NOTE TO CONSULTANTS: Edit with Track Changes turned on, any text in this section that appears in bold and italics then turn off the bold and italics for the final approved version. (Remove this Note).

PART 1 - GENERAL

1.01 Summary:

A. This section includes administrative and procedural requirements for the temporary protection of trees, vegetation and soils not designated for removal. Such trees, vegetation and soils shall be left in place and protected from damage or injury by the Contractor during construction, using full and adequate methods of protection as described herein or as directed by the Engineer:

1. Developing a Tree, Vegetation & Soil Protection Plan (TVSPP).
2. Furnishing all labor, materials, equipment, supplies, and operations as required installing and maintaining temporary tree and plant protection as required.
3. Maintaining newly installed tree protection elements, including, but not limited to: fencing, woodchip mulch, landscape fabric, cabling, and signs.

1.02 References:

A. This Section incorporates by reference the following documents:

1. City of Seattle Standard Specifications for Road, Bridge and Municipal Construction.
2. City of Seattle Standard Plans Nos. 132A, 132B, 133 and 142.
3. Council of Tree and Landscape Appraisers:
   a. *Guide for Establishing Values of Trees and Other Plants*, issued by the Council of Tree and Landscape Appraisers.
4. American National Standards Institute Standards (ANSI) A300 - Pruning Standards.

1.03 Related Sections:

Section 01 57 13 - Construction Stormwater Control
Section 02 41 13 - Selective Site Demolition
Section 31 00 00 - Earthwork
Section 31 11 00 - Clearing & Grubbing
Section 31 13 13 - Tree & Plant Removal
Section 32 93 00 - Landscape Planting
Section32 96 00 - Transplanting

1.04 Definitions and Terminology:

A. COS: City of Seattle.

B. SPR: Seattle Department of Parks and Recreation.

C. The Engineer: SPR's project personnel including, but not limited to; the SPR Engineering Manager, the SPR Construction Manager, the SPR Project Inspector, the SPR Urban Forester, and/or their designees.

D. Landscape Requiring Protection: All Trees, vegetation & soils which are identified on the **Tree, Vegetation and Soil Protection Plan (TVSPP)** included in the Contract Documents). All existing trees, vegetation and soils identified to remain, which may be affected by the Work.

E. ISA: International Society of Arborists.

F. Consulting Arborist: An ISA Certified Arborist who is on the Design Consultant's team and is responsible for the preparation of the TVSPP.

G. Project Arborist: An ISA Certified Arborist who is paid by the Contractor and has been approved by the Engineer.

H. Critical Root Zone (CRZ): Defined as an area surrounding the tree trunk as described on the City of Seattle Standard Plan No. 133 and the City of Seattle Standard Specifications Section 1-07.16(2) and Section 8-01.3(2)B for Tree, Vegetation and Soil Protection techniques within COS owned properties and for the information that shall be included on the TVSPP.

I. Dripline: Defined as the area on the ground beneath the outer edge of the tree's canopy.

J. DBH: Diameter of a tree at Breast Height, as measured 4-1/2 feet above root crown.

1.05 Tree, Vegetation and Soil Protection Plan:

A. The Consulting Arborist shall prepare the TVSPP as part of the Contract Documents. The TVSPP shall include but not be limited to the following:

1. The true and actual CRZ and Dripline of all trees and plants of significant sizes based on the Site Survey of Existing Conditions as described in the SPR Design Standards for Survey http://www.cityofseattle.net/parks/projects/standards/files/01_Information_Resources_for_Consultants.pdf.
2. Final landscape protection fencing locations and phasing information.
3. A list and schedule of all intended landscape maintenance practices to be provided.
4. Tree labels, including identification number as assigned.

5. The watering schedule for temporary watering. Indicate source of water, a reliable method of slow application, and duration of watering.
6. An inventory of pre-construction existing soil conditions including the requirements called for in the DPD Director's Rule 10-2011.
7. Anticipated work methods for work within landscape protection areas.
8. A list of plant pruning guidelines.
9. A list of clearing & grubbing, excavation and earthwork guidelines.
10. A list of the proposed tree and root avoidance techniques.
11. A list of the radial trenching and/or root re-invigoration/soil amending guidelines.
12. Documentation of the Consulting Arborist's on-site confirmation or re-designation of the landscape protection area for each tree.

B. Photo Documentation, tagging, and inventory reports to be performed by the Project Arborist prior to any construction activities:

1. Photograph all Landscape Requiring Protection prior to commencement of construction and again after plants produce a full canopy of leaves if initial photographs are taken when trees are bare of leaves.
2. Photograph all Landscape Requiring Protection from the cardinal directions (north, south, east, and west). Label all photographs with:
   a. Tree tag number, unique for each tree.
   b. Direction from which the photograph was taken.
   c. Date photograph was taken.
3. Written inventory of all Landscape Requiring Protection, confirming location, type, and size.
4. Provide 2 hard copies of photographic documentation with inventory and 2 electronic copies to the Engineer and SPR Urban Forester 30 Days prior to the Work commencing on Site.

1.06 Contractor Submittals:

A. Qualifications of the Project Arborist.

B. An appraisal provided by the Project Arborist for all Landscape Requiring Protection identified by the Contract Documents. The Project Arborist shall provide supplemental appraisal values for any additional landscape, or any additional trees whose critical root zones may be affected by the Work and therefore need to be protected. Base the appraisals upon the current Guide for Establishing Value of Trees and Other Plants.

C. Product Data for:

1. Mycorrhizae fungal inoculants.
2. Slow release fertilizer.
3. Landscape protection fencing.

4. Wood chips, including laboratory test report.

D. Samples:

1. Landscape protection signage: one
2. Tree appraisal value signage: one.
3. Cabling material: one foot length.
4. Wood chips: one pound bag.
5. Coir mat: one square foot.

E. Laboratory Test Reports:

1. Employ an accepted agricultural testing laboratory to perform wood chip testing. The testing laboratory must be accepted by the Engineer in advance.
2. Submittal for wood chips:
   a. Test sample of wood chips for protection areas. Follow testing laboratory instructions for wood chip sample collection.
   b. The test shall measure and confirm pathogen levels for the following: Phytophthora (1 propagule per gram (ppg) maximum), Pythium (450 ppg maximum), Fusarium (1800 maximum), and Rhizoctonia (10 ppg).
   c. The test shall identify and measure heavy metals and other chemicals including: lead, cadmium, arsenic, and potassium.
   d. Wood chips with laboratory test results confirming pathogens at higher than the maximum levels indicated, unacceptable levels of heavy metals, or other chemicals will be rejected.

F. Compliance Reports: Submit observations and recommendations for each site visit conducted by the Project Arborist.

1.07 Project Conditions:

A. The Engineer may order the Work stopped if landscape protection measures are not completed prior to start of the Work if unauthorized uses of protected areas are occurring, or if tree protection fencing is not restored within 24 hours of notice to do so.

B. Tree Identification: In all correspondence regarding Landscape Requiring Protection and tree protection systems, refer to the specific tree number on the Contract Documents, or as listed herein.

1.08 Replacement Plant Warranty:

A. The Contractor shall replace any trees and plants which, in the opinion of the Engineer, are in unhealthy or unsightly condition or that have lost their natural shape due to dead branches, excessive pruning, or excessive defoliation related to damage caused by the Contractor.

B. Be responsible for maintenance of all replacement trees and plants during the Warranty Period. Inspect the plant materials to ensure that the areas are receiving proper care. The Engineer will provide periodic reviews and notify the Contractor of any areas needing attention. Warrant all replaced material for a period of 1 year from date of replacement.

C. Replace unacceptable plants no later than the next succeeding planting season.

D. Replace unacceptable plants in accordance with the original specifications.

E. Any tree or plant that is 25 percent or more dead or disfigured is considered dead. Plants are considered disfigured when excessive dead wood has been removed or when the symmetry, typical habit of growth, or sculptural form has been impaired by the removal of dead wood.

F. The above Warranty is applicable to any growing conditions through which plants of like kind could be expected to survive and any deformity or cause of death which could be attributed to, or affected by, the physiological conditions of the plant. The Warranty would not apply to plant losses due to abnormal weather conditions such as floods, excessive wind damage, drought, severe freezing, or abnormal rain, as determined by the National Weather Service.

PART 2 - PRODUCTS

2.01 Temporary Landscape Protection Fencing:

A. Landscape protection fencing shall be comprised of the following:

1. In accordance with COS Standard Plan No. 132A. Use chain link fencing only.
2. Fencing Type 1 and/or Type 2:
   a. Chain link fence materials including footings, posts, braces, and mesh to be used to form a 6 foot high enclosure.
   b. Footings:
      1) Type 1: no footings required.
      2) Type 2: above ground precast concrete block type footings, 100 pounds minimum.
   c. Posts: 1-1/2 inch steel pipe, minimum. Use with approval by the Engineer in areas where fence must cross existing paved surfaces or as indicated on the Contract Documents or accepted Landscape Protection Plan.
   d. Mesh: 2 inch by 2 inch, 11 gauge chain link fabric, minimum.

B. Landscape Protection Signage:

1. Provide weather resistant, fluorescent green or yellow signs 48 inch by 48 inch with minimum of 3 inch high letters indicating the following:
   a. Tree Protection Warning: "No Trespassing on the Critical Root Zone of this/these tree/trees/plants without direct approval of the Engineer. Unauthorized activities or Work within the Critical Root Zone will result in a fine of $1,500, or the appraised landscape value, whichever is greater".
   b. Botanical/common names.
   c. Appraised value of plants.

C. Cabling: Meet landscape industry standards for permanent cabling of trees.

D. Tree Tags: Race-track shaped aluminum tags engraved with individual tree numbers as indicated on Contract Documents.

E. Water: Irrigation water shall be supplied by the Contractor.

F. Mycorrhizae Fungal Inoculant: Mycogrow Gel, manufactured by Fungi Perfecti (Olympia, WA) or Mycorrhizal Landscape Inoculant, manufactured by BioOrganics (Santa Monica, CA), or approved equal.

G. Slow Release Fertilizer: Osmocote 14-14-14 slow release pellets, Osmocote Controlled Release Fertilizer 13-13-13, Sierra Controlled Release Fertilizer Plus Minors 17-6-12, or approved equal.

H. Wood Chips: Chipped wood mulch or hog fuel. Submit mulch to laboratory to be checked for undesirable pathogens. Submit laboratory report.

I. Coir Mat: Geocoir@DeKoWe 400, by Belton Industries, Koir Mat 400 by Nedia Enterprises, or approved equal.

PART 3 - EXECUTION

3.01 Installation:

A. Prior to any construction activity the Contractor and their Project Arborist shall:

1. Review the TVSPP.
2. Verify adequacy of the extent of Landscape Requiring Protection, as defined in the Contract Documents.
   a. Review Contract Documents and periphery of the Site for any additional landscape or any additional trees whose CRZ may be affected by the Work and therefore need to be protected.
   b. Tag trees with designated numbers.

c. Post tree preservation area/restrictions signage and appraised value signage on all Landscape Requiring Protection as specified herein.
d. Protect Landscape in accordance with approved TVSPP.
e. Protect soil and roots within the Dripline of all Landscape Requiring Protection with a 1" mesh opening coir mat under four (4) inches deep of wood chips. Provide a minimum of 6 inches radius zone clear of mulch at the base of each tree or shrub.
f. Coordinate with the Engineer, regarding areas requiring special attention as identified and specified on the Contract Documents.
g. If required, root prune within the CRZ 3 months prior to commencement of the Work.

3.02 Installation:

A. Landscape protection fencing:

1. Type 1 Fencing: Drive posts a minimum of 2 feet below existing grade and deep enough to remain rigid during subsequent excavating and grading.
2. Type 2 Fencing: Install fence on above ground precast concrete block type footings in locations as indicated by Contract Documents.
3. Install fencing and wood chips to protect Trees Requiring Protection from construction activities when trees are located inside the construction fence.
4. For Landscape Requiring Protection located outside the construction fence, no additional protection fencing is required if construction activities will not impact the landscape. If construction activities are expected adjacent or near Trees Requiring Protection, install chain-link fencing in accordance with COS standard Plan No. 132A, Type 1 and 2 for the duration of any construction activities.
5. Do not compact soil or use heavy equipment in the Landscape Protection Area when installing protective fencing installation.
6. Provide diagonal bracing to vertical posts at corners of enclosures and wherever needed to ensure rigidity of the fencing.
7. Install chain link fabric tight to grade at the bottom edge, and stretched uniformly between posts. Install top of fabric 6 feet above grade, minimum.
8. Install fabric to form continuous fencing as indicated on Contract Documents. Attach fabric to posts 12 inches on center with 11 gauge wire ties securely fastened, or with bolted ring clips, and to top rail not over 3 feet on center.
9. Attach orange flag strips 12 inches long at 3 feet on center along the fence, 5 feet above grade.
10. Provide 1 locked gate at each fenced area.

B. Landscape Protection Signage:

1. Affix one landscape protection sign to each landscape protection area fence using a method accepted by the Project Arborist.

C. Wood chips:

1. Protect soil and roots within the landscape protection area with a layer of 6 inches of wood chips. Provide a 36 inch diameter clear zone at the base of each tree.
2. In areas of Landscape Requiring Protection with understory landscape as indicated by Contract Drawings, provide wood chips when directed to do so by the Engineer as needed to protect soils and roots from any work taking place within the fencing.

3.03 Protection:

A. During the execution of the Work, the Contractor shall:

1. Notify the Engineer in anticipation of any construction activities within landscape protection area, including all excavation, demolition, and resurfacing of sidewalks or paved areas. The Contractor shall notify the Engineer at least five (5) Working Days in advance of commencing such operations. Call the **SPR Inspection Request Line @ (206) 684-7034 or by email at parksconstruction.inspection@seattle.gov** to make arrangements for inspection.
2. Within the landscape protection area, hand-excavate to prevent tears and breaks in root surfaces. Leave roots larger than 2 inches in diameter intact and undamaged. During the time of exposure, keep roots moist with moist soil, wet mulch, and burlap, or accepted equal.
3. Use air spade to dig all trenches within landscape protection area, as identified on TVSPP. Cut off roots cleanly with a sharp blade when roots are exposed or disturbed by work activities. Place utility conduit either under roots by tunneling, or over roots using adequate sand bedding and providing adequate cover. Obtain acceptance from the Engineer that bedding is adequate.
4. Monitor the Work and be on site at time of removal of existing hardscape within landscape protection areas to avoid root damage. As hardscape is removed, identify existing sub-grade and assist in establishing final grades or new pavement sub-grade by providing direction for root protection. Where new pavement is planned, direct the cutting of roots 6 inches clear of planned paving edge.
5. Monitor maintenance of all landscape protection areas to ensure it is in a healthy condition and report any deficiencies or concerns to the Engineer immediately. Implement adjustments to the Landscape Protection Plan as directed by the Engineer as needed during the course of the Work.
6. Immediately report any deficiencies or concerns to the Engineer.
7. Implement adjustments to the TVSPP and list landscape protection areas as needed and as accepted by the Engineer.
8. Perform on-site review as needed during construction for activities that are adjacent to or affecting all landscape protection areas.

9. Monitor clearing and grubbing in areas requiring special attention as identified on tree and plant protection Contract Documents and as specified in Section 31 11 00 - Clearing and Grubbing, in order to preserve roots.
10. Monitor any work within landscape protection areas including all excavation, demolition, and resurfacing. See Section 31 11 00 - Clearing and Grubbing, for excavation requirements for select plants.

B. Landscape Protection:

1. Protect landscape in accordance with approved TVSPP.
2. Coordinate with Project Arborist regarding areas requiring special attention as identified and specified on the Contract Documents.
3. Locate tree protection in accordance with the Contract Documents and approved TVSPP unless otherwise directed by the Engineer
4. Protect soil and roots within the landscape protection areas with a 1” mesh opening coir mat under 4 inches of wood chips. Provide a 36 inch diameter zone clear of mulch at the base of each tree.
5. In areas requiring attention for measures of Special Protection:
   a. Protect soil and roots within the landscape protection areas with a 6 inch layer of wood chips.
   b. Provide a 24 inch radius zone clear of mulch at the base of each tree.
6. In areas of Landscape Requiring Protection with understory landscape (such as lawn or shrubs) as indicated by Contract Documents, provide wood chips when directed to do so by the Engineer as needed to protect soils and roots from any work taking place within the fencing.
7. Carefully plan and execute operations to avoid damaging trees. Coordinate with the Engineer and SPR Urban Forester for requirements specified herein.
8. Protect against cutting, breaking or skinning of roots, skinning or bruising of bark, compaction of root zones, and breaking of branches.
9. Perform any heavy equipment work from locations, angles, and directions that minimize compaction to tree or shrub roots. Under the supervision of the Engineer, tie back flexible limbs and overhead branches which may, in the opinion of the Engineer, are damaged by the passage or activity of equipment. Anticipate limbs that may be in the way of necessary equipment to avoid limb damage and provide a remedy before work occurs. Do not remove tree limbs without the prior written acceptance of the Engineer.

3.04 Above Grade Work:

A. For tree removal or tree trimming within 10 feet of any overhead utility lines the Contractor shall make the notifications specified in City of Seattle Standard Specifications (most recent edition).

B. When the Contractor anticipates construction operations that will unavoidably affect tree limbs, the Contractor shall notify the Engineer at least five (5) Working Days in advance of commencing such operations. Call the **SPR Inspection Request Line @**

(206) 684-7034 or by email at parksconstruction.inspection@seattle.gov to make arrangements for inspection.

1. Before trimming any trees, the Contractor shall notify the Engineer of the proposed method and the amount of trimming anticipated.
2. Trimming shall be done by an ISA Certified Arborist working for a professional tree service company whose past and current performance is in accordance with the American National Standards Institute Standards (ANSI) A300 Pruning Standards.

C. Use of the area within protective fences and within the landscape protection area:

1. Do not store materials potentially harmful to tree roots within 20 feet of outside limit of protected areas. Potentially harmful materials include, but are not limited to: petroleum products, cement and concrete materials, cement additives, lime, paint coatings, waterproofing agents, form coatings, detergents, acids, and cleaning agents.
2. Alter no grades within the required protective fence area.
3. Control soil moisture within the landscape protection area. Prevent flooding of the soil, and protect root areas from leachate, cement, oil, fuel and lubricating oil, and all contaminants.
4. Notify the Engineer at least two (2) working days in advance of the need to move a tree protection fence.
5. Upon relocation of fence, continue all other protection efforts and maintenance of landscape protection area in accordance with the accepted TVSPP.

3.05 Trenching and Tunneling within the Dripline:

A. Trenching and tunneling within the drip-line of existing trees not designated for removal shall be in accordance with the City of Seattle Standard Plans & Specifications (most recent edition), and defined zone clearance requirements.

B. Excavation or tunneling of any kind within the landscape protection area, as defined by the Standard Plans, will not be allowed unless the Contractor requests permission to do so at least two (2) Working Days in advance and receives approval of the Engineer. Call the **SPR Inspection Request Line @ (206) 684-7034 or by email at parksconstruction.inspection@seattle.gov** to make arrangements for inspection

C. Treatment of Roots: Excavation around roots 2-inches in diameter and greater requires handwork.

1. Individual tree roots 2-inches or greater in diameter shall not be cut, but rather protected when within the drip-line of the tree.
2. Tree roots smaller than 2-inches in diameter shall be cleanly cut flush with a saw along the edge of the trench or tunnel.

3. Ripping or tearing of tree roots will not be allowed.

3.06 Repair, Replacement and Payment for Damage:

A. Trees or other plant material not ordered or designated to be removed but that are destroyed or irreparably damaged by Contractor's operations as determined by the Engineer, shall be repaired or replaced by the Contractor in accordance with the Engineer's recommendations (at least 2 replacement trees for every 1 tree removed).

1. Replacements shall be of the same species and as nearly as possible of the same size as the trees to be replaced (minimum of 2" caliper).
2. The Contractor shall allow one (1) Working Day advance notice for inspection of nursery stock replacements by the Engineer.

B. Payment: In addition to the Contractor's restoration approved by the Engineer, the Contractor will be assessed damages for the difference in the dollar value of the damaged tree, shrub, or other plant material, and the dollar value of the replacement.

1. The dollar value will be determined by the Engineer from the "Guide for Establishing Values of Trees and Other Plants," prepared by the Council of Tree and Landscape Appraisers, current edition. Damages assessed will be deducted from moneys due or that may become due to the Contractor.

C. Planting of replacement stock shall be done in accordance with the requirements of the Contract Documents during the first fall or spring planting period, whichever comes first.

3.07 Fence Removal:

A. Remove temporary protection fencing and wood chips only at the Engineer's direction. Fence removal is subject to all protection measures for landscape protection areas as stated in this Section and the TVSPP prepared by the Consulting Arborist.

3.08 Tree & Plant Schedule:

(Edit & Insert matrix as needed)

(PROJECT NAME)

NUMBER	SIZE	NAME	VALUE

END OF SECTION