

## **PART 1 - GENERAL**

### **1.01 SECTION INCLUDES**

- A. General protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.

### **1.02 RELATED REQUIREMENTS**

- A. Section 01 1000 - Summary: For limits placed on Contractor's use of the site.
- B. Section 01 5000 - Temporary Facilities and Controls: For other temporary site fencing.
- C. Section 31 1000 - Site Clearing: For removing existing trees and shrubs.
- D. Section 31 2200 - Grading: Preparation of subsoil that may affect existing plants.

### **1.03 DEFINITIONS**

- A. Caliper: Diameter of a trunk measured by a diameter tape or the average of the smallest and largest diameters at a height 6 inches (150 mm) above the ground for trees up to and including 4-inch (100-mm) size at this height and as measured at a height of 12 inches (300 mm) above the ground for trees larger than 4-inch (100-mm) size.
- B. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.
- C. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and defined by a circle concentric with each tree with a radius 1.5 times the diameter of the drip line unless otherwise indicated.
- D. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

### **1.04 PREINSTALLATION MEETINGS**

- A. Preinstallation Conference: Conduct conference at project site.
  - 1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:
    - a) Tree-service firm's personnel, and equipment needed to make progress and avoid delays.
    - b) Arborist's responsibilities.
    - c) Quality-control program.
    - d) Coordination of Work and equipment movement with the locations of protection zones.
    - e) Trenching by hand or with air spade within protection zones.
    - f) Field quality control.

### 1.05 SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
  - 1. Include plans, elevations, sections, and locations of protection-zone fencing and signage, showing relation of equipment-movement routes and material storage locations with protection zones.
  - 2. Detail fabrication and assembly of protection-zone fencing and signage.
  - 3. Indicate extent of trenching by hand or with air spade within protection zones.
- C. Samples: For each type of the following:
  - 1. Organic Mulch: 1-pint (0.5-L) volume of organic mulch; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch.
  - 2. Protection-Zone Fencing: Assembled samples of manufacturer's standard size made from full-size components.
  - 3. Protection-Zone Signage: Full-size samples of each size and text, ready for installation.
- D. Qualification Data: For arborist and tree service firm.
- E. Certification: From arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.
- F. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.
- G. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.
  - 1. Use sufficiently detailed photographs or video recordings.
  - 2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.
- H. Quality-control program.

### 1.06 QUALITY ASSURANCE

- A. Arborist Qualifications: Licensed arborist in jurisdiction where project is located.
- B. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed temporary tree and plant protection work similar to that required for this project and that will assign an experienced, qualified arborist to project site during execution of the Work.
- C. Quality-Control Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work without damaging trees and plantings. Include dimensioned diagrams for placement of protection zone fencing and signage, the arborist's and tree-service firm's responsibilities, instructions given to workers on the use and care of protection zones, and enforcement of requirements for protection zones.
- D. Root Pruning Operations: All root pruning operations shall be performed by the Contract Arborist and directed in the field by and ISA Certified Arborist with documented experience in

similar SSAT excavation and root pruning.

## 1.07 FIELD CONDITIONS

- A. The following practices are prohibited within protection zones:
  - 1. Storage of construction materials, debris, or excavated material.
  - 2. Moving or parking vehicles or equipment.
  - 3. Foot traffic.
  - 4. Erection of sheds or structures.
  - 5. Impoundment of water.
  - 6. Excavation or other digging unless otherwise indicated.
  - 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- B. Do not direct vehicle or equipment exhaust toward protection zones.
- C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

- A. Organic Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:
  - 1. Type: Wood and bark chips.
  - 2. Size Range: 3 inches (76 mm) maximum, 1/2-inch (13-mm) minimum.
- B. Protection-Zone Fencing: Fencing fixed in position and meeting the following requirements: Previously used materials may be used when approved by Landscape Architect.
  - 1. Plastic Protection-Zone Fencing: Plastic construction fencing constructed of high-density extruded and stretched polyethylene fabric with 2-inch (50-mm) maximum opening in pattern and weighing a minimum of 0.4 lb/ft (0.6 kg/m); remaining flexible from minus 60 to plus 200 deg F (minus 16 to plus 93 deg C); inert to most chemicals and acids; minimum tensile yield strength of 2000 psi (13.8 MPa) and ultimate tensile strength of 2680 psi (18.5 MPa); secured with plastic bands or galvanized-steel or stainless-steel wire ties; and supported by tubular or T-shape galvanized-steel posts spaced not more than 96 inches (2400 mm) apart.
    - a) Height: 48 inches (1200 mm).
    - b) Color: High-visibility orange, nonfading.
- C. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes prepunched and reinforced; legibly printed with nonfading lettering and as follows:
  - 1. Size and Text: 12 inch by 18-inch sign reading "NO ENTRY - TREE PROTECTION ZONE".
  - 2. Lettering: 3-inch (75-mm) high minimum, black characters on white background.

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- B. All existing trees to remain to be evaluated by a licensed arborist for tree protection, pruning or removal, if necessary, for safety reasons.
- C. Prepare written report, endorsed by arborist, listing conditions detrimental to tree and plant protection.

### **3.02 PREPARATION**

- A. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated. Flag each tree trunk at 54 inches (1372 mm) above the ground.
- B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.
- C. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated. Do not exceed indicated thickness of mulch.
  - 1. Apply 4-inch (100-mm) uniform thickness of organic mulch unless otherwise indicated. Do not place mulch within 6 inches (150 mm) of tree trunks.

### **3.03 PROTECTION ZONES**

- A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people and animals from easily entering protected areas except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.
  - 1. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Landscape Architect.
- B. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Landscape Architect. Install one sign spaced approximately every 50 feet (15 m) on protection-zone fencing, but no fewer than two signs with each facing a different direction.
- C. Maintain protection zones free of weeds and trash.
- D. Maintain protection-zone fencing and signage in good condition as acceptable to Landscape Architect and remove when construction operations are complete, and equipment has been removed from the site.
  - 1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.

2. Temporary access is permitted subject to preapproval in writing by arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

### 3.04 ROOT PRUNING

- A. Prune tree roots that are affected by temporary and permanent construction. Prune roots as follows:
  1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
  2. Cut Ends: Do not paint cut root ends.
  3. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
  4. Cover exposed roots with burlap and water regularly.
  5. Backfill as soon as possible according to requirements in Section 31 2310 31-2323.
- B. Root Pruning at Edge of Protection Zone: Prune tree roots 12 inches (300 mm) outside of the protection zone by cleanly cutting all roots to the depth of the required excavation.
- C. Site Inspection: Arborist shall probe subsurface soil moisture condition more than 72 hours in advance of start of work. Using a tile probe or similar method, probe subsurface to a 2-to-3-foot depth to determine if sufficient soil moisture exists. If sufficient moisture is not found, immediate coordination with the Construction Manager shall be made to irrigate the proposed work areas. Methodology may be soaker hose, sprinklers, soaker cans with small, drilled holes to release water slowly or other methods. A second follow-up inspection shall be made to determine final sufficiency to begin.
- D. Root Pruning at Utility Trenches: The Contractor shall reveal the structural roots on the side of the trees affected by trenching using compressed air or hand digging. The Contractor shall operate a diamond blade vibratory knife, vibratory plow or rock saw within 2 feet of the proposed trench line to cleanly cut any large structural roots without tearing the root bark. Hand work may be required in some locations. Unless otherwise instructed by the Engineer, root pruning shall be performed to a depth of 2.5 feet only in the vicinity of existing trees. Root pruning shall occur prior to protective fencing and clearing and grubbing.

### 3.05 FIELD QUALITY CONTROL

- A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

### 3.06 REPAIR AND REPLACEMENT

- A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or to be relocated that are damaged by construction operations, in a manner approved by Landscape Architect.
  1. Submit details of proposed pruning and repairs.
  2. Perform repairs of damaged trunks, branches, and roots within 24 hours according to arborist's written instructions.
  3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Landscape Architect.

- B. Trees: Remove and replace trees indicated to remain that are more than 25 percent dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that Landscape Architect determines are incapable of restoring to normal growth pattern.
  - 1. Small Trees: Provide new trees of same size and species as those being replaced for each tree that measures 6 inches (150 mm) or smaller in caliper size.
  - 2. Large Trees: Provide two new tree(s) of 6-inch (150-mm) caliper size for each tree being replaced that measures more than 6 inches (150 mm) in caliper size.
    - a) Species: As selected by Landscape Architect.
  - 3. Plant and maintain new trees as specified in Section 32 9300.
  
- C. Soil Aeration: Where directed by Landscape Architect, aerate surface soil compacted during construction. Aerate 10 feet (3 m) beyond drip line and no closer than 36 inches (900 mm) to tree trunk. Drill 2-inch (50-mm) diameter holes a minimum of 12 inches (300 mm) deep at 24 inches (600 mm) o.c. Backfill holes with an equal mix of augered soil and sand.

### **3.07 DISPOSAL OF SURPLUS AND WASTE MATERIALS**

- A. Disposal: Remove excess excavated material, displaced trees, trash, and debris and legally dispose of them off Owner's property.

**END OF SECTION**