

SECTION 31 23 16 – TREE PROTECTION: EARTH MOVING & FILL EXCAVATION**PART 1: GENERAL****1.01 Scope of Standards**

- A. This standard provides general guidance concerning the specific preferences of the Texas State University for Tree Protection.
- B. Texas State University recognizes that project conditions and requirements vary, thus precluding the absolute adherence to the items identified herein in all cases. However, unless there is adequate written justification, it is expected that these guidelines will govern the design and specifications for Texas State University projects.

1.02 Summary

- A. This Section of tree preservation procedures includes:
 - 1. Establishing adequate tree protection fencing.
 - 2. Raising low limbs by cablings, trimming or tying to allow access through existing roads and to allow access around the proposed building.
 - 3. Containing concrete and other chemicals to specific washout areas away from root zones.

1.03 Quality Assurance

- A. The work of this section shall be performed by a company which specializes in the type of tree preservation work required for this Project, with a minimum of 5 years of documented successful experience and shall be performed by skilled workmen thoroughly experienced in the necessary crafts.
 - 1. Work shall be performed in compliance with Texas State University insurance underwriters' requirements.
- B. Manufacturer shall specialize in manufacturing the type of materials for tree preservation work specified in this section, with a minimum of 5 years of documented successful experience, and have the facilities capable of meeting all requirements of Contract Documents.

1.04 Submittals

- A. Submit the following according to Conditions of the Construction Contract and Division 1 Specification Sections.

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- B. Hazardous Materials Notification: In the event no product or material is available that does not contain asbestos, PCB or other hazardous materials as determined by Texas State University, a “Material Safety Data Sheet” (MSDS) equivalent to OSHA Form 20 shall be submitted for that proposed product or material prior to installation.
- C. Asbestos and PCB Certification: After completion of installation, but prior to Substantial Completion, Contractor shall certify in writing that products and materials installed, and processes used, do not contain asbestos or polychlorinated biphenyls (PCB), using format in Section 01 77 00/Closeout Procedures.

1.05 Warranty

- A. Comply with General Conditions and Section 01 78 36/Warranties.

PART 2: PRODUCTS**2.01 Unauthorized Materials**

- A. Materials and products required for work of this section shall not contain asbestos, polychlorinated biphenyls (PCB) or other hazardous materials identified by Texas State University.

2.02 Acceptable Manufacturers

- A. Products of the manufacturers specified in this section establish the minimum aesthetic, functional and quality standards required for the work of this section.
- B. Substitutions: Comply with Section 01 25 13.

PART 3: EXECUTION**3.01 Tree Preservation Guidelines**

- A. Damaging Conditions not Allowed:
 - 1. All trees to be preserved should be identified on plans before construction begins. Diameter Breast High (DBH) and full extent of canopy should be shown on plans. Once trees to be preserved are identified, the Critical Root Zone (CRZ) of each should be determined on site by the Director of Grounds Operations, or delegate, prior to any construction activities. Tree protection fencing shall be placed at the extent of the CRZ where possible and shall not be moved for the duration of the project, signage shall be attached to the fence at this time. Should a fence need to be moved for any reason, approval for such a move must be given by Director of Grounds Operations or delegate. Fencing material shall be chain link unless otherwise approved by

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Director of Grounds Operations or delegate. CRZ shall also be shown on plans with dimensions from trunk of tree.

If Critical Root Zone (CRZ) can not be used, then the variance, in writing, from these standards has to be approved by the Director of Grounds Operation or delegate. Should there be an exception that would allow protective fencing closer than 4 foot from trees trunk, protect the trunk with strapped 2x4x8' lumber in addition to the protective fencing.

- a. It should be determined by the Director of Grounds Operations or delegate and the Project Manager what pruning will be required to accommodate equipment. Prevent damage by improper pruning techniques or contact from equipment such as backhoes.
 - b. Pruning shall be performed to specs written in accordance with ANSI A300 standards by an ISA Certified Arborist at the Contractor's expense. The contractor shall be given a pruning objective list for each pruning situation requested.
2. Prevent compaction of root zone areas by foot and vehicular traffic and material storage.
 - a. Soil compaction, one of the leading contributors to tree decline and death associated with construction, can be controlled with the use of adequate tree protection fencing and mulching.
 - b. Minimum tree protection fencing should include the area from the tree trunk out to the canopy dripline or CRZ.
 3. Prevent poisoning by pouring or spilling chemicals including gasoline, oil, paint, concrete acid washed concrete surfaces and other injurious materials on or near root zone areas.
 4. It is the contractor's responsibility to prevent stress and damage from lack of moisture during periods without adequate natural rainfall, or from changing the natural drainage patterns. Supplemental irrigation may be required as determined by Director, Grounds Operations, or delegate. Method of irrigation must be acceptable to Director of Grounds Operations or delegate; Slow-Soaking by Drip Irrigation is often used. Supplemental irrigation amounts and duration will be requested by the Director of Grounds Operations or delegate via the Texas State University document titled: Tree Preservation Checklist.
 5. Prevent change in soil pH caused by the addition of lime in root zones by direct application or concrete waste. After protection fences are removed, no soil or fill should be added within root zone without approval of

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Director, Grounds Operations, or delegate. Should any materials such as mulch or silt that were installed or accumulated during construction need to be removed, it must be done by hand; No Heavy Equipment allowed within the CRZ without written approval.

6. Prevent change in grade. No change in grade within CRZ should occur. Should a grade change be required for any reason, consultation with an Arborist as well as the Director Grounds Operations or delegate required.
7. If damage occurs to protected trees or trees become stressed as a result of the construction process, remediation measures shall be recommended by ISA Certified Arborist and implemented at the Contractor's expense. If pruning is required, this shall be done only by or under the oversight of an ISA Certified Arborist.
8. Erosion control barriers shall be installed and or maintained in a manner that will not allow for silt or sediment to build up in the CRZ.

B. Protection Procedures:

Limit construction access by placing temporary tree protection fencing around trees to be preserved, along with proper signage (See A1 above). Fence location shall be measured and inspected regularly to maintain integrity of protection. During construction and/or periods of drought it may be requested that trees be mulched to a depth as follows:

1. Trees should be mulched to a depth of at least 6 inches within fence and not be mulched closer than 6" to the trunk; no mulch on root flare.
 - a. Fencing should be placed as far out from the tree trunk as possible, a minimum distance to include the branch dripline or CRZ. And should be installed and removed by hand. No heavy equipment in CRZ.
 - b. In areas where construction access is required, the natural grade can be protected from compaction by placing a blanket of mulch 12 inches deep over ¾" plywood over natural grade. This should be removed after the project is completed by hand, using no heavy equipment in CRZ.
2. Any work, excavation or grading required within the protected root zone areas should be limited and will require the approval of the Director of Grounds Operations or delegate. An ISA Certified Arborist may be hired at the contractors expense should remediation from damages be needed or requested by Texas State Staff.

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Work in root zone areas where roots exceed $\frac{3}{4}$ inch diameter should be done by Airspade, including grading, landscaping and irrigation installation. An air spade should be used in areas where a trench is required across or through CRZ. Should a trench or similar be required within the CRZ, the ideal distance for excavation and continued tree health would be two foot of distance from trunk of tree for each inch diameter of tree at breast height. Absolute minimum would be one foot distance from the tree trunk for each inch diameter at breast height.

- a. Proof and schedule of any such services (Airspade) provided by an ISA Certified Arborist shall have input from Texas State staff.
 - b. Tree removals within a fenced or protected area shall be done in a manner that has no negative effect on remaining trees.
3. Route underground utility and irrigation lines around root zone areas as a first priority; second priority, air spade; third priority, bore at a minimum depth of 3' to eliminate open cuts through root zones.

When it is not possible to re-route, air spade, or to bore under the root system in order to preserve roots $\frac{3}{4}$ " and larger, consult with Certified Arborist and Grounds Operations staff.

- a. Airspade is required where applicable.

Place drives, walks, etc., on or above grade to eliminate altering or severing the root system. Should a walkway or other hard surface require excavation within the CRZ of a tree on campus consultation with a Certified Arborist and Grounds Operations staff is required before beginning any disruption of the soil.

4. To help reduce the number of roots damaged by ripping and tearing while excavating with a backhoe or any other large piece of equipment in tree root zone areas, cut roots along the edge of the required excavation point first using an Airspade. (Depth of trench should be limited to the depth of the required excavation for installation of the utility or 3', whichever is less.) Any root $\frac{3}{4}$ inch or larger will be cut flush with loppers or a hand saw and painted with an acceptable tree paint immediately after damage has occurred.
 - a. If tree roots are exposed in trenches without cover of soil, accommodations will be made by the contractor to cover roots with hay or burlap within 8 hours of excavation and keep moist until covered by appropriate soil.
5. Trees affected by construction should have CRZ covered with compost to a 3" depth, Airspaded to a depth of 6-8 inches and then mulched with 2"

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mulch and irrigated immediately after any construction damage.

Fertilization may be required until the trees have become re-established, consulting with an ISA Certified Arborist may be required by Texas State staff. The cost of this shall be the responsibility of the Contractor.

6. During periods of minimal rainfall, supply supplemental moisture to damaged trees to help eliminate additional stress.
7. Due to threat of Oak Wilt, the pruning of any Oak trees should be done only at the hottest and coldest times of the year, July-August or December-January. Again, pruning should be done by an ISA Certified Arborist and can be performed outside of these times if performed by such.
8. Wound dressing must be applied to pruning cuts or damage to trunks or limbs, on all oak trees at all times of the year within 5 minutes of damage.

C. Cautions:

1. The area of soil from the branch dripline to the tree trunk is considered the most important part of the tree feeder root zone area that should be protected from disturbance.
 - a. When possible, 10' beyond the dripline should also be protected.
2. Request consultation with Grounds Operations before any disruption to the campus landscape.

3.02 Tree Preservation Procedures**A. Tree Protection Fencing:**

1. Tree protection fencing should be installed to protect all tree root zone areas adjacent to areas of construction activity as designated on the site plan.
 - a. Tree protection fences should be installed to protect root zones as well as low growing limbs which exist adjacent to the construction and materials storage areas.
 - b. Locations for tree protection fencing should be designated on the construction documents.
2. The tree protection fence should be constructed of galvanized chain-link 6' in height. Signage should be placed on all fences to clearly indicate in English and Spanish to all on site that fences shall not be moved by

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construction personnel without authorization which has been cleared by Director, Grounds Operations, or delegate.

3. Tree protection fencing should be installed prior to any site activity and should remain in place in its original location until construction is complete and as authorized by the Director of Grounds Operations or delegate.
 4. Access into protected root zone areas should be prohibited.
 - a. Any necessary access into protected root zone areas should be approved by the Director of Grounds Operations or delegate.
- B. Demolition of Existing Buildings, Parking Lots, sidewalks, or other hard surfaces with Tree in proximity:
1. Demolition should be accomplished working from the limits of the existing parking lot and building.
 - a. Caution should be used when removing the hard surface and base material in order to keep from disturbing roots growing below the base material. Hand labor may be required.
 - b. Test dig under the hard surface in proximity of trees, to determine if roots are growing below the paved surface. Should a significant number of roots be found within the base material by the project certified Arborist, the roots should be pruned prior to removing the base material, in a way indicated in 3.01 B.5 above. Consultation before any root pruning with Grounds Operations.
 - c. Pruning the roots at the limit of the demolition area will minimize damage to roots outside of the area to be excavated.
 - d. Soil below the base material should not be disturbed by excavating into the soil or by compaction caused by driving trucks and equipment over it.
 - e. Should a variance to Tree Protection Fencing be requested approval will be through the Director of Grounds operations or delegate.
- C. Construction:
1. Designate limited areas for concrete washout.

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- a. Locate concrete washout areas away from root zones to eliminate the chance of concrete or contaminated water from running into the root zone areas.
2. Stabilizing soils with lime or related products should be limited to a minimum distance of 10' from the drip line of any tree.
3. Deviation from the Tree Preservation Procedures will occur only under written authority from a Texas State University representative.

3.03 Tree Services**A. Tree Limb Trimming:**

1. Trees located adjacent to the construction access route to the construction site should be pruned by ISA Certified Arborist to allow access of vehicles hauling construction materials.
 - a. Raising low limbs temporarily by using ropes to tie limbs up may be an alternative to trimming.

B. Tree Damage Assessment

Variations of these guidelines encroachment and damages to trees will be addressed and reported through the assigned university project manager. Random site visits by Texas State University Certified Arborist will occur throughout the project with results documented on the Tree Protection Checklist form.

1. Any damages or anticipated tree damages incurred during the construction process shall be addressed and reported through the assigned project manager.
2. Mitigation of damages shall occur at the cost of the contractor. Mitigation may include fertilization or root invigoration programs, corrective root pruning, and or structural corrective pruning. Mitigation needs may be determined by ISA Certified Arborist or Texas State University staff.

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