughout the warranty period including quantity, species, and location. Provide this document to the UW at end of warranty period.
 - iv. Additional plant replacement shall be performed during winter and summer months if directed by UW.
 - b. For tree replacements, also refer to 3.3.A.1.
13. Irrigation:
- a. In general, established plant materials need approximately ½ inch to 1 inch of water per week, including natural precipitation. Set the irrigation system to provide this

amount. Monitor the site to ensure that the ground stays moist, but is not saturated. Provide sufficient available moisture at deepest root zone.

- b. Established landscapes in our region typically require irrigation from mid-July through the end of September. Seasonally adjust the automatic irrigation system to account for evaporation during the hotter months or during times of extreme heat or drought. More frequent early spring and late fall irrigation may be needed to establish new plantings.
- c. In the winter months, continually monitor “rain shadows” where building overhangs and structures obstruct natural rainfall from reaching landscape beds. If soil moisture levels drop in these areas, occasional hand watering may be required.
- d. Provide and fill water bags weekly or as needed at each tree during the growing season through the contractor maintenance period.

14. Irrigation System Maintenance and Management:

- a. Contractor shall manage irrigation controller and irrigation system with UW having “read only” privileges.
- b. Contractor to provide, set, manage, and monitor irrigation schedules and programs seasonal adjustments based on weather, plant type, plant water requirements, microclimate variables such as exposure, radiant and reflective heat, density, slope, and soil type.
- c. Contractor shall use a soil moisture probe to evaluate soil moisture at plant and tree root zones for each program the day before the longest no water interval of a new irrigation cycle for each program, to verify proper scheduling.
- d. Activation: Contractor to test, repair and turn on irrigation system for seasonal operation in spring.
 - i. Install and open quick coupler valves at all mainline terminations to safely vent stored compressed air energy.
 - ii. Turn on the point of connection and valves to fill the mainline. When mainlines filled and air purged; close and remove quick coupler valves.
 - iii. Inspect the irrigation point of connection assembly and mainline for leaks.
 - iv. Inspect and electronically operate individual irrigation zones. Adjust irrigation sprinklers and plants as necessary to provide full coverage. Repair any damage with the exception of failures or repairs to the irrigation system resulting from acts of nature, vandalism, or other accidents at no fault of the contractor, and notify the UW. UW shops may make repairs but if they lack capacity, the contractor shall notify the UW to review the damage, agree upon the scope of repair work, and the contractor shall procure and execute the repairs within five (5) business days after identifying the damage and UW declining the work, or as agreed to between the contractor and UW. The UW will furnish a purchase order for the repairs based on a contractor quote based on market rates and prevailing wage requirements. Note that the contractor is responsible for providing temporary irrigation as needed until repairs are complete. All repairs shall be made with original equipment.

e. Winterization:

- i. Contractor to winterize the irrigation system during fall.
 - (a) Contractor to turn off all major components of irrigation system.
 - (b) Winterization will be performed by experienced personnel only. Sprinkler system will be winterized before freezing occurs to avoid damage. Extreme care must be taken when blowing out the system to avoid excessive pressure which may damage valves or sprinkler pipe, or cause physical injury. Air pressure must not exceed 60 pounds PSI. Close gate valve downstream of master valve and flow sensor. Air compressor capable of providing 10 to 25 CFM of air volume will be introduced into the mainline with a quick coupler key into a quick coupler valve with a second quick coupler key fitted with a bronze full port ball valve inserted into a quick coupler valve at all mainline terminations to act as a safety air vent. Compressor will be turned on, gradually increasing air flow, initially purging the mainline of water, then activating the zone to purge it of water until the sprinklers only expel a fine mist and air. Repeat the process as necessary. After blowing out all zones, the safety air vent quick couplers will be opened while shutting down the compressor. Controller power should remain on but adjust the controller to a no irrigation setting.
 - (c) Contractor to notify owner that winterization process is completed.

3.08 CLEANING

- A. Keep project site reasonably free from accumulation of debris, topsoil, and other materials at all times. Maintain pedestrian and driving routes as dictated by the Owner.
- B. Remove topsoil and backfill mixes from walks and paving on a daily basis.
- C. Remove construction rubbish, broom and hose down areas daily as necessary to maintain clean pavement.
- D. After installation and before Substantial Completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

3.09 PROTECTION

- A. Protect landscape work and materials from damage due to landscape operations, operations by other contractors, trades, and trespassers.
 1. Maintain protection during installation and maintenance periods.
 2. Treat, repair or replace damaged landscape work as directed.