

SECTION 02111
TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes:

1. Installation of Fencing.
2. Installation of Boxing.
3. Siltation Control.
4. Transplanting.
5. Tree Removals.
6. Protection of Trees to Remain

B. Related Work:

1. Section 01010 'Contractor's Access and Staging Areas'
2. Section 01500 'Temporary Facilities'
3. Section 02110 'Site Clearing'
4. Section 02200 'Earthwork'
5. Section 02221 'Trenching, Backfilling, Compacting'
6. Section 02920 'Soil Preparation'
7. Section 02930 'Bluegrass Seeding'
8. Section 02931 'Native Grasses Seeding'
9. Section 02932 'Bluegrass Sodding'
10. Section 02950 'Trees, Plants and Groundcovers'

1.2 REFERENCES

- A. ANSI Z133.1 Safety Requirements for Pruning, Trimming, Repairing, Maintaining and Removing Trees, and for Cutting Brush.
- B. Council of Tree and Landscape Appraisers: Guide for Plant Appraisals, 9th edition (April 2000)
- C. International Society of Arboriculture (ISA): Tree and Shrub Transplanting Manual.
- D. National Arborist Association (NAA) Book of Standards, most recent edition.

1.3 DEFINITIONS

- A. Tree Protection Fencing: Temporary fencing installed prior to site preparation and demolition which protects a group of trees or shrubs.
- B. Boxing: Temporary wood box form installed prior to site preparation and demolition which protects individual trees and shrubs.
- C. Root Pruning: Physical cutting of plant roots to minimize root damage and promote healing.
- D. Construction Branch Pruning: Physical cutting of any branch which interferes with construction.

1.4 SUBMITTALS

- A. Comply with Section 01300. All submittals shall be accepted by the Landscape Architect in writing before Work commences.
- B. Schedule: Submit construction schedule which includes time frame for work near existing plant material. Provide transplanting and tree removal schedule including tree transplants and locations. Obtain approval by Landscape Architect prior to beginning of transplanting work and construction near restricted area.
- C. Work Methods: Submit proposed methods and schedule for effecting tree and plant protection for approval, including proposed methods, materials, and schedule for root pruning, construction pruning, aeration and subsequent tree fertilization. Mark plan location of root pruning and siltation fencing in field with paint for approval by Landscape Architect. Any root pruning which is required due to construction work adjacent to existing trees and shrubs designated to remain shall occur any time ground can be worked except when tree or shrubs are in leaf. Root pruning when tree or shrubs are in leaf may occur only with approval by Landscape Architect.

1.5 QUALITY ASSURANCE

- A. Comply with Division One.
- B. Qualifications
 - 1. Arborist: Company having adequate capacity and facilities to meet the specified requirements. All tree pruning and cleaning shall be performed by a landscape contractor with a minimum 5 years documented experience. Evidence to this effect shall be provided by the supplier if required by the Architect.
- C. Regulatory Requirements: City permits are necessary for pruning or removal of all trees in the right-of-way.
- E. Pre-Installation Conference

1. Conduct pre-installation conference prior to construction.
2. **Attendance required by: Owner, Architect, Contractor(s), Manufacturer(s),/Supplier(s), other parties who are involved.**

1.6 PROJECT/SITE CONDITIONS

- A. All plant materials to remain or be moved will be tagged by the Landscape Architect to assist the Contractor in identifying the trees. Contractor to notify Landscape Architect seven (7) days before tree relocation. All relocated plant material to be included in maintenance – see 1.7.
- B. Maintain all plant materials within tree protection areas. Designated tree protection areas of trees, shrubs, and grasses are to remain untouched and unharmed.
- C. Construction activities, including stockpiling, in tree protection areas are prohibited.
- D. Tree arborist shall determine and document value of each tree or other plant materials within the limits of work line that is designated to remain. Contractor shall reimburse client for the value of any of these trees or other plant materials that are lost or damaged during construction.

1.7 MAINTENANCE

- A. **Maintenance Services:** Performed by a landscape contractor during construction and for the first year after final completion of all site construction.
- B. **Maintenance Period:** Begin maintenance immediately upon start of construction. Continue maintenance until one year after final completion of all site construction.
- C. **Maintenance to Include:**
 1. Quarterly review and monitoring of tree conditions.
 2. Maintaining guying and lightening protection. Repair or replace when required.
 3. Water at a sufficient frequency to saturate root system and keep soil moist.
 4. Pruning, including removal of dead or broken branches, and treatment of pruned areas or other wounds.
 5. Disease Control.
- D. **Protection:** In accordance with paragraph 3.2 Preparation-B.
- E. **Root Zone Fertilization:** Root zone fertilize all trees affected by construction. The first root zone fertilization shall occur within 6 months after completion of site construction and the second within 12 months. Use a liquid application with an 18 inch soil probe. Fertilization mix shall be submitted to the Landscape Architect for acceptance prior to application.

- F. Pesticides: Apply pesticides, with permission of owner, in accordance with manufacturer's instructions. Remedy damage resulting from improper use of pesticides.
- G. Maintenance Reports: Provide maintenance report including date and detailed summary of work completed on site, to the Landscape Architect after each maintenance visit.

PART 2 - PRODUCTS

2.1 TREE PROTECTION FENCING

- A. Fencing: Galvanized chain link fencing, 6 ft. high.
 - 1. Tree protection fencing is the property of the Contractor.
 - 2. Gates at tree protection areas shall be 6'-0" width min. for maintenance vehicles and be 6'-0" ht. galvanized chain link fence.
- B. Metal Fence Posts: 9 ft. galvanized steel posts, driven a minimum of 3 ft. into the ground. Space 10 ft. o.c. maximum.

2.2 SILTATION CONTROL FENCING

- A. Fencing: 30" height. Siltation fencing complying to local codes.
- B. Posts: Attach to tree protection fencing.

2.3 SOIL AMENDMENTS/MULCH

- A. Organic compost: A-1 Premium 3 Organic Compost. Submit sample for Landscape Architect's approval.
- B. Wood Mulch: Washington Cedar Mulch.

PART 3 - EXECUTION

3.1 NEW CONSTRUCTION

- A. Curb cuts should not be closer than the dripline of the tree without permission from the Landscape Architect.
- B. New sidewalks, paving or asphalt within the drip line of the tree must allow breathing space for tree roots. The following should be used as a guideline: For trees up to 4 inches in trunk caliper, 25 square feet of porous area is needed. For each additional 2 inches of tree caliper, 10 more square feet are needed.

- C. Where grade change is required, the same area must be provided either by construction of a drywell where the level is to be raised or by building a retaining wall where the level is to be lowered. The grade within the drip line of the tree is not to be changed without Landscape Architect approval.
- D. Avoid cutting surface roots wherever possible. Sidewalks and paving levels would be contoured sufficiently to avoid such cutting.

3.2 EXAMINATION

- A. Verification Of Conditions: Examine areas and conditions under which the Work of this Section will be performed. Report unsatisfactory or questionable conditions to the Landscape Architect. Do not proceed with the Work until unsatisfactory conditions have been corrected. Commencement of work implies acceptance of all areas and conditions.
- B. Verify all utility locations in the field prior to digging.

3.3 PREPARATION

- A. Marking of Construction/Demolition/Tree Preservation Limits
 1. Clearly mark the tree protection fence locations as indicated on the Drawings, boxing and all construction/demolition limits in the field.
 2. Mark individual tree root pruning areas and location of siltation fencing with paint.
 3. Verify all trees to be removed, transplanted, or protected with Landscape Architect. Tag all plant material with appropriate tags noting action to be taken with each plant.
 4. Contact and accompany Landscape Architect on a joint review of construction/demolition limits, tagging and painting before prior to the installation of the tree protection fencing and start work.
 5. Verify with Landscape Architect all trees to remain along the relocated irrigation ditch.
 6. Limit of construction is generally defined as the limit of demolition. Contractor to immediately notify Architect if work will occur outside the construction/demolition limits.
 7. Contractor to verify limits of existing R.O.W. Contractor to obtain all necessary permits from appropriate jurisdictions prior to commencing activity within the R.O.W.

3.4 INSTALLATION OF FENCING

- A. Fencing: Install tree protection fencing prior to start of demolition work and clearing and grubbing operations in accordance with the following:
 1. Following approval of staking by the Landscape Architect, install fencing at the tree protection areas.

2. Install fencing as approved. No fencing is allowed within three (3) feet outside the drip line of trees.
3. Install posts 10'-0" o.c. maximum.
4. Install gates where noted on the plans.

3.5 SILTATION CONTROL

- A. Fencing: Provide silt control at Tree Protection Areas by attaching silt fence to the uphill side of the protective fencing. Place lower 6" of silt fence in trench below grade. Backfill trench.
- B. Drainage: Maintain positive drainage from Tree Protection Areas. Divert runoff from site around Tree Protection Areas.

3.6 TREE REMOVALS

- A. Schedule: Obtain approval of schedule prior to starting work.
- B. Notification: Trees to be removed according to the Tree Protection Plans shall be tagged by the Contractor and approved by the Architect prior to removal.
- C. Stump Removal: Remove tree stumps by Landscape Architect approved means to a depth of 12" below the proposed finished grade surface in lawn areas and 36" below finish grade in paved areas as determined by the Engineer. Remove wood chips from site. Fill stump removal areas with existing soil. Chemicals which will harm future landscape above stumps may not be applied to aid in stump removal.
- D. Disposal: Dispose of all removals from the site at an approved disposal or recycling facility. Contractor may grind tree removals to be used for mulching purposes if mulch is approved by the Landscape Architect. Removals or mulch become the property of the Contractor.
- E. Protection: Contractor responsible for protection of all trees designated to remain or transplanted during removal procedures.

3.7 ROOT PRUNING AND PROTECTION

- A. Root Pruning
 1. Prune roots where construction will sever roots.
 2. Only clean cutting methods are acceptable. Root pruning is the physical cutting of tree roots to minimize root damage and promote healing. Unsuitable means for root pruning include trenching, vibrating plow, stump grinder. Any method which tears roots or disturbs the soil beyond the grading limit is unacceptable.
 3. Hand trim roots at trench walls. Make clean cuts through roots.

4. Prune tree roots to a depth no greater than required by construction excavation, by approved means only. All roots shall be pruned by an approved method.
- B. Backfill: Close trenches within 24 hours. Backfill root pruning trench with existing soil. Tamp lightly to set soil.
1. When trench closing is not possible within 24 hours, protect trench side in accordance with this Section.
- C. Mulching: Apply wood mulch to a depth of 4 in. to 5 in. at minimum 10 ft. to 15 ft. radius around tree to reduce compaction and increase moisture retention. Soil shall be kept moist in root pruning areas.
- D. Root Protection: If tree roots larger than two (2) inches in diameter are encountered with digging or trenching, tunnel under for any improvements if possible. Dig trench by hand only.
1. Conform with paragraphs 3.6.A - 3.6.C this Section.
 2. Notify Landscape Architect to allow physical inspection of excavation around root zones to determine damage and health of tree. Do not tear the roots out. Removal of two (2) inches or larger diameter roots encountered during construction is not allowed without permission of Landscape Architect.
 3. Upon approval by Architect, wrap cut roots 2' and larger with burlap to prevent scarring or excessive drying.

3.8 CONSTRUCTION BRANCH PRUNING

- A. Prune any branches of trees to be preserved which interfere with construction only at the direction of the Landscape Architect. Approval of all proposed pruning is required prior to start of work. Pruning is an incidental pay item associated with the transplanting of existing trees, the planting of new trees, and the care of existing trees to remain. Payments for such incidental items shall be drawn from the project budget.
- B. Remove any branches which are weak or dead.
- C. Any pruning included as part of the project shall be done by a licensed tree company and in accordance with good pruning practices as approved by the Landscape Architect. Pruning shall maintain balance, form and function of tree.

3.9 TEMPORARY TREE GUYING

- A. Upon review of on-site root pruning and construction grading limits, the Landscape Architect shall determine whether the existing trees designated to remain should be temporarily guyed.

- B. Complete tree guying using materials and techniques designated by the Landscape Architect in accordance with Section 02900 and complete in a timely manner.

3.10 AERATION

- A. If areas inside the restricted area become compacted as determined by the Landscape Architect, aerate to a 20 inch depth using an aeration "grow gun," avoiding damage to surface absorbing feeder roots.
- B. Inject filler material to hold aeration fractures open.

3.11 WATERING

- A. Apply supplemental watering to a depth of 10-12" (18" max) with a deep root feeder if loss of grasses or heating of the roots occurs during construction or as directed by Landscape Architect. Approximately 100 gallons per tree shall be applied.
- B. Contractor to water existing trees as determined by Landscape Architect to promote healthy, thriving plant material.
- C. Contractor and Landscape Architect to determine appropriate water pressure.

3.12 EXCAVATION INSULATION

- A. Provide mitigation from moisture and temperature fluctuations by pinning 3 layers of burlap onto the entire face of excavations exposed for more than 24 hours.
- B. Wet burlap insulation immediately following installation.
- C. Keep moist for the entire period the excavation remains open.
- D. Remove insulation prior to backfilling.

3.13 CHEMICALS, FERTILIZATION AND INSECT SPRAYING

- A. No chemicals shall be applied or used around or near existing trees.
- B. No fertilizers, insect sprays or other chemicals shall be applied before or during root or branch pruning process.

3.14 CONCRETE WASHOUT

- A. Provide concrete washout in areas which drain away from the Tree Protection Areas as indicated on the Drawings. The Landscape Architect shall approve concrete washout area prior to the start of any site work.

3.15 GRADING AT TREE PROTECTION AREAS

- A. All grading within protected areas shall proceed only after review and approval by the Landscape Architect.
- B. All fill within protected areas must be approved by the Landscape Architect. Tamping of fill earth shall be allowed; compaction of fill earth shall not be allowed. No "cutting" of grades in root area shall be allowed.

3.16 FIELD QUALITY CONTROL/DAMAGE PENALTIES

- A. Trees labeled as requiring "General Protection" or "Special Protection" adjacent to construction areas and in other key locations are identified on the Drawings. Loss of any of these trees due to Contractor neglect or improper construction activities will result in liquidated damages for the assessed value of the tree as determined by a licensed arborist. Damage to a portion of these trees will be assessed by the arborist and a portion of the liquidated damages will be assessed to the Contractor. A list of tree values for the project will be on file in the Landscape Architect's office. Any damaged tree not on this list shall be evaluated by the Architect as necessary to comply with this penalty.
- B. A fine of \$1,000 will be levied against the Contractor for each incident of construction (including construction traffic) inside tree protection areas.
- C. Trees or roots visibly damaged will cause the Owner to withhold from the Contractor an assessed amount conforming to the requirements stipulated above, for a period of two years. After that period the impact of the damage to any tree will be assessed by the Landscape Architect.
- D. If any trees or shrubs designated to be saved are damaged and replacement is required, a number and diameter of trees or shrubs of the same species and variety, as specified by the Landscape Architect, shall be furnished and planted by the Contractor. The total inch diameter of the replacement trees or shrubs shall equal the diameter of the tree or shrub to be replaced as measured by The Guide For Establishing Value of Trees and Other Plants, published by the International Society of Arboriculture. The Contractor shall not be liable for any loss or damage which occurs while the Contractor is complying with instructions given by the Landscape Architect working on the Project.

3.17 ADJUSTING

- A. Tree Protection Area Access: When construction traffic is unavoidable as concurred by the Contractor and Landscape Architect the following procedure shall be followed:
1. Obtain approval from the Landscape Architect for Tree Protection Area access.
 2. Install protective fencing by hand to delineate the construction corridor. Fencing location must be approved on site by the Landscape Architect.
 3. Install a 12" layer of wood chips overlaid with continuous 3/4" plywood sheets on the existing grade for the entire area of the traffic route to allay rutting and slightly reduce soil compaction.
 4. Remove all materials and return area to preconstruction condition within one week of the work.
- B. Excavation Insulation: If in the Contractor's opinion, climate conditions do not necessitate the installation of burlap insulation at an excavation, he may submit to the Landscape Architect a written request to omit the burlap insulation. Submit request to the Landscape Architect 24 hours prior to excavation.

3.18 CLEANING

- A. Removal Of Protection: Except as otherwise indicated or requested by Engineer, temporary protection devices and facilities installed during course of the work shall be removed only after all work which may injure or damage trees and plants is completed.
- B. Removal: Remove all excess material during construction period and haul off-site.
- C. Repair: Repair surface damage caused by fence posts. Restore to match surrounding conditions.

3.19 PROTECTION

- A. Protect planting areas and plants at all times against damage of any kind for the duration of the maintenance. If any plants become damaged or injured, they shall be treated or replaced as directed by the Landscape Architect at no additional cost to the Owner. The contractor shall not be responsible for acts of vandalism or acts of God during the maintenance period.
- B. Protect tree roots in accordance with paragraph 3.7 this Section.
- C. Branch Protection: Contact Landscape Architect if it appears that construction will damage to the branches of any tree. The Landscape Architect will determine action to be taken. If pruning is required, perform in accordance with paragraph 3.8 this Section.

END OF SECTION 02111