

SECTION 01 56 39**TEMPORARY TREE AND PLANT PROTECTION****PART 1 - DESIGN DIRECTIVES****1.1 SUMMARY**

- A. The Dartmouth Plant Preservation program is built on the premise that existing plant materials are important campus assets necessitating protection during the construction process. However, it is neither practical nor desirable to save all plant material on a construction site. The following guidelines are intended to assist designers and project managers in designating which plants require protection measures. The document outlines acceptable practices and procedures.

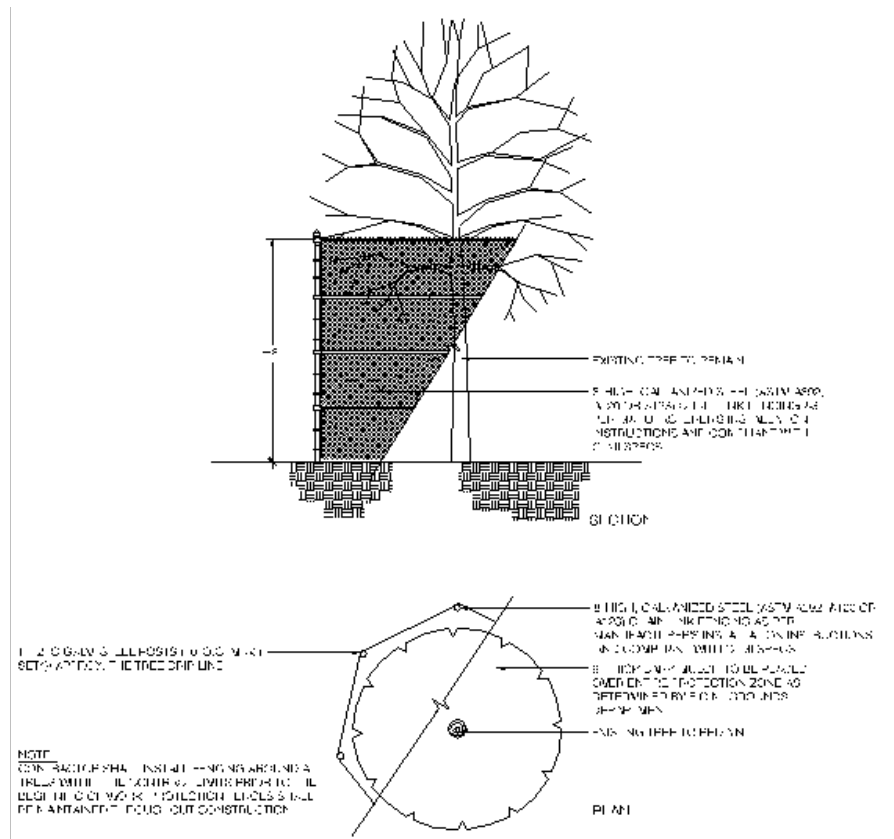
1.2 DESIGN CRITERIA

- A. Only healthy, structurally sound plants free of disease and insect infestation and projected to have a long life span should be considered as primary candidates for preservation. Other considerations include:
1. Trees posing a potential threat to individuals or property during the construction process should not be considered prime candidates for preservation.
 2. Consideration must be given to the plant's ability to tolerate construction impacts. Species with a low tolerance for construction impact should not be considered prime candidates for preservation.
 3. Dedicated plants or plants with significant historical or sentimental value should be given special consideration in the evaluation process.
 4. Plants requiring extraordinary protection measures or necessitating expensive construction detailing should not be considered prime candidates for preservation.
 5. Preservation measures should take into consideration the Contractor's ability to build the project in an efficient and economical manner.
- B. During the Contract Document Phase prepare a Plant Protection Plan for review by the Dartmouth Grounds Supervisor. The drawing should depict the following:
1. Protective fencing (size, type and location)
 2. Identification of trees to be protected (name, size & Dartmouth Tree Inventory number)
 3. Limits of grading & site disturbance
 4. Root Protection Zone
 5. Materials and equipment storage areas
 6. Location of project trailer
 7. On-site construction parking
- C. Whenever feasible, maintain existing grades within tree drip lines. If the grades are to be substantially altered within the root zone, the following factors should be considered.

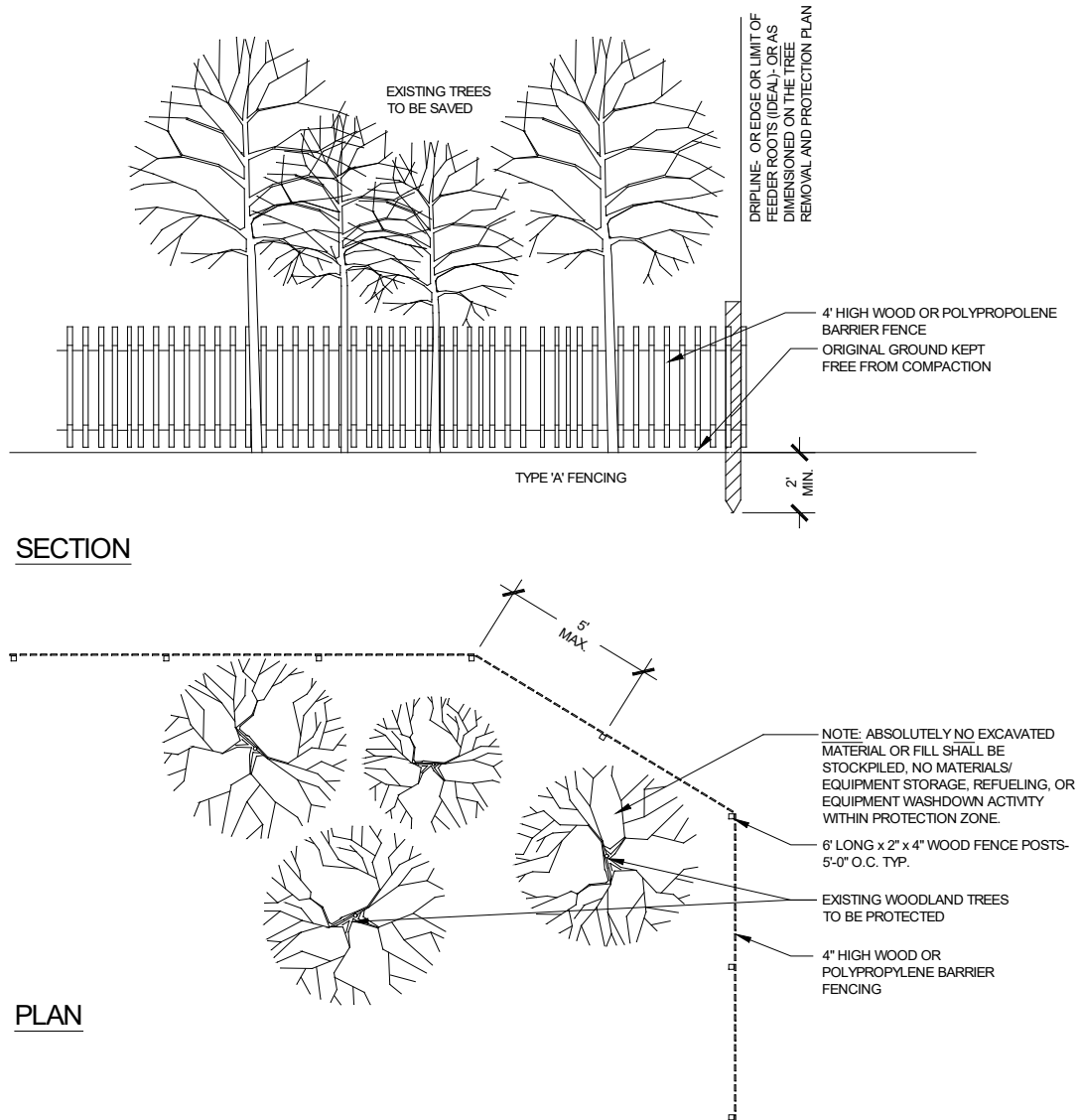
1. Lowering Grades Around Plants: Lowering the grades around plants may compromise both the health of a plant and its structural stability. The following guidelines should be considered when developing grading plans around plants.
 - a. Minimize the amount of soil removed from under a plant. If the grade within more than 50% of the root zone must be lowered by more than 6", consider the removal the plant.
 - b. The majority of plant roots lie within the top 6" – 8" of soil. Strive to limit cuts within the rootzone to 6" or less.
 - c. For trees with diameters less than 12" do not remove anchor roots within 4' of the trunk. For trees greater than 12" diameter, allow one additional foot for every three inches of trunk diameter.
 - d. Within the root zone, strive to do all excavation by hand. Broken or severed roots shall be cut clean with proper pruning equipment.
 - e. Protect exposed roots from desiccation. Cover exposed roots with dampened burlap until the area is backfilled.
2. Raising Grades Around Plants: Raising the grade around plants impacts soil aeration, soil moisture, and soil temperature. The following guidelines should be considered when developing grading plans around plants.
 - a. Minimize the amount of soil added over a plant's root system. Strive to limit fill sections to 6" or less.
 - b. If the grade within more than 50% of the root zone must be raised by more than 6" consider the removal of the plant.
 - c. Do not dispose of excess soil on top of existing root zone.
 - d. To minimize fill against existing tree trunks consider the installation of retaining walls or cassion walls outside the root zone.
- D. Tunneling is the preferred method of routing utility lines through a root zone. Trenching may be allowed if, in the opinion of the Dartmouth Grounds Supervisor, it will not endanger the health or vitality of a plant. This situation may occur when:
 1. Trees adjacent to the utility line are 4" or less in caliper.
 2. Trenching impacts less than 10% of the root zone (as determined by the Dartmouth Grounds Supervisor).
- E. CU-Structural soil should be considered for use when planting trees adjacent to walkways, terraces, and other paved surfaces.

1.3 PLANT PROTECTION DETAILS

- A. This section consists of AutoCAD drawings depicting typical landscape details governing the installation of plant protection fences on the Dartmouth Campus. The following is an index of standard landscape details contained in this section.
 1. Typical Individual Plant Protection
 2. Typical Woodline Protection
- B. Typical Individual Plant Protection:



C. Typical Woodline Protection:



1.4 QUALITY ASSURANCE

- A. Engage an experienced tree service firm that has successfully completed tree protection and trimming.
- B. An arborist certified by the International Society of Arboriculture or licensed in New Hampshire shall be on the project sites at all times during execution of tree removal, pruning or trimming.
- C. The campus arborist or an arborist certified by the International Society of Arboriculture or licensed in New Hampshire shall be on the project sites at all times during excavation adjacent to trees to be salvaged.

1.5 PROJECT MONITORING

- A. The Dartmouth Grounds Supervisor or the Campus Tree Warden will periodically monitor the construction site to verify compliance with the Plant Preservation Plan and Plant Protection Specifications.
- B. The Project Manager shall prepare an Incident Report whenever a protected plant is damaged due to construction activity. The incident report shall document the date, the extent of damage, the party responsible for the damage, and the circumstances leading to the damage.
- C. The Dartmouth Grounds Supervisor or Campus Tree Warden shall inspect damaged plants to assess the extent of the injury and make recommendations regarding the repair or removal of the damaged plant.
- D. The Contractor, at his or her expense, may conduct an independent appraisal by a Consulting Arborist of their choice. The Consulting Arborist must be certified by the International Society of Arboriculture.
- E. The Campus Tree Warden and the Consulting Arborist shall conduct their appraisals in conformance with the policies and procedures developed by the Council of Tree and Landscape Appraisers.
- F. The appraisals prepared by the College Tree Warden and the Consulting Arborists shall serve as the basis for assigning costs related to the repair or replacement of damaged plants.
- G. Disputes shall be settled by arbitration.

1.6 CODES

- A. Comply with the National Arborist Association's "Pruning Standards for Shade Trees" except where more stringent requirements are indicated in project drawings or specifications.

1.7 PROJECT COORDINATION

- A. A preconstruction conference shall be held to review plant protection procedures and ensure that all plant protection measures, (fencing, fertilization, pruning, etc.) have been completed.

PART 2 - PRODUCTS**2.1 MATERIALS**

- A. Shredded hardwood mulch, free from deleterious materials and suitable as a temporary protective top dressing of root protection zones.
- B. 6' high protective fencing: galvanized chain link fencing including black fabric, posts and other framework, hardware and accessories for complete fence sections.
- C. 4' high protective wooden or polypropylene snowfence.
- D. CU-Structural soil. (see manufacturer's recommendations relevant to mixes and installation techniques.)

PART 3 - EXECUTION**3.1 PREPARATION**

- A. Provide temporary fencing located as indicated and dimensioned on the Plant Removal and Protection Plan or as directed by the Dartmouth Grounds Supervisor.
- B. Keep all Plant Protection fences in place and in good repair until the end of the construction period or as directed by the Dartmouth Grounds Supervisor.
- C. Place 2 -3 inches of shredded hardwood bark mulch over entire root protection zones.
- D. Carefully remove any existing paving within tree protection zones prior to bark mulching.
- E. Protect plant root systems from damage due to noxious materials caused by run-off or spillage while mixing, placing, or storing construction materials.
- F. Protect root systems from flooding, eroding, or excessive wetting caused by dewatering operations.
- G. Do not store construction materials, debris, or excavated material within the root zone of trees to remain.
- H. Do not permit vehicles or foot traffic within the drip line: prevent soil compaction over root systems.
- I. Do not allow fires under or adjacent to remaining trees or other plants.

3.2 EXCAVATION

- A. Where demolition of existing paving and structures and excavation for new construction is required within tree drip lines, hand excavate to minimize damage to root systems.
- B. When grading within the root zone, use narrow-tine spading forks and comb soil to expose roots.

3.3 ROOT PRUNING

- A. Prune plant roots exposed during grading operations.
- B. Do not cut main lateral roots or tap roots; cut only smaller roots.
- C. Cut roots with sharp pruning instruments; do not break or chop.

3.4 TREE PRUNING

- A. If corrective pruning is required due to construction damage or situations related to construction activities, consult with the Dartmouth Grounds Supervisor prior to executing any work.
- B. Cut branches with sharp pruning instruments; do not break or chop.
- C. Chip branches and remove from project site.

3.5 IRRIGATION

- A. Protected plants must be kept well watered throughout the construction period. Irrigate protected plants as directed by the Dartmouth Grounds Supervisor.

3.6 TREE REPAIR AND REPLACEMENT

- A. Promptly repair trees damaged by construction operations to prevent progressive deterioration.
- B. Remove trees damaged by construction activities that the Dartmouth Grounds Supervisor determines to be incapable of restoring to a normal growth pattern.
- C. Provide replacement trees of a caliper, size, and species as directed by the Dartmouth Grounds Supervisor.

3.7 DISPOSAL OF WASTE MATERIALS

- A. Burning of debris or construction waste is not permitted on the project site.
- B. Remove excess excavated material, displaced trees, and excess chips from project site as directed by the Dartmouth Grounds Supervisor.

END OF SECTION 01 56 39