DESIGN STANDARD 32 93 02

TREE & PLANT PROTECTION

1.01 GENERAL

A. Intent of Standard: This Design Standard provides criteria for the Protection of Trees, Vegetation and Soil (Landscapes Requiring Protection) during the construction phase of development projects in parks and other facilities owned or operated by the Seattle Department of Parks and Recreation (SPR). It also delineates the roles and responsibilities of the Project Design Consultant, the Consulting Arborist and the SPR Urban Forestry staff during the preparation of Contract Documents for those projects.

B. Design Mission: SPR's goal is to protect the existing landscape infrastructure to the maximum extent feasible while doing improvements and major maintenance projects within park properties.

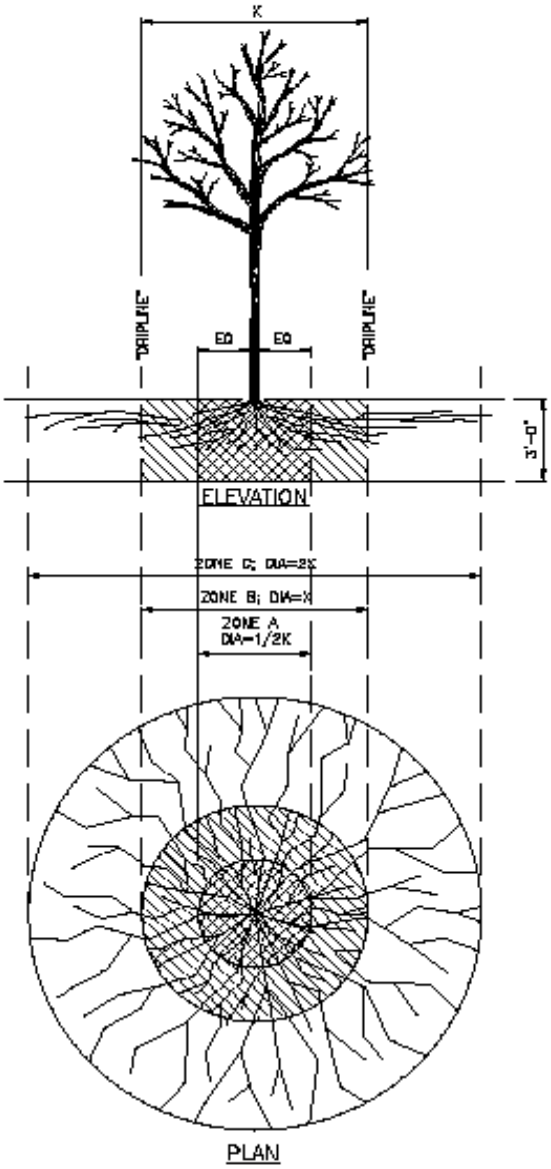
C. Design Product: The design product shall include the following elements:

1. **Contract Document Drawing Set:** The Design Consultant shall prepare a complete set of drawings showing all locations of existing site elements including, but not limited to; existing landscape trees and shrubs, structures and utilities that are slated for protection or demolition, construction stormwater control CSC (TESC) measures, grading, drainage, paving and all other improvements included in the development or redevelopment of the site. The drawings shall also include all components, instructions and installation necessary for successful implementation of the approved Temporary Tree and Plant Protection measures for all project Work areas defined as the "Landscape Protection Area".

2. **Tree, Vegetation & Soils Protection Plan (TVSPP):** The Design Consultant in conjunction with the Consulting Arborist shall produce, as a part of the Drawing Set, a completely separate sheet that is based upon the site survey and existing conditions sheet and shall not be combined with the CSC (TESC) sheet(s). The TVSPP shall include a complete inventory and condition assessment of all existing trees and plants that are required to be protected during construction activities, along with a complete description of proposed improvements which shall impact existing trees and plants. The TVSPP shall also include recommendations for the root re-invigoration and soil amendment methods required to be implemented by the Contractor if and when soil compaction occurs within the landscape protection areas. Those methods are described in Section H and are shown in Figure #2 of this Design Standard.

3. **Final Technical Specifications:** The Consultants shall complete all relevant template technical specifications (2010 CSI Format - Divisions 02 thru 48) to the extent required to properly coordinate with the approved TVSPP and the design drawings, as needed for their inclusion as part of the final Construction Contract Documents.

D. City of Seattle (COS) Standard Plans for Municipal Construction and Standard Specifications for Road, Bridge and Municipal Construction: Refer to City of Seattle (COS) Standard Plans Nos. 132a, 132b and 133 and Standard Specification Sections 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.



NOTE: A TREE, VEGETATION, AND SOIL PROTECTION PLAN (TVSPP) IS REQUIRED FOR ALL PROJECTS. APPROVAL OF PLAN REQUIRED ENGINEER'S PRIOR TO MOBILIZATION.

TRENCHING/EXCAVATION

ZONE A (CRITICAL ROOT ZONE–CRZ)

1. NO DISTURBANCE ALLOWED WITHOUT SITE-SPECIFIC INSPECTION AND APPROVAL BY ENGINEER OF METHODS TO MINIMIZE ROOT DAMAGE.
2. SEVERANCE OF ROOTS LARGER THAN 2"DIA REQUIRES ENGINEER'S APPROVAL.
3. TUNNELING REQUIRED TO INSTALL LINES 3'-0" BELOW GRADE OR DEEPER.

ZONE B (DRIPLINE)

1. ZONE B FOR ASYMMETRICAL COLUMNAR AND NARROW CONICAL TREE FORMS. ZONE B = 1' RADIUS FOR EVERY 1" OF TRUNK DIAMETER.
2. TUNNELING MAY BE REQUIRED FOR TRENCHES DEEPER THAN 3'-0".

ZONE C (ACTUAL EXTENT OF TREE ROOTS)

1. ZONE C = 2' RADIUS FOR EVERY 1" OF TRUNK DIAMETER.
2. LIMITED WORK BY ENGINEER'S APPROVAL.

TEMPORARY TREE PROTECTION DURING TRENCHING, TUNNELING OR EXCAVATION

COS STANDARD PLAN NO.133

E. Seattle Parks & Recreation (SPR) Standards: The following standards and specifications are also available from the Park Engineer and/or on the Parks public website at www.seattle.gov/parks/projects/standards and shall be used as applicable to the Scope of Work. Note that the parks public website contains .pdf files format versions of the latest standards, and the Designer shall request Word and AutoCAD versions of the standards at the beginning of each project to confirm that they are utilizing the most current versions of the available standards. The Consultant shall produce technical specifications and details other than those provided and listed below during the course of design and design review, as may be deemed necessary for the acceptable completion of the Contract Documents.

1. SPR's Design Standards (General Guidelines): Some existing SPR Design Standards may be pertinent to the protection of trees and plants on SPR construction projects. Such standards shall apply to the extent applicable within the Scope of Work, and may include, but are not limited to:

- 32 20 00 - Play Area Design
- 32 80 00 - Irrigation Systems Design
- 32 93 00 - Landscape Planting Design
- 32 93 13 - Site Restoration of Natural Areas

2. SPR's Technical Specifications: The Designer shall modify the available template technical construction specifications to the extent needed to address the proposed product usage, and may create a stand-alone technical section specifically for a given component only if appropriate and approved in advance by the Park Engineer. If the stand-alone option is utilized, the Designer is responsible to verify that all technical specifications are consistent with Parks' Standards and that there are no contradicting requirements contained in other sections of the Construction Contract Documents. SPR template Technical Specifications that may be utilized as applicable include, but are not limited to:

- 01 56 39 - Temporary Tree & Plant Protection
- 02 41 13 - Selective Site Demolition
- 02 41 13.23 - Site Utility Removal
- 02 41 16.13 - Building Demolition
- 31 00 00 - Earthwork
- 31 11 00 - Clearing & Grubbing
- 31 13 13 - Tree & Plant Removal
- 32 12 16 - Asphalt Paving
- 32 12 16.39 - Porous Asphalt Paving
- 32 13 13 - Concrete Paving
- 32 13 13.13 - Porous Concrete Paving
- 32 15 40 - Crushed Rock Paving
- 32 60 00 - Trail Construction & Restoration
- 32 80 00 - Irrigation Systems
- 32 91 13 - Soil Preparation

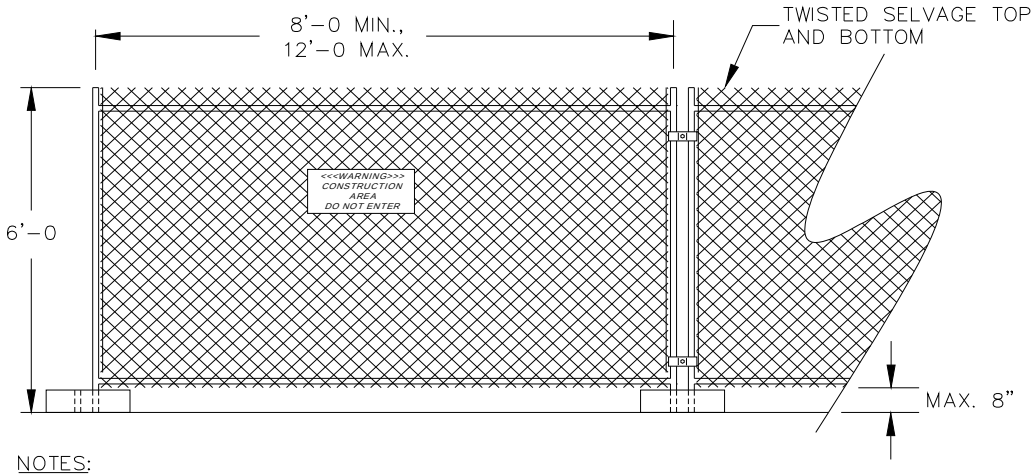
- 32 93 00 - Landscape Planting
- 32 96 00 - Transplanting

3. **SPR's Standard Details:** Some existing SPR Standard Detail drawings may be pertinent to the protection of trees and shrubs on SPR construction projects. Such standards shall apply to the extent applicable within the Scope of Work, and may include, but are not limited to:

- 01 56 39 -Temporary Tree & Plant Protection (Full Sheet)
- 01 56 39 - Temporary Tree Protection
- 01 56 43 - Temporary Tree Protection Notes
- 01 57 13.19 - Temporary Security/Construction Fencing

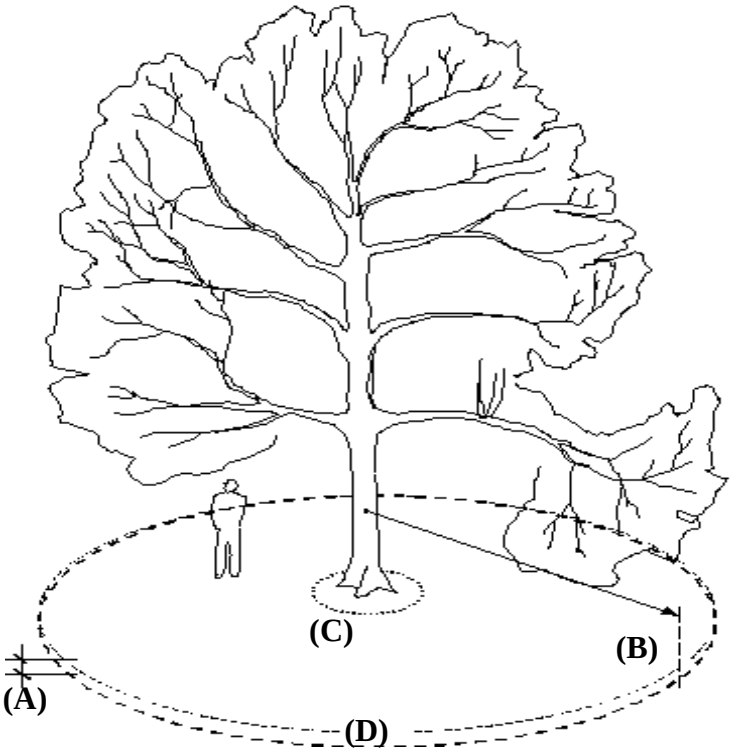
1.02 **DESIGN GUIDELINES -** In general refer to the Tree & Plant Protection information included in the COS and SPR Standards Specification Section 01 56 39 - Temporary Tree & Plant Protection and as shown on the TVSPP. The Consultant shall also read and incorporate the following guidelines into the Construction Contract Documents.

A. **Temporary Fencing/Signs:** Chain link fencing shall be provided and maintained according to COS and SPR Standards and/or as directed by the SPR Construction Manager and/or the SPR Urban Forestry Staff. Refer to the COS Standard Plans Nos. 132A, Type 1 and/or Type 2 fence bases as required and SPR's Temporary Construction Fencing Detail No. 01 57 13.19 as shown below. Fence bases shall be of sufficient weight and/or spread to adequately support each panel and be fixed into position as required. Notice signs shall be posted on fencing at least 20' O.C. and shall read as described in COS Specification Section 8-01.3(2)B. The wording shall define and demarcate a specific protection area for each tree or grouping of trees and plants and it shall be fixed in position. The barriers shall remain in place until all Work has been completed and shall only be removed upon approval of the Engineer.



NOTES:
1. CHAIN LINK FABRIC TO BE MIN. 11 GAUGE, GALVANIZED. NO RUSTED OR EXCESSIVELY MALFORMED FABRIC.
2. FENCE BASES SHALL BE OF SUFFICIENT WEIGHT and/or SPREAD TO ADEQUATELY SUPPORT EACH PANEL.
3. PANEL–TO–PANEL CONNECTIONS SHALL BE MADE AT A MIN. TWO LOCATIONS PER CONNECTION UNLESS OTHERWISE APPROVED.
4. PROVIDE CONSTRUCTION WARNING SIGNAGE 50'O.C. ALONG FENCING INSTALLATION.

B. **<u>Zone (B) = Landscape Protection Area</u>:** Defined as an area surrounding the tree trunk which is equal to 1 foot radius for every 1 inch of diameter of tree trunk at Diameter of a tree at Breast Height (DBH), measured from the center of the tree. This area is also known as the "Dripline".



<u>FIGURE #1</u> - General Illustration of Landscape Protection Area

<u>Legend</u>:

(A) Install & maintain 6 inches depth of woodchip mulch (absolute minimum).

(B) Install & maintain woodchip mulch from the outer limit of branch spread or specified landscape protection area; whichever is furthest. Mulch berm or coir log containment edge material is required, unless otherwise specified and approved, and shall be installed prior to site work; install at Point (B) around the edge of the entire landscape protection area.

(C) Maintain area at base of trunk free of mulch. As a guide, use the following formula to determine the distance: (Tree Trunk Girth x 0.5 = distance mulch should be kept away from the trunk).

(D) No construction equipment, materials, stockpiling and/or spoils shall be located within the landscape protection area as described above and as illustrated in Figure #1. All construction trailers, traffic and storage areas must remain outside the landscape protection area at all times. All underground utilities and drainage or irrigation lines shall be routed outside this area as described below except as approved by the Engineer. If lines must traverse the landscape protection area, they shall be tunneled or bored under the tree roots.

C. **Pruning Guidelines:** Additional tree pruning required for clearance during construction must be performed by a qualified International Society of Arboriculture (ISA) Certified Arborist subcontracted or hired by the Contractor at their expense. The Contractor's construction personnel shall not perform such work unless they are so certified. Refer to SPR Standard Specification Section 01 56 39 - Temporary Tree & Plant Protection, Part 3.04 - Above-grade Work for specifics.

SPR and the City of Seattle (in particular DPD) cite the American National Standards Institute Standards (ANSI) A300 - Pruning Standards; NAA tree pruning standards shall not be utilized. If injury should occur to any tree during construction the Contractor shall immediately notify the Engineer who will in turn request that the SPR Urban Forester evaluate the situation as soon as possible so that appropriate treatments can be applied. No appropriate treatment shall be applied without the prior approval of the Engineer.

D. **Clearing & Grubbing, Excavation, Earthwork Guidelines:** Excavation around any roots 2-inches in diameter and greater shall require handwork or special practices described as follows:

1. Refer to SPR Standard Specification Section 31 11 00 - Clearing & Grubbing for specifics about how to remove vegetation from the Landscape Protection Area.
2. Individual tree roots 2-inches or greater in diameter shall not be cut, but rather protected when within the Landscape Protection Area.
3. Tree roots smaller than 2-inches in diameter shall be cleanly cut flush with a saw along the edge of the trench or tunnel.
4. Air Spade or Water Jet Treatments: An Air Spade is a compressed air tool and Water Jet is a method that utilizes a 'Vactor' truck with water spray nozzle and vacuum hose equipment. These methods of root excavation that remove soil without damaging roots, (even fine fibrous roots) are preferred by SPR and are highly recommended.
5. Ripping or tearing of tree roots will not be allowed.

E. **Irrigation Guidelines:** All trees shall be irrigated at least three times per week for the period July 1st thru September 30th over the duration of the project. Irrigation must wet the soil within the landscape protection area to a depth of at least 30 inches. Before grading, pad preparation, or excavation for foundations, footings, walls, or trenching, trees shall be root pruned 12 inches outside the tree protection area by cutting all roots cleanly to a depth of 24 inches. Roots shall be cut by manually digging a trench and cutting exposed roots with a saw, vibrating knife, rock saw, and narrow trencher with sharp blades, or other approved root-pruning equipment. Any roots damaged during grading or construction shall be exposed to sound tissue and cut cleanly with an approved tool as described above.

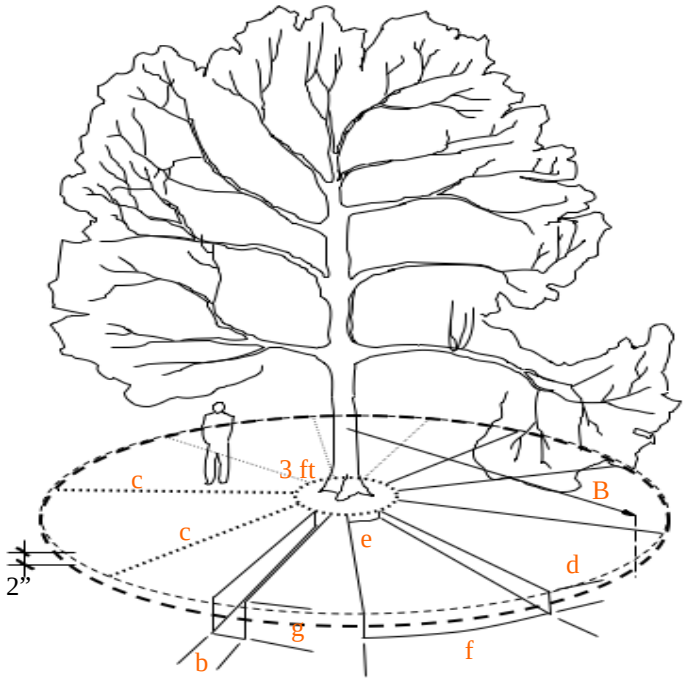
F. **Spoils Disposal Guidelines:** Spoils from trenches; basements or other excavations shall not be placed within the specified Landscape Protection Area, either temporarily or permanently. Engineer's approval is required for use/access anywhere within the Landscape Protection Area.

G. **<u>Surface Protection Measures within the Landscape Protection Area</u>:** The surface protection measures that may be applied within the Landscape Protection Area, as directed by the Engineer and/or the SPR Urban Forestry Staff are as follows:

1. Mulch layer 6 inches depth with a geo-textile fabric underlay (normal protection area, light access, storage, and equipment operation).
2. ¾ inch plywood (for storage).
3. Steel plates (for equipment operation, access or bridging over root zones).
4. 4 - 8 inch quarry spalls, with a geo-textile fabric underlay at a minimum 12 inch thickness (for construction access or haul routes).
5. Irrigation, as previously specified shall be applied to un-affected areas within the entire Landscape Protection Area, as specified.

H. **<u>Radial Trenching and/or Root Re-invigoration/Soil Amending</u>:** All trees specified to receive either radial trenching and/or root re-invigoration/soil amending treatment shall be treated as described below and as shown in Figure #2:

1. Within the Landscape Protection Area exposed and available rooting areas shall have all ground covers, i.e. turf grasses, manually removed as described in SPR Standard Specification Section 31 11 00 - Clearing & Grubbing. The soils shall have a root re-invigoration treatment that will de-compact the soils and allow for the incorporation of compost. This is achieved by using a pneumatic air wand. The use of a compost blend designed for soil enhancement, is required for all areas that are affected. This treatment shall be completed to a depth of 18 inches for radial trenching and 6 inches for root re-invigoration. The total treated area shall include a maximum of 50% surface area within the Landscape Protection Area shall be treated in a single growth period as shown in Figure #2 below:



<u>FIGURE #2</u> - Radial Trenching & Root Re-invigoration - Soil Amendment Treatment

Legend:

1. The labeling (B) refers to the Landscape Protection Area.
2. The labeling (c) refers to radial trenching spaced at no more than 30 degree intervals in a radial pattern in any direction.
3. The labeling (e) to (f) refers to a 30 degree radial pattern area and depth (d), typically 6 inches refers to a typical root re-invigoration area.
4. The radial trenches shall be no more than 12 inches width (b) and shall be no more than 18 inches depth (g) except as directed by the Engineer or SPR Urban Forestry Staff.
5. Trench length shall be to the limits of the Landscape Protection Area or further as directed by the Engineer. Trenches shall be backfilled with 50% compost and 50% native soil. Water shall be applied to each trench once backfill is completed. The trench shall start or stop at no closer than 3 feet from the tree trunk base.
6. A 2 inch layer of compost shall then be applied to the entire area beneath and within the Landscape Protection Area after trenching and/or re-invigoration is complete.

END OF SECTION