

ORDINANCE NO.

AN ORDINANCE AMENDING ORDINANCE NO. 1203-15-02-24 OF THE CITY OF PFLUGERVILLE CODE OF ORDINANCES TITLE XV LAND USAGE, CHAPTER 157 UNIFIED DEVELOPMENT CODE BY AMENDING SUBCHAPTER 12 TO INCORPORATE A REVISED TREE TECHNICAL MANUAL AND AMEND TREE PRESERVATION STANDARDS; AND AMENDING SUBCHAPTER 20, DEFINITIONS, BY ADDING CORRESPONDING DEFINITIONS; REPLACING ALL ORDINANCES IN CONFLICT; CONTAINING SEVERABILITY AND REPEALER CLAUSES; PROVIDING FOR A PENALTY FOR A VIOLATION OF CHAPTER 157, SUBCHAPTER 12 AS A CLASS C MISDEMEANOR AND A FINE IN AN AMOUNT OF NOT LESS THAN \$300.00 AND NOT TO EXCEED \$500.00; AND DECLARING AN EFFECTIVE DATE.

WHEREAS, the City Council approved the Unified Development Code on February 24, 2015, which replaced, in its entirety, the Unified Development Code adopted on September 8, 2009; and

WHEREAS, the City Council has determined that it is necessary to update and amend the Unified Development Code from time to time to ensure realization of its stated purposes and its compliance with applicable State law; and

WHEREAS, the Planning and Zoning Commission held a public hearing on October 1, 2018, and voted affirmatively in recommending approval of the proposed Unified Development Code amendments contained herein through its final report and recommendation to City Council with a vote of 5 - 0; and

WHEREAS, the City Council has determined that revising the applicability standards of the City's tree preservation requirements by extending the tree preservation standard to the City's full Extra-Territorial Jurisdiction (ETJ), with stated exceptions, is necessary in order to promote the safe, orderly and healthful development in accordance with the Texas Local Government Code §§ 212.002 and 212.003; and

WHEREAS, the City Council has also determined that modification of the protected tree classifications by adding another classification and providing for a list of Heritage Tree species and clarifying protective tree fencing requirements and grade change restrictions within the critical root zone (CRZ) of a protected tree is necessary to realize the purpose of Subchapter 12 of the Unified Development Code; and

WHEREAS, the City Council finds that amendments to Subchapter 12 of the Unified Development Code are necessary to comply with changes in State law relating to regulating tree removal as provided in Texas Local Government Code § 212.905 and, collectively with the other amendments to Subchapter 12 of the Unified Development Code provided above, finds it prudent and necessary to amend Subchapter 12 as provided herein; and

WHEREAS, the City Council has determined the incorporation of the Tree Technical Manual: Standards and Specifications, as Appendix A of Subchapter 12, is based on generally accepted best management practices and is necessary to ensuring tree preservation; and

WHEREAS, the City Council finds it necessary to add definitions to Subchapter 20 of the Unified Development Code related to tree preservation standards as amended herein; and

WHEREAS, the City has complied with all conditions precedent necessary to take this action, has properly noticed and conducted all public hearings and public meetings pursuant to the Texas Local Government Code and Texas Government Code, as applicable.

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF PFLUGERVILLE, TEXAS:

Section I. Findings.

That the foregoing recitals are hereby found to be true and correct and are hereby adopted by the City Council and made a part hereof for all purposes and findings of fact.

Section II.

That the Code of Ordinances of the City of Pflugerville, Texas, is hereby amended by amending Chapter 157, Subchapter 12, Tree Preservation Standards in its entirety to read as amended in Exhibit A, attached hereto and incorporated herein for all purposes.

Section III.

That the Code of Ordinances of the City of Pflugerville, Texas, is hereby amended by amending Chapter 157, Subchapter 12, Tree Preservation Standards to incorporate the Tree Technical Manual: Standards and Specifications, as Appendix A of Subchapter 12, to read as provided in Exhibit B, attached hereto and incorporated herein for all purposes.

Section IV.

That the Code of Ordinances of the City of Pflugerville, Texas, is hereby amended by amending Chapter 157 Subchapter 20 Definitions, by amending and adding definitions, in which the following definitions read as follows:

Subchapter 20 – DEFINITIONS

CRITICAL ROOT ZONE (CRZ) - A circular region measured outward from the tree trunk representing the essential area of the roots that must be maintained or protected for the

tree's survival. The Critical Root Zone is one foot of radial distance from the base of the tree for every inch of tree Diameter at Breast Height (DBH).

TREE DAMAGE (INJURY) - Tree Damage (or Injury) means a wound resulting from any activity, including but not limited to 'excessive pruning', cutting, trenching, excavating, altering the grade, paving or compaction within the tree protection zone of a tree. Injury shall include bruising, scarring, tearing or breaking of roots, bark, trunk, branches or foliage, herbicide or poisoning, or any other action foreseeable leading to the death or permanent damage to tree health.

TREE PROTECTIVE FENCING - Tree Protective Fencing means a temporary enclosure erected around a tree to be protected at the boundary of the tree protection zone. The fence serves three primary functions: 1) to keep the foliage crown, branch structure and trunk clear from direct contact and damage by equipment, materials or disturbances; 2) to preserve roots and soil in an intact and non-compacted state; and 3) to identify the tree protection zone in which no soil disturbance is permitted and activities are restricted.

TREE PRUNING, EXCESSIVE - Excessive Pruning means removing in excess, one-fourth (25 percent) or greater, of the functioning leaf, stem or root area. Pruning in excess of 25 percent is injurious to the tree and is a prohibited act. Excessive pruning typically results in the tree appearing as a 'bonsai', 'lion's-tailed', 'lolly-popped' or overly thinned.

- 1) Unbalanced Crown. Excessive pruning also includes removal of the leaf or stem area predominantly on one side, topping, or excessive tree canopy or crown raising. Exceptions are when clearance from overhead utilities or public improvements is required or to abate a hazardous condition or a public nuisance.
- 2) Roots. Excessive pruning may include the cutting of any root two (2) inches or greater in diameter and/or severing in excess of 25 percent of the roots.

TREE TOPPING - Tree Topping refers to the indiscriminate cutting of tree branches to stubs or lateral branches that are not large enough to assume the terminal role. Topping shall include 'heading', 'hat racking', and 'rounding over'.

Section V.

Severability.

If any provision of this Ordinance is illegal, invalid, or unenforceable under present or future laws, the remainder of this Ordinance will not be affected and, in lieu of each illegal, invalid, or unenforceable provision, a provision as similar in terms to the illegal, invalid, or unenforceable provision as is possible and is legal, valid, and enforceable will be added to this Ordinance.

Section VI.

Repealer.

This ordinance shall be cumulative of all other ordinances, resolutions or acts of the City of Pflugerville, and this ordinance shall not operate to repeal or affect any other ordinances of the City of Pflugerville except insofar as the provisions thereof might be inconsistent or in conflict with the provisions of this ordinance, in which event such conflicting provisions, if any, are hereby repealed.

Section VII.

That a violation of this Ordinance shall be an offense punishable upon conviction as prescribed in Subchapter 1, Chapter 157, and Subchapter 12, Section 12.11 of this Code of Ordinances.

Section VIII.

Effective Date.

This Ordinance will take effect upon its adoption by the City Council and publication of the caption hereof in accordance with Section 3.15(d) of the City Charter.

PASSED AND APPROVED this _____ day of _____, 2018.

CITY OF PFLUGERVILLE, TEXAS

By: _____
Victor Gonzales, Mayor

ATTEST:

Karen Thompson, City Secretary

APPROVED AS TO FORM:

Charles E. Zech, City Attorney
DENTON NAVARRO ROCHA BERNAL & ZECH, P.C.

EXHIBIT A
SUBCHAPTER 12. TREE PRESERVATION STANDARDS

<u>Section</u>	<u>Subchapter 12. Tree Preservation Standards Title</u>
12.1	Purpose
12.2	Applicability
12.2.1	Applicability of Nuisance Provisions
12.2.2	Applicability of Subdivision and Platting Requirements Development Applications
12.3	Tree Classifications
12.4	General Tree Preservation Requirements
12.5	Tree Protection
12.6	Tree Removal
12.6.1	Tree Removal – In Conjunction with a Development Application <ul style="list-style-type: none"> A. Tree Protection Plan Required B. Tree Replacement Plan C. Plan Requirements
12.6.2	Tree Removal – Not in Conjunction with a Development Application
12.7	Protected Tree Removal Exceptions
12.8	Mitigation for Tree Removal
12.8.1	On Site
12.8.2	Alternative Mitigation
12.8.3	Mitigation Exceptions <ul style="list-style-type: none"> A. Natural Disasters and Other Emergencies B. Dead or Diseased Trees
12.9	Prohibited Activities
12.10	Appeals
12.11	Penalty

SUBCHAPTER 12. TREE PRESERVATION STANDARDS

12.1 PURPOSE

This Subchapter establishes requirements for tree preservation and replacement within the City and, to the extent authorized by state law relating to subdivision regulations, within the City's extra territorial jurisdiction (ETJ), as necessary ~~in order~~ to provide for orderly and healthful development of the community through the protection of specified trees, to promote the health, safety, welfare, and quality of life for the residents of the City and ETJ, to encourage the preservation of trees to provide environmental elements necessary to reduce the amount of pollutants entering streams and to provide elements crucial to establishment of the local ecosystem, to protect property values, and to avoid significant negative impacts on ~~the~~ adjacent properties. The existing natural landscape provides superior ecological, environmental, and aesthetic qualities to the streetscape and parks, ~~and~~ continues to help define the unique character of the City and ETJ ~~Pflugerville~~. Therefore, the City requires the preservation of the existing natural landscape to the maximum extent feasible and declares ~~and, where necessary, protected with setbacks from development~~ the ~~Indiscriminate clearing of land and removal of protected trees is hereby declared a nuisance a~~ violation of this Chapter in accordance with the terms of this Subchapter.

12.2 APPLICABILITY /TREE TECHNICAL MANUAL ADOPTED

12.2.1 Applicability of ~~Nuisance~~ Provisions

Except as specifically exempted below, ~~t~~The provisions of this Subchapter shall apply to all property located within the City and ETJ ~~corporate limits of the City of Pflugerville and that portion of the extra-territorial jurisdiction (ETJ) within 5,000 feet from the city limit boundary in one or more of the following conditions:~~

- ~~A. All existing and new development with commercial, industrial and multi-family zoning and/or land use;~~
- ~~B. All new construction of single-family development without a Certificate of Occupancy;~~
- ~~C. All property with agriculture zoning and not utilized for agricultural purposes; and~~
- ~~D. All property associated with a preliminary plan, final plat, construction plan, site disturbance and/or site plan.~~

A. The following properties are exempt from this Subchapter 12:

1. Developed single-family and two-family dwelling units with certificates of occupancies;
2. Properties designated for agricultural purposes and uses, being limited to those properties granted an agriculture tax exemption by the applicable county tax appraisal district and, in addition, being located in an Agriculture/Development

- Reserve (A) district as designated by the City, are exempt, except in relation to Section 12.4(I) of this Subchapter, which shall apply; and
3. Capital improvements projects by the City, State or Federal government, on property or rights-of-way for which the entity owns or controls.

B. This Subchapter is applicable to property located within the City's ETJ to the extent authorized by state law pursuant to Texas Local Government Code §§ 212.002 and 212.003. Accordingly, all provisions in this Subchapter that govern or are incidental to plats, subdivisions and the associated development of land shall apply in the ETJ as the same are applied within the City.

~~12.2.2 Applicability of Subdivision and Platting Provisions~~

~~The provisions of this Subchapter shall apply any private property located within the portion of the extra-territorial jurisdiction (ETJ) of the City of Pflugerville that is not within the 5,000 foot boundary defined in Section 12.2.1, above, in one or more of the following conditions:~~

- ~~A. All new development with commercial, industrial and multi-family zoning and/or land use;~~
- ~~B. All new construction of single-family development without a Certificate of Occupancy;~~
- ~~C. All property associated with a preliminary plan, final plat, construction plan, site disturbance and/or site plan.~~

12.2.2 Applicability of Development Applications

The provisions of this Subchapter shall be reviewed with a preliminary plan, final plat, construction plan, site disturbance plan, site plan, and building permits, as applicable. No certificate of occupancy for in city development or acceptance of public infrastructure associated with a construction plan in the ETJ, as applicable, shall be issued until the provisions of this Subchapter 12 have been satisfied.

12.2.3 Tree Technical Manual Adopted

There is hereby adopted a Tree Technical Manual, which is incorporated herein for all purposes as Appendix A to this Subchapter, as if laid out here in full. The Tree Technical Manual shall provide the specifications, procedures and standards by which this Subchapter shall be interpreted, implemented and administered. In the event that any conflict exists between this Subchapter and the Tree Technical Manual, this Subchapter shall control. A true and correct copy of the Tree Technical Manual shall be maintained by the Planning Director and be available on the City's website.

12.3 TREE CLASSIFICATIONS

- A. Trees within the City and ETJ ~~Pflugerville~~ are grouped in ~~four~~ five (45) tree classes as outlined below. Classes 2-~~4~~ 5 are considered protected tree classes and are subject to

mitigation in accordance with Section 12.8 ~~and~~ ~~and~~ shall not be removed from ~~the~~ site without first ~~securing~~ ~~obtaining necessary approval under a~~ ~~Site D~~ disturbance permit, site plan permit, construction plan, or, if required, approval ~~by~~ ~~from~~ City Council, each as applicable ~~if the tree is considered a heritage tree~~.

- B. A protected tree is any tree measuring 8-eight (8") inches ~~(8")~~ ~~and~~ ~~or~~ greater in diameter at breast height (referred to herein as DBH, which is 4.5 feet above natural grade, as more specifically described in the City's adopted Tree Technical Manual) ~~from natural grade~~ ~~and any tree planted to satisfy the landscaping requirements of Subchapter 11 pursuant to an approved site plan, public infrastructure construction plan, or tree replacement plan.~~ ~~This Protected trees~~ includes multi-trunk trees, which are measured by combining the diameter of the largest stem or trunk with one-half of the diameter of each additional stem or trunk, all measured at DBH. ~~A Heritage Tree is any protected tree measuring 25" in DBH or greater. A heritage tree shall not be removed unless specifically approved by City Council.~~

Table 12.3: Tree Classification	
Class 1	Unprotected Trees - Trees with DBH < 8 inches (<u>unless tree was planted to satisfy requirements of Subchapter 11</u>)
Class 2	Protected Trees with DBH 8 - 17.99 inches <u>and</u> <u>Trees planted to satisfy requirements of Subchapter 11</u>
Class 3	Protected Trees with DBH 18 - 24.99 inches
<u>Class 4</u>	<u>Protected Trees with DBH 25 inches or greater</u> (<u>Not a Heritage Tree species</u>)
Class <u>45</u>	"Heritage Tree" – Protected Trees with DBH 25 inches or greater

- C. Trees within the Class 1 are not considered protected unless the tree was planted to satisfy requirements of Subchapter 11 of this Code. However, healthy trees ~~(of protected tree species with good branching structure, height, and spread similar to nursery grown trees)~~ with DBHs from 3-7.99 inches may be credited toward landscaping requirements described in Subchapter 11 of ~~the Unified Development~~ this Code and should be preserved where possible.

- D. A heritage tree is any protected tree measuring 25" in DBH or greater of the following tree species:

1. American Elm
2. Bald Cypress
3. Bur Oak
4. Cedar Elm
5. Chinquapin Oak
6. Live Oak
7. Mexican White (Monterrey) Oak
8. Pecan
9. Shumard Red Oak
10. Texas (Spanish) Red Oak
11. Lacey Oak

12. All other Oak trees not specified

13. Texas Walnut

E. A non-hazardous heritage tree shall not be removed unless specifically approved by City Council as provided in Section 12.7 of this Subchapter.

12.4 GENERAL TREE PRESERVATION REQUIREMENTS

A. All trees are considered protected trees within classes 2-4-5 as described in Section 12.3 of this Subchapter with the following exceptions: Chinaberry, Hackberry, Ashe juniper (Cedar), Chinese Tallow, Willow, Ligustrum, Mimosa, Cottonwood, ~~Huisache, and~~ or any other tree that is determined to be in a ~~hazardous~~ dangerous condition so as to endanger the public health, safety, or welfare. The Planning Director shall make the determination as to whether, such as a tree that is damaged, diseased, or dying due to natural or other causes, as determined by the Administrator.

~~A.B.~~ All existing non-hazardous trees, regardless of species, located within the required bufferyard per Subchapter 4 of this Code shall be considered protected.

~~B.C.~~ All proposed buildings and improvements shall be oriented in a manner ~~which~~ that allows, ~~for to~~ the greatest extent ~~feasible, for the~~ of preservation of the protected trees.

~~C.D.~~ Tree preservation shall also be based on the hierarchy of trees indicated in Section 12.3 of this Subchapter, Tree Classifications with Class 5 heritage trees being at the top of the hierarchy for preservation purposes.

~~D.E.~~ Parking lots shall be designed to incorporate protected trees as focal points or practical means of segmenting parking lots through preservation of existing trees within landscape islands, peninsulas, and medians.

~~E.F.~~ Trees preserved shall be integrated with the design of open spaces, screening, and landscape areas.

~~F.G.~~ Prior to the approval of the applicable Tree Protection, Removal or Replacement Plan where protected trees are proposed for tree removal with on-site mitigation, ~~F~~iscal security is required in an amount equal to 100 percent of the mitigation value of the trees proposed for preservation per Section 12.8.2(B) of this Subchapter, Tree Classification-Fee by Diameter Inch Removed.

~~G.H.~~ All tree preservation and maintenance measures shall be in accordance with the City's adopted Tree Technical Manual.

~~H.I.~~ Any tree with a DBH of eight (8) inches or ~~larger~~ greater that is in a floodplain or floodway is considered protected, regardless of species, unless it is determined to be in a hazardous condition so as to endanger the public health, safety, or welfare or it affects hydraulics in the floodplain or floodway. The Planning Director shall make the determination as to whether a tree is damaged, diseased, or dying due to natural causes and is, therefore, in a hazardous condition. The Development Engineering Director shall make the determination as to whether a tree ~~such as a tree that is damaged, diseased or dying due~~

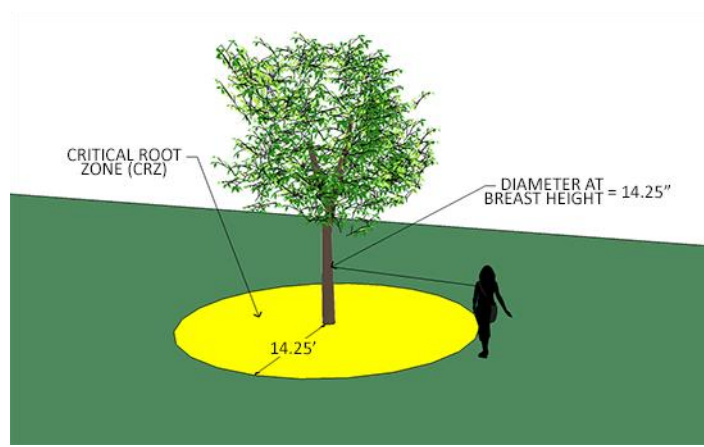
~~to natural causes, as determined by the Administrator, or~~ affects the hydraulics of the flood area ~~as determined by the Engineering Department.~~

~~I.J.~~ The mowing and clearing of brush located within or under the drip-lines of protected trees is allowed, provided a site disturbance permit is issued and such mowing or clearing is accomplished by hand or by mechanical mowers with turf tires. Mechanical mowers with tracks shall not be used within or under driplines of protected trees. ~~(no equipment with tracks).~~

~~J.K.~~ The ~~Administrator~~ Planning Director shall require a ~~certificate signed letter~~ from ~~an architect, a landscape architect or a professional engineer,~~ certified landscape professional, ~~licensed surveyor or licensed nurseryman~~ that states verifies the development complies with: (1) the tree preservation and tree removal mitigation requirements of this Subchapter prior to issuance of a certificate of occupancy in the City or acceptance of public infrastructure associated with a construction plan in the ETJ; and (2) if required, provision of permanent utilities irrigation system provisions are provided. The ~~Administrator~~ Planning Director or the Administrator's designee ~~may~~ has the right to inspect each site in conjunction with final inspection and at other times to ensure compliance with this Subchapter.

12.5 TREE PROTECTION

- A. All trees identified for preservation on an approved Tree Protection Plan shall be flagged and encircled with protective chain-link fencing installed along the ~~drip line~~ critical root zone (CRZ) or a dripline of the tree, whichever is greater, in accordance with the Tree Technical Manual. If there are physical constraints preventing the placement of the protective fencing at the CRZ or dripline of the tree, whichever is greater, the Planning Director may allow for the fencing to encroach into the CRZ by up to fifty percent (50%), but at no point may result in a fence closer than five (5) feet from the base of the tree. No construction, such as trenching or regrading, is to occur within an area that constitutes more than fifty percent (50%) of the CRZ critical root zone (as measured from the edge of the drip line to the trunk of the tree) for each tree being preserved. Tree protective fencing shall remain in place pursuant to the approved Tree Protection Plan throughout the construction process, and may not be removed until such time the Planning Director allows for the removal of such fencing.



B. Grade changes shall not be permitted within the CRZ unless otherwise permitted by the Planning Director. If grading within the CRZ is approved, grading shall be done by hand or with small equipment to minimize root damage. Grade changes under specifically approved circumstances shall not allow more than six (6) inches of fill soil added or allow more than six (6) inches of existing soil to be removed from natural grade unless mitigated. Grade fills over six (6) inches or impervious overlay shall incorporate an approved permanent aeration system, permeable material, or other approved mitigation. Grade cuts exceeding six (6) inches shall incorporate retaining walls or an appropriate transition equivalent.

~~B.C.~~ No grading or tree removal shall occur on a lot until the Tree Protection Plan has been approved.

~~C.D.~~ Compliance with the criteria in this ~~S~~section shall be demonstrated in the field as well as on the applicable plan.

~~D.E.~~ Tree Protection Plan adjustments made during construction must be reviewed and approved by the ~~Administrator~~ Planning Director prior to implementing such adjustments. An applicant who removes protected trees in violation of this Subchapter shall be required to fully mitigate damages caused by the tree removal and is subject to penalties under~~per~~ Section 12.11 of this Subchapter.

~~E. The provisions of this Subchapter shall be implemented by the Administrator.~~

12.6 TREE REMOVAL

12.6.1 Tree Removal in Conjunction with Development Applications

~~Any approved T~~ree R~~emoval Plan associated in conjunction~~ with a development ~~application permit or construction plan approval~~ shall remain in effect until the expiration of such development ~~permit~~application or construction plan, provided fiscal security is posted and maintained until the expiration of such development permit or construction plan approval, or the trees have been replaced pursuant to the approved Tree Replacement Plan, as applicable. Physical tree removal from the site may occur only after Tree Removal P~~plan~~ approval. A non-hazardous H~~eritage~~ t~~ree~~ may be removed only if approved by City Council in accordance with Section 12.7 of this Subchapter.

A. Tree Protection Plan Required

A Tree Protection Plan shall be submitted before or with the site plan or associated development application submittal and prior to the removal of any trees. The Tree Protection Plan shall: (1) include a tree survey in accordance with the Tree Technical Manual graphically identifying protected trees on the site; (2) provide for tree protective measures; and (3) identify the trees proposed for preservation and removal. All trees shall be identified by species, diameter, condition, and mitigation ratio and value.

~~At or before the site plan submittal and prior to the removal of any trees, the applicant shall submit a Tree Protection Plan, which shall graphically identify protected trees and indicate those proposed for preservation and for removal.~~

B. Tree Replacement Plan

If development under a proposed site plan will remove a tree with a DBH of 8" or greater, the City shall require tree mitigation in accordance with Section 12.8. Mitigation for Tree Removal, of this Subchapter, including the planting of replacement trees or the payment of an applicable fee in-lieu, as a condition of site plan or other development application approval. The ~~Administrator~~ Planning Director or Development Engineering Director, as applicable, shall not release the construction plan, site disturbance plan, or site plan until the applicant satisfies the condition(s) of approval or posts fiscal security to ensure the condition(s) of the tree replacement will be satisfied.

C. Plan Requirements

A tree survey, ~~T~~ree ~~R~~eplacement ~~P~~lan, Tree Removal Plan and ~~T~~ree ~~P~~rotection ~~P~~lan shall be provided in accordance with the applicable survey and plan requirements specified in the Tree Technical Manual and the respective development application. These elements shall be incorporated into the overall sheet set for preliminary plans, construction plans, site plans, or site disturbance plans. The irrigation plan shall be in accordance with Subchapter 11 of this Code, Chapter 113 of the Code of Ordinances (Irrigators), and the Tree Technical Manual.

12.6.2 Tree Removal Not in Conjunction with a Development Application

- A. The proposed removal of any ~~protected~~ tree not associated with a development application or plan shall require a site disturbance permit with the exception of single-family and two-family lots or units. The clearing of brush and trees less than eight (8") inches shall require a site disturbance permit.
- B. The site disturbance permit application shall be made by the owner of the property on which the ~~protected~~ tree(s) is located or by the owner(s)'s authorized representative. A tree survey in accordance with the Tree Technical Manual survey requirements, and a Tree Replacement Plan and Tree Protection Plan, as applicable, shall be provided with the site disturbance permit application.
- C. Upon receipt of a complete application, the ~~Administrator~~ Planning Director shall inspect the subject tree and approve or deny the application in accordance with the provisions of this ~~S~~ection. ~~within fifteen (15) business days of the date on which the Administrator deemed the application complete. If a pending decision by the Administrator would delay construction already properly commenced and in progress, the Administrator shall approve or deny the application within five (5) business days.~~
- D. A site disturbance permit shall not be approved or released until a ~~T~~ree ~~R~~eplacement ~~P~~lan has been approved and fiscal security has been posted, or payment of fee in-lieu has been provided in accordance with Section 12.8 ~~Tree~~-Mitigation of this Subchapter for Tree Removal.
- E. A non-hazardous Heritage ~~T~~ree may be removed only if approved by City Council and tree replacement or payment for fee in-lieu of replanting is provided per Tables 12.8.1 and 12.8.2(B) of this Subchapter. The applicable Tree Replacement Plan shall reflect the

heritage tree(s) requested to be removed, which shall be processed in accordance with Section 12.10 of this Subchapter.

- F. ~~Site disturbance permits shall remain valid for a period of 60 days. If no construction activity has occurred on the property within 60 days of site disturbance permit approval, the application shall expire.~~

12.7 PROTECTED TREE REMOVAL EXCEPTIONS

- A. A protected tree may be removed without tree replacement or mitigation if the tree is identified for removal in a capital improvement project which has been approved by City Council or governing jurisdiction (e.g., Travis County).
- B. Existing single-family and two-family or duplex lots or units with a valid ~~C~~ocertificate of ~~O~~ccupancy are exempt.
- C. A protected tree, including a heritage tree, may be removed if the ~~Administrator~~Planning Director ~~or the Administrator's designee~~ determines that the tree is in a hazardous condition so as to endanger the public health, safety or welfare, or the tree is found to be dead or dying by the Planning Director (referred to herein as a hazardous tree); ~~such as a tree that is damaged, diseased or dying due to natural causes.~~
- D. A property owner may request authorization from City Council to remove a heritage tree in accordance with Section 12.10 of this Subchapter.

12.8 MITIGATION FOR TREE REMOVAL

12.8.1 On-Site Mitigation

- A. Any protected tree removed, damaged, or killed as a result of development or improper maintenance, such as excessive pruning, shall be replaced by a tree or trees of the same species or comparable alternative equal to the total number of diameter inches removed, as measured at breast height (DBH). Tree replacement on site shall be in accordance with Table 12.8.1, Tree Classification - Mitigation Ratio. Replacement trees shall meet the planting criteria in Subchapter 11 of this Code and in the Tree Technical Manual. The ~~Administrator~~Planning Director shall determine ~~be the final decision-making authority on~~ the cause of damage or death for a protected tree.

Table 12.8.1: Tree Classification - Mitigation Ratio lists the protected tree classifications based on size or designation with the applicable tree mitigation ratio for replacement caliper inches.

Table 12.8.1: Tree Classification		Mitigation Ratio
Class 1	Unprotected Trees - Trees with DBH < 8 inches	N/A

	<u>(unless tree was planted to satisfy requirements of Subchapter 11)</u>	
Class 2	Trees with DBH 8 - 17.99 inches <u>and</u> <u>Trees planted to satisfy requirements of Subchapter 11 with DBH less than 8 inches</u>	1:1
Class 3	Trees with DBH 18 - 24.99 inches	2:1
<u>Class 4</u>	<u>Protected Trees with DBH 25 inches or greater</u> <u>(Not a Heritage Tree species)</u>	<u>2.5:1</u>
Class <u>45</u>	"Heritage Tree" - Trees with DBH 25 inches or more	3:1

~~A.B.~~ No protected trees shall be removed, and no replacement trees shall be planted, until the ~~Administrator~~ Planning Director has reviewed and approved the ~~I~~tree ~~R~~replacement ~~P~~plan and fiscal security equivalent to the replacement value, as represented in Table 12.8.2(B), has been posted. Fiscal security will be returned once all replacement trees have been successfully ~~planted~~ installed and inspected.

~~B.C.~~ Protected trees may be transplanted to a suitable location on the same property or off-site within the City or its ETJ. If off-site, and no replacement on site shall be required, ~~if the~~ application developer shall comply with the generally accepted transplanting methods of the American National Standards Institute (ANSI A300 Standards), ~~and the trees survives are required to survive for a period of at least five-one (15) years and shows no without showing any signs of decline, and so long as the tree is transplanted to a site within the City or its extraterritorial jurisdiction (ETJ).~~ Posting fiscal security equivalent to the replacement value of the transplanted tree is required. Fiscal security will be returned once the ~~five-one (51)~~ five-one (51) years, outlined previously, has been successfully completed.

~~G.D.~~ Irrigation shall be provided for replacement trees in accordance with Subchapter 11 of this Code, Chapter 113 of the Code of Ordinances (~~;~~ Irrigators), and the Tree Technical Manual.

12.8.2 Alternative Mitigation

When the ~~Administrator~~ Planning Director determines that mitigation for protected tree removal by replanting trees on site is not feasible, (e.g., planting capacity has been reached on site), an applicant may choose one of the following alternatives in lieu of replanting on site:

- A. ~~Planting~~ the replacement trees with the applicable mitigation ratio identified in Table 12.8.1 in a City park or other ~~publicly~~ City-owned property as would otherwise be required on site in ~~the~~ locations approved by the ~~Administrator~~ Planning Director and ~~Director of Parks and Recreation Director~~;
- B. Make a pPayment ~~per diameter inch of protected trees removed, as measured at breast height (DBH), shall be paid~~ into the Tree Fund, or account for use by the City, for the planting, pruning, irrigation, and other activities associated with trees in ~~a~~ City ~~p~~Parks or

on other City-owned property. The payment shall be based on the DBH of the protected trees removed. ~~The~~is payment ~~into the Tree Fund~~ is non-refundable.

Table 12.8.2(B) Tree Classification Removal Fees lists the tree classifications with their applicable fees per diameter inch removed, as measured at breast height (DBH).

Table 12.8.2(B) Tree Classification Removal Fees		
Tree Classification		Fee per Diameter Inch Removed
Class 1	Unprotected Trees - Trees with DBH < 8 inches <u>(unless tree was planted to satisfy requirements of Subchapter 11)</u>	N/A
Class 2	Trees with DBH 8 - 17.99 inches <u>and</u> <u>Trees planted to satisfy requirements of Subchapter 11 with DBH less than 8 inches</u>	\$150
Class 3	Trees with DBH 18 - 24.99 inches	\$450 <u>300</u>
<u>Class 4</u>	<u>Protected Trees with DBH 25 inches or greater</u> <u>(Not a Heritage Tree species)</u>	<u>\$375</u>
Class 4 <u>5</u>	"Heritage Tree" - Trees with DBH 25 inches or more	\$450

C. Mitigation Fee Credits. In accordance with Section 212.905 of the Texas Local Government Code, which is adopted and incorporated herein for all purposes, and notwithstanding anything in this Subchapter to the contrary, tree planting credits offsetting Tree Classification Removal Fees identified in Table 12.8.2(B) of this Subchapter are hereby established as required by state law. The Planning Director shall develop processes and procedures necessary for the implementation of these requirements.

12.8.3 Mitigation Exceptions

A. Natural Disasters and other Emergencies

If a protected tree is ~~determined to be~~ causing a danger or ~~to be in~~ is in a hazardous condition due to a natural disaster, such as a tornado, fire, storm, flood, or other act of God that endangers public health, welfare, or safety, the requirement of this Subchapter may be waived ~~as deemed necessary~~ by the ~~Administrator~~ Planning Director.

B. Dead or Diseased Trees

If the ~~Administrator~~ Planning Director, with assistance from an ISA Certified Arborist engaged by the property owner, determines that, based on an on-site inspection and ~~in writing a report from the ISA Certified Arborist~~, that a protected tree is already dead, dying, or fatally diseased, the provisions of the mitigation requirements ~~will do~~ not apply.

12.9 PROHIBITED ACTIVITIES

- A. It is unlawful for any person to remove any ~~protected~~ tree without first securing the required ~~approvals~~~~permits~~ as specified in this ~~Subchapter~~~~section~~.
- B. All development subject to this Subchapter, including grading, trenching, ~~or~~~~and~~ tree removal on all sites, is prohibited prior to the approval of a ~~T~~ree ~~P~~rotection, ~~Replacement~~ ~~and/or~~ ~~R~~emoval ~~P~~lan, ~~as applicable~~.
- C. It is unlawful for any person to damage a protected tree in any way, such as through tree topping or pollarding, ~~over-excessive~~ pruning or chemical poisoning. ~~Refer to the~~All tree maintenance and pruning shall be conducted pursuant to the requirements of the Tree Technical Manual.~~for more specificity regarding tree maintenance and pruning.~~
- D. Indiscriminate clearing or stripping of the natural vegetation on any lot is prohibited and is considered a violation of this Subchapter.
- E. It is unlawful for a person to continue work on a site or lot or removal~~ale~~ ~~of~~ trees after a stop work order has been issued.

12.10 APPEALS

- A. An applicant may appeal the decision of the ~~Administrator~~Planning Director to deny a heritage tree removal application to ~~the~~ City Council where the Planning Director determined the tree to be non-hazardous. Such appeal must be made in writing and received by the ~~Administrator~~Planning Director within thirty (30) days from the date of the decision on the tree removal application or official correspondence referencing the denial of the proposed heritage tree removal application. The request for appeal must set forth the specific reasons for the appeal and state the specific reasons for disagreement with the decision of the Planning Director~~Administrator~~, including the basis for the applicant's position that the application should have been granted. In addition, a request to remove a non-hazardous heritage tree as reflected in the applicable Tree Replacement Plan, shall be forwarded to City Council for consideration.
- B. In each such case, ~~The~~ Planning Director~~Administrator~~ shall set the matter for public hearing before ~~the~~ City Council at the earliest possible regularly scheduled meeting of ~~the~~ City Council.
- C. ~~The~~ City Council shall review the request and render a decision either affirming, affirming in part, conditionally affirming, or reversing the determination of the Planning Director~~Administrator~~, or approving a non-hazardous heritage tree removal request only after determining that the heritage tree ~~creates one of the following conditions~~:
 1. Prevents ~~all~~substantial economically viable use of the property;
 2. Prevents reasonable use of or access to the property;
 3. Is dying or dead;
 4. Is diseased and restoration is not practicable or the disease may be transmitted to other trees;
 5. Poses a high risk of property damage or personal injury that cannot reasonably be mitigated without removing the tree; (Reasonable mitigation may include lightning protection measures.);
 6. ~~If~~is located on public property, street or easement;
 7. Prevents the opening of necessary vehicular traffic lanes in a street or alley; or

8. Prevents the construction of utility or drainage facilities that may not feasibly be rerouted due to physical constraints.

- D. If heritage tree removal is permitted after an appeal ~~(or after the expiration of the appeal period)~~ pursuant to the provisions of this ~~subsection~~, the applicant shall comply with all applicable provisions of this ~~Section~~Subchapter, including tree mitigation, unless the appeal determines the heritage tree is hazardous.

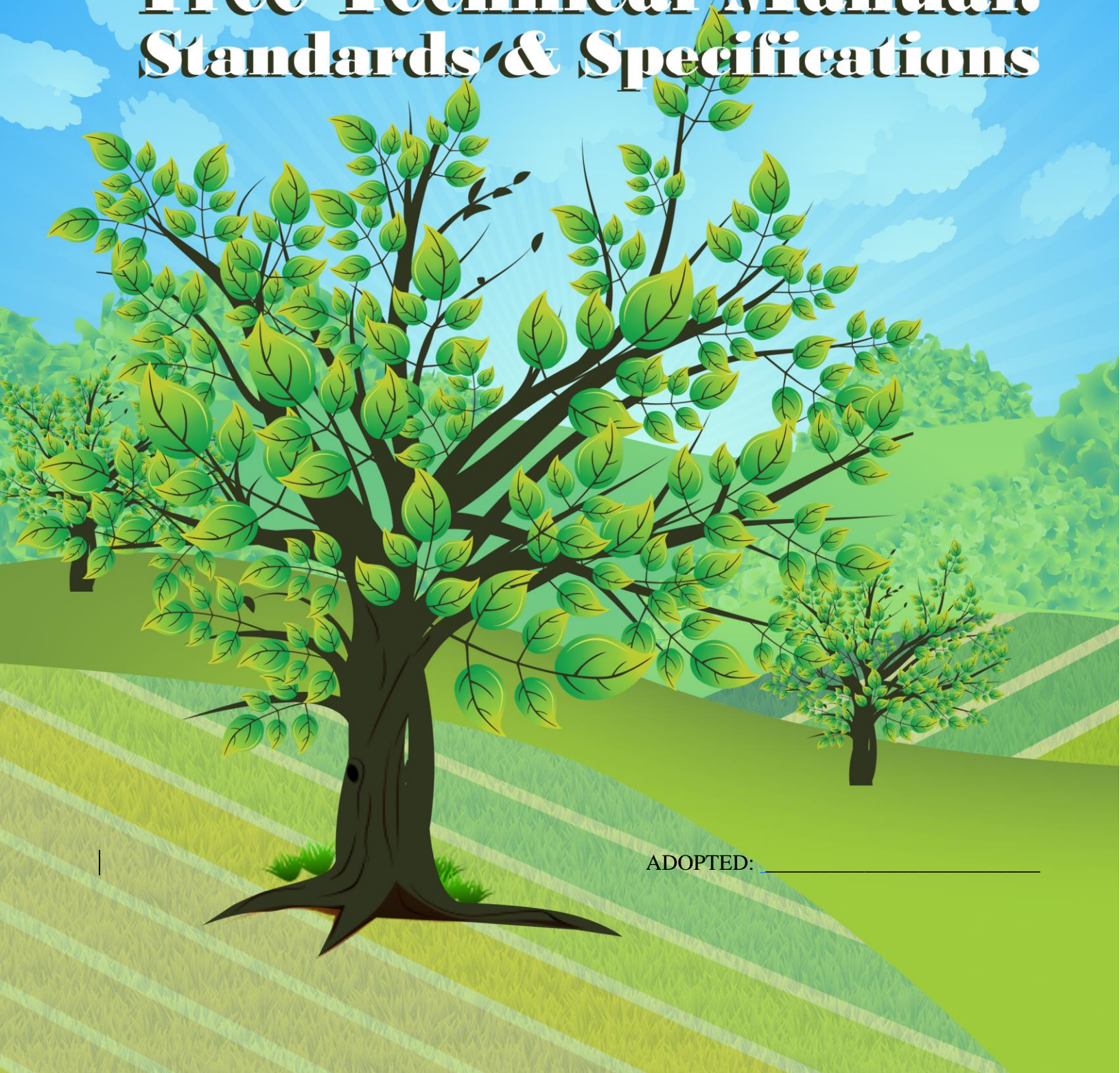
12.11 PENALTY

Violations of this Subchapter 12 that occur within the City are punishable in accordance with Subchapter 1 of this Chapter 157, but ~~occurring on properties to which Section 12.2 of this Subchapter applies~~ shall be punishable by a fine of not less than \$300 ~~nor more than \$2,000~~500 per violation. ~~This offense is hereby declared to be unlawful. An offense under this Subchapter is hereby declared to be~~ a strict liability offense, and the culpable mental state required by Chapter 6.02 of the Texas Penal Code is hereby specifically negated ~~and clearly dispensed with.~~ Each violation of this Subchapter, including without limitation, each protected tree that is unlawfully removed or damaged shall constitute a separate and distinct offense. Criminal prosecution shall not preclude civil action available at law by the City to recover for the damage or loss of the tree, ~~and the City Attorney is hereby authorized, without further authorization from the City Council, to institute and prosecute a lawsuit against any person who unlawfully removes or damages a protected tree to recover the reasonable value of the tree based on the latest edition of the Guide for Plant Appraisal by the Council of Tree and Landscape Appraisers~~as determined by industry-accepted appraisal valuations. The criminal penalty established herein shall not apply to violations of this Subchapter that occur in the City's extraterritorial jurisdiction. However, the City is entitled to appropriate injunctive relief, such other rights to relief as provided in Texas Local Government Code §§ 212.003 and 212.018, and other remedies established at law to redress such violations.

~~Violations of Subchapter 12 occurring on properties to which Section 12.2 of this Subchapter applies shall not be punished with criminal penalties, but enforcement against such violations is hereby authorized pursuant to and under the authority granted by Texas Local Government Code, § 212.001, et. se~~

EXHIBIT B
APPENDIX A OF SUBCHAPTER 12. TREE PRESERVATION STANDARDS
TREE TECHNICAL MANUAL: STANDARDS AND SPECIFICATIONS

Tree Technical Manual: Standards & Specifications



ADOPTED: _____

TABLE OF CONTENTS

Introduction	5
Section 1: Tree Survey Standards	6
1.1. Introduction.....	6
1.2. Protected and unprotected trees.....	6
1.3. Tree survey required.....	7
1.4. Tree survey certification.....	7
1.5. Information to be gathered in the field.....	7
1.6. Information to be provided on the tree survey	8
1.7. Additional information	9
Section 2: Tree Protection Standards.....	11
2.1. Introduction.....	11
2.2. Critical Root Zone (CRZ)	11
2.3. Tree Protection and Preservation Plan & pre-construction requirements	12
2.3.1. Site plan reflecting Critical Root Zones	12
2.3.2. Tree protection notes	13
2.3.3. Exceptions to Construction within Critical Root Zone (CRZ).....	14
2.3.4. Intent of Tree Fencing for Protected Trees.....	15
2.3.5. Tree Fencing for Protected Trees Standards	16
2.4. Tree pruning, tree surgery, and removal prior to construction	20
2.4.1. Pruning	2-10
2.4.2. Tree surgery	2-12
2.4.3. Tree removal adjacent to protected trees.....	2-12
2.5. Activities during construction and demolition near trees.....	20
2.5.1. Soil compaction	20
2.5.2. Grading limitations within the Critical Root Zone	20
2.5.3. Trenching, excavation, and equipment use	21
2.5.4. Tunneling and directional drilling.....	22
2.5.5. Construction impact mitigation	23
2.6. Damage to trees	24
2.6.1. Reporting	24
2.6.2. Penalty for damage to protected trees	24
2.7. Pavement and hardscape conflicts with tree roots	25
2.7.1. Removal and replacement of pavement and sidewalks.....	25
2.7.2. Alternative methods to prevent root cutting (Recommended).....	25
2.7.3. Avoiding conflicts (Recommended).....	25
2.7.4. Alternative base course material (Recommended).....	25
Section 3: Tree Removal, Replacement, Planting, and Maintenance Standards	26
3.1. Introduction.....	26
3.2. Tree removal	26

3.2.1. Allowable removal.....	26
3.2.2. Protected Tree Removal Permit Application.....	26
3.3. Tree replacement plan.....	26
3.4. Tree planting requirements.....	27
3.4.1. Species.....	27
3.4.2. Planting distances/spacing requirements	28
3.5. Tree stock and materials	28
3.5.1. Quality	28
3.5.2. Container grown/ ball and burlapped trees.....	29
3.5.3. Miscellaneous materials.....	29
3.6. Planting site preparation	29
3.6.1. Soil preparation and conditioning	29
3.6.2. Planter pit preparation.....	29
3.6.3. Drainage	30
3.7. Planting the tree	30
3.7.1. Container grown trees.....	30
3.7.2. Ball and burlapped trees	30
3.7.3. Backfill soil, amended soil	31
3.7.4. Filling the hole.....	31
3.7.5. Constructing a berm or dam.....	31
3.7.6. Mulching	31
3.7.7. Staking or guying	31
 3.8. Pruning new trees.....	3-8
 3.8.1. Prohibitions.....	3-8
 3.8.2. Pruning guidelines (Recommended)	3-8
 3.8.3. Limb removal (Recommended)	3-8
3.9. Transplanting trees.....	33
 3.10. Irrigation	34
3.11. Maintenance	35
 Section 4: Tree Pruning, Surgery, and Maintenance	36
4.1. General Tree Pruning and Surgery.....	36
4.1.1. Pruning	36
4.1.2. Certified Arborist Required.....	36
4.1.3. Time of Year for Pruning	36
4.1.4. Pruning Limitations	36
4.1.5. Types of Pruning.....	37
4.1.6. Types of Pruning Prohibited.....	39
4.1.7. Making Proper Pruning Cuts	39
4.1.8. Tree surgery	40
4.1.9. Tree removal adjacent to protected trees.....	40
4.2. Pruning New Planted Trees.....	40

4.2.1. Types of Pruning Prohibited.....	40
4.2.2. Pruning guidelines (Recommended)	40
4.2.3. Limb removal (Recommended)	41
Section 45: Administration, Inspection, and Enforcement.....	42
45.1. Administration.....	42
45.2. Inspection	42
45.2.1. Inspection by owner	42
45.2.2. Inspection by city representative	42
45.3. Enforcement	43
 Appendix	
A. Definitions.....	A-1
B. Bibliography	B-1
C. Tree Protection Construction Details.....	C-1

INTRODUCTION

Trees provide numerous benefits to quality of life in the urban area, such as beautification, [storm water absorption](#), energy conservation, and increased property values. ~~The City of Pflugerville is a fast growing city with a population of 47,417. In 2000, the population was 16,335.~~ The [City's](#) historic ecotype is blackland prairie, most of which was transitioned to farmland. Few remnants of native vegetation remain; these can be found in the floodplain basins of the Gilleland Creek and Wilbarger watersheds, and along the MoKan right-of-way. The most common native vegetation is the tallgrasses and wildflowers of the blackland prairie, and the elms, and pecans of the floodplains.

~~This Tree Technical Manual will refer to The City of Pflugerville Code of Ordinances, Subchapter 11, Landscaping and Screening Standards and Subchapter 12, Tree Preservation Standards of the Unified Development Code. was completely revised in 2009 to preserve the remaining trees on property under development or already developed. This manual will refer to Subchapter 11 and Subchapter 12 simply as "the Ordinance."~~ The ~~Ordinance~~ [Tree Technical Manual and Subchapter 12, Tree Preservation Standards of the UDC](#) ~~is~~ [are](#) the City's primary regulatory tools to provide for orderly protection of specified trees to promote the health, safety, welfare, and quality of life for the residents of the City, [to promote the safe, orderly and healthful development of the City,](#) to protect property values, and to avoid significant negative impacts on adjacent properties. By assuring preservation and protection of trees through regulations and standards of care, these resources will remain significant contributions to the landscape, streets and parks, and continue to help define the unique character of [the City](#) ~~Pflugerville~~.

This *Tree Technical Manual* (the Manual), [is](#) adopted by City Council by ~~resolution, ordinance~~ [is published separately from the Ordinance](#) and is maintained by the Planning Department with distribution by the City ~~Arborist~~ [Forester](#). The Manual provides standards and specifications based on generally accepted practices and provides guidelines for survey, protection, planting, pruning and irrigation of trees. If there appears to be a conflict in verbiage between the ~~Ordinance~~ [UDC](#) and the Manual, the ~~Ordinance~~ [UDC](#) will take precedence. The goals of the Manual are intended to provide consistent care and serve as benchmarks to measure achievement in the following areas:

- ❖ Ensure and promote preservation of the remaining tree canopy cover within the City limits and ~~within 5,000 feet from City limits~~ in the ETJ;
- ❖ Provide standardized presentation of tree survey data required by the City;
- ❖ Maintain the health and vigor of trees during and after construction events by providing protection standards and best management practices;
- ❖ Provide standards for the replacement of trees that are permitted to be removed;
- ❖ Provide standards for new tree planting, tree care and irrigation; [and](#)
- ❖ Provide guidance on protection, planting, and care of trees in the ~~e~~ [City's](#) right-of-way and publicly owned lands; ~~and~~.

PRIMARY SOURCES CONSULTED

Standards and specifications were gathered from various sources as listed in the bibliography. The International Society of Arboriculture (ISA) material was used for much of the tree planting, pruning, and general tree care information. The *Tree Technical Manual* produced by the City of Palo Alto, California and Round Rock, Texas were ~~also consulted~~used to develop the standards provided within the Manual. The standards in this Manual are based on common practices in the area and the types of soils and trees that exist in the City~~Pflugerville~~.

SECTION 1: TREE SURVEY STANDARDS

1.1. INTRODUCTION

This section describes the format of tree surveys, as well as the types of tree identification required in the field. These standards and specifications assure a faster review process as they relate to tree protection and mitigation.

1.2. PROTECTED AND UNPROTECTED TREES

Trees of all species that are at least eight (8) inches in diameter are protected, except for Chinaberry, Hackberry, Ashe Juniper (Cedar), Chinese Tallow, Willow, Ligustrum, Mimosa, Cottonwood, Huisache and other exceptions provided in Subchapter 12 of the Unified Development Code (UDC). If there are any discrepancies between the Manual and the UDC, the UDC shall govern. For details related to protected trees, refer to ~~the ordinance~~ Subchapter 12 of the UDC.

~~Significant Stands of Trees are protected. A Significant Stand of Trees has a DBH sum of at least 20 inches (minimum DBH of 2") within an area at least 100 square feet, where the center of each tree is no more than 10 feet from another tree. Chinaberry, Hackberry, Ashe Juniper, Chinese Tallow, Willow, Ligustrum, Mimosa, Cottonwood and exceptions as outlined in Subchapter 12 are excluded.~~

Per Subchapter 12 of the Unified Development Code, ~~T~~here are ~~six~~ five tree classifications based on size or designation.

Tree Classifications	Description	Mitigation Ratio (Replacement Inches: Removed Inches)	Credit Ratio (Preserved Inches: Credit Inches)
Class 1	Unprotected Tree - Tree with DBH* < 8 inches (<u>unless tree was planted to satisfy requirements of Subchapter 11</u>)	N/A	1:1 1:1 1.5:1 1.5:1 <u>Refer to the UDC</u>
Class 2	Tree with DBH 8 - 17.99 inches; <u>and Trees planted to satisfy requirements of Subchapter 11</u>	1:1	
Class 5 <u>3</u>	Tree with DBH 18 – 24.99 inches	3 <u>2</u> :1	
<u>Class 4</u>	<u>Tree with DBH 25 inches or more</u>	<u>2.5:1</u>	
Class 6 <u>5</u>	"Heritage Tree" - Tree with DBH 25 inches or more	3:1	

*Diameter at Breast Height (See Illustration 1-1)

The first classification may include trees with diameters up to 7.99 inches DBH; trees less than eight (8) inches in diameter are not protected unless the tree was planted to satisfy the requirements of Subchapter 11 of the Unified Development Code. ~~However, healthy trees (good branching structure, height, and spread similar to nursery-grown trees) with diameters from 3-7.99 inches may be credited toward landscaping requirements described in Subchapter 11 of the Zoning Ordinance.~~ The trees selected for mitigation or ~~t~~Tree credit ~~will~~ shall be indicated on the tree survey and within a site plan, site disturbance plan, and construction plans, ~~and will be protected in the same manner as a protected tree. The City Arborist or Administrator will approve the trees recommended for mitigation.~~

The second classification includes trees ~~with diameters of~~ 8-17.99 inches [DBH](#) and trees planted to satisfy the requirements of Subchapter 11 of the Unified Development Code.

~~The third classification includes Significant Stands of Trees that equal 20—39.99 inches.~~

~~The fourth classification includes Significant Stands of Trees that equal 40 + inches.~~

The ~~fifth~~-[third](#) classification includes trees ~~with diameters of~~ 18-24.99 inches [DBH](#).

[The fourth classification includes trees 25 inches and greater DBH, of non-heritage tree species per Subchapter 12 of the Unified Development Code.](#)

The ~~sixth~~-[fifth](#) classification includes Heritage Trees: these are trees with diameters of 25 inches and above. [Refer to heritage tree species within Subchapter 12 of the Unified Development Code.](#)

1.3 TREE SURVEYS REQUIRED

Tree surveys are required at all phases of development including, but not limited to: ~~Conceptual Plan, P~~preliminary ~~P~~plan, ~~C~~construction ~~P~~plan, ~~S~~site ~~D~~isturbance ~~P~~plan, and ~~S~~site ~~P~~plan.

1.4 TREE SURVEY CERTIFICATION

All tree surveys shall be prepared by a certified arborist, registered landscape architect or registered professional land surveyor. ~~Stand-alone Protected T~~All trees, regardless of species over eight (8) inches in diameter and above and Significant Stand of Trees shall be surveyed and reflected on the survey graphically and in the legend. Ensure all trees within a required Bbufferyard per Ordinance are identified as they are protected regardless of species or size. Trees less than eight (8) inches in diameter that are proposed for preservation and landscape credit shall also be included in the tree survey and legend.

If it is found upon field inspection that the survey is inaccurate, the tree survey will not be accepted ~~and~~or reviewed, and it will be returned for corrections. This will delay the respective development application site plan or preliminary plant review process while the tree survey is corrected ~~and approved~~.

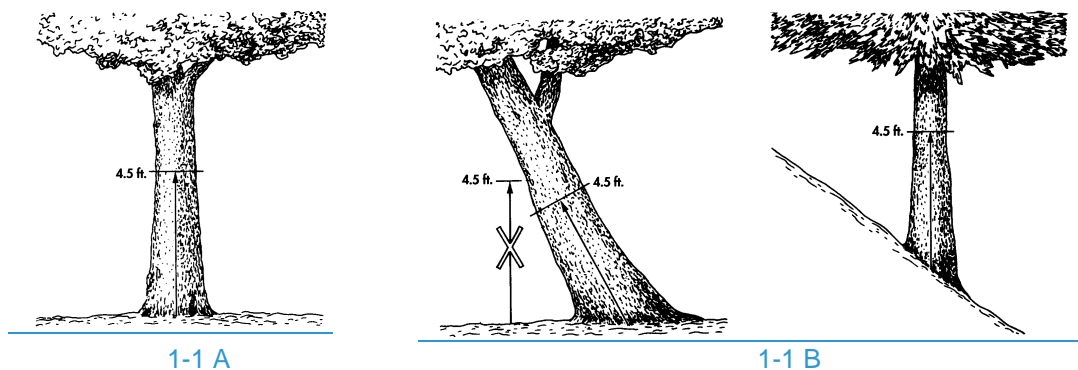
1.5. INFORMATION TO BE GATHERED IN THE FIELD

The data required to be collected and illustrated in the ~~P~~preliminary ~~P~~plan, ~~C~~construction ~~P~~plan, ~~S~~site ~~D~~isturbance ~~P~~plan, and ~~S~~site ~~P~~plan include tree locations, diameters, species, limits of construction, and certain tree graphics.

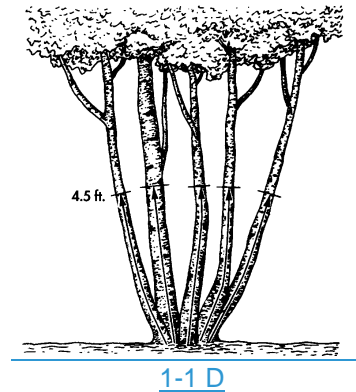
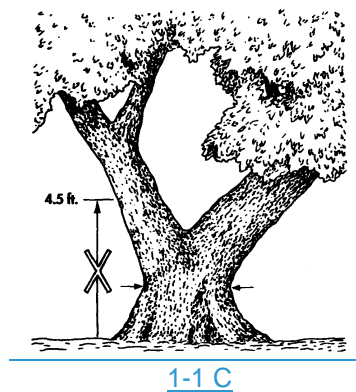
1. **Location-** Tree data submitted must be obtained from a ground survey. A number shall be assigned and a corresponding numbered tag placed on each tree surveyed and provided in the overall tree survey. Tree numbers will remain on the trees until the project has received its certificate of occupancy in the City or acceptance of public infrastructure associated with a construction plan in the ETJ.
2. **Diameter-** Diameters of existing trees are measured as follows. Diameter measurement ~~should~~shall be recorded to the nearest inch. Trees may be measured with a caliper, cruise stick, standard tape measure or diameter tape.
 - a. Straight trunk: Trees with fairly straight, upright trunks should be measured four and a half (4.5) feet above the ground (See illustration 1-1 A).

Illustration 1-1 A-D: Measurement of trees

From: Guide for Plant Appraisals, 9th ed.



- b. Trunk on an angle or on a slope: The trunk is measured at right angles to the trunk four and a half (4.5) feet along the center of the trunk axis, so the height is the average of the shortest and the longest sides of the trunk (see Illustration 1-1 B).
- c. Trunk branching lower than four and a half (4.5) feet from the ground: When branching begins less than four and a half (4.5) feet from the ground, measure the smallest circumference below the lowest branch. In this example, an alternative would be to add the sum of the cross-sectional areas of the two stems measured about 12 inches above the crotch. Then average the sum of these two branch areas and the smallest cross-sectional area below the branches. This may give a better estimate of the tree size (see Illustration 1-1 C).



- d. Multi-stemmed tree: To determine the diameter of a multi-trunk tree, measure all the trunks; add the total diameter of the largest trunk to one-half (1/2) the diameter of each additional trunk (see Illustration 1-1 D). A multi-trunked tree is differentiated from individual trees growing from a common root stock if there is a visible connection between the trunks above ground.
3. **Species-** The name of the species, such as Live Oak, Cedar Elm, or Pecan, should be accurately reflected. Tree types ~~may~~ should be listed by common names ~~or~~ and Latin names, however common names shall be required. Indicating a tree name as "unknown" on a tree survey is not acceptable.

1.6. INFORMATION TO BE PROVIDED ON THE TREE SURVEY

1. **Trunk location-** The trunk location on the plan must represent the center of the trunk at ground level in the field. If the tree leans substantially above that point, show the direction of the lean with an arrow. See the legend under the sample Tree Survey in Illustration 1-2 for an example.
2. **Critical Root Zone (CRZ)-** Trees are to be represented on the tree survey by a concentric circle centered on the trunk location, with a radius equal in feet to the number of inches of the tree's trunk diameter. For example, an oak tree with a trunk diameter measuring fifteen (15) inches would be represented to scale on the tree survey with a circle representing a fifteen (15) foot radius. Trees to be retained will be represented by a solid circle. Trees to be removed are to be represented by a dashed circle. See Illustration 1-2.
3. **Diameters and types of existing trees-** Tree diameters and types shall be shown on the survey ~~through~~ within a legend. Tree numbers on the legend ~~will be~~ shall correlated with the appropriate tree circle drawn on the plan and the trees in the field. Special conditions such as "dead" ~~will~~ shall be noted.
4. **Tree numbers-** Tree numbers on the plan ~~will~~ shall correlate with tags assigned to trees during the survey.
5. **Tree survey table -** A table will be included listing all surveyed trees by number, species, size, protection status, removal status, health conditions, and credit ~~able~~ trees under eight inches. Additionally, it will include calculations of the number of inches to be removed with and without mitigation, and number of inches credited. See illustration 1-2 for reference.

1.7. ADDITIONAL INFORMATION

There are other types of information related to tree structure and condition which may affect site plan design. The City ~~Arborist~~ Forester or Administrator may request these types of information. The information will be expressed as a written note on the survey and include the tree number and a description of any of the following:

1. **Crown configuration-** If a tree has a crown which is skewed in one direction, this information would be useful for surveyors to note. Project designers and plan reviewers need such information to more accurately assess design impacts on such trees.
2. **Crown clearance-** This information is often critical in determining whether a given structure or vehicular use area can practically be placed within the dripline of a tree. If this information is recorded, the surveyor should consider the vertical distance to any major branches.
3. **Condition-** This is one of the principle factors in determining whether a tree should or should not be preserved. Surveyors should not speculate about the condition of all trees unless they have the necessary credentials; however, if a tree is obviously in poor condition, it should be noted to prevent unnecessary expense in trying to design around it.
4. **Spot elevation-** Taking an elevation reading near the trunks of some trees will provide valuable information for project designers. Since grade changes are the most destructive impacts on trees, it is important to get the most accurate information possible. If there is

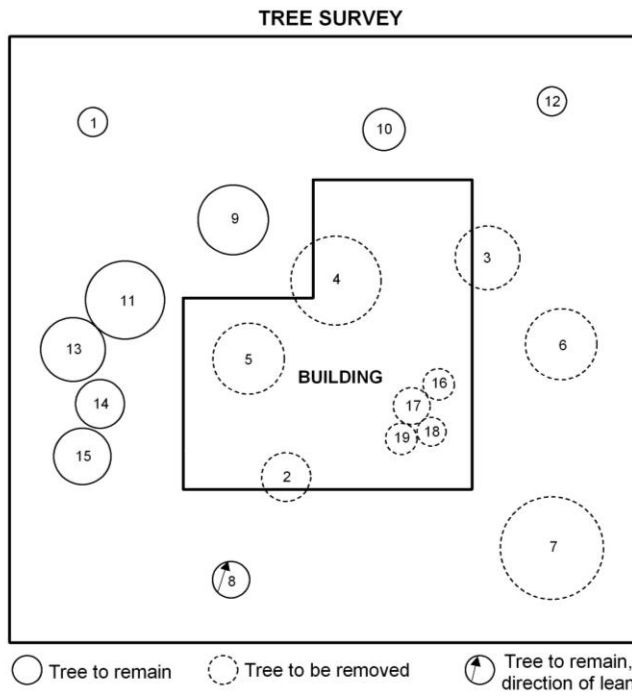
more than a six-inch change, existing and proposed grade elevation will need to be reflected on the tree survey.

|

Illustration 1-2: Elements of a Tree Survey [and Tree Protection Plan](#)

TREE SURVEY							
Protection Status and Class	Proposed Removal (X) or Credit (C)	Tree #	Size (inches) - Species	Mitigation <u>(Replacement Inches:</u> <u>Removed Inches)</u>		Credit <u>(Preserved Inches: Credit</u> <u>Inches)</u>	
				Ratio	Inches Required	Ratio	Inches Credit
NP - Class 1	C	1	4" – Live Oak			1:1	4
NP - Class 1	X	2	10" – Hackberry	N/A	0		
P - Class 2	X	3	16" – Post Oak	1:1	16		
P - Class <u>65</u>	X	4	36" – Cedar Elm	3:1	108		
P - Class <u>53</u>	X	5	20" – Live Oak	2:1	40		
P - Class <u>55</u>	X	7	40" – Live Oak, Dead	N/A	0		
NP - Class 1	C	8	6" – Mountain Laurel			1:1	6
P - Class <u>53</u>	C	9	18" – Pecan			1.5 <u>2</u> :1	<u>9</u>
NP - Class 1	C	10	7" – Pecan			1:1	7
NP - Class 1	C	12	4" – Bur Oak			1:1	4
Total Inches Mitigation and Credit					<u>164</u>		<u>30</u>
Mitigation – Credit = Diameter inches proposed for mitigation or applied towards landscaping requirements				<u>164-30</u> = <u>134</u> inches mitigation required			
LEGEND Not Protected (NP) Protected (P) <u>Tree Removal (X)</u> <u>Tree Credit (C)</u>							
<u>No credit shall be given for Chinaberry, Hackberry, Ashe Juniper (Cedar), Chinese Tallow, Willow, Ligustrum, Mimosa, Cottonwood, Huisache trees, or any other unprotected trees per Subchapter 12 of the Unified Development Code.</u>							

Illustration 1-2: Elements of a Tree Survey (continued):



|

SECTION 2: TREE PROTECTION STANDARDS

2.1. INTRODUCTION

The tree protection section of the Ordinance and the standards in this section are provided to ensure that appropriate practices will be implemented in the field to eliminate undesirable consequences that may result from uninformed or careless acts, and preserve both trees and property values. Construction projects are required to implement the protective practices described in this section.

Typical negative impacts that may occur during construction include:

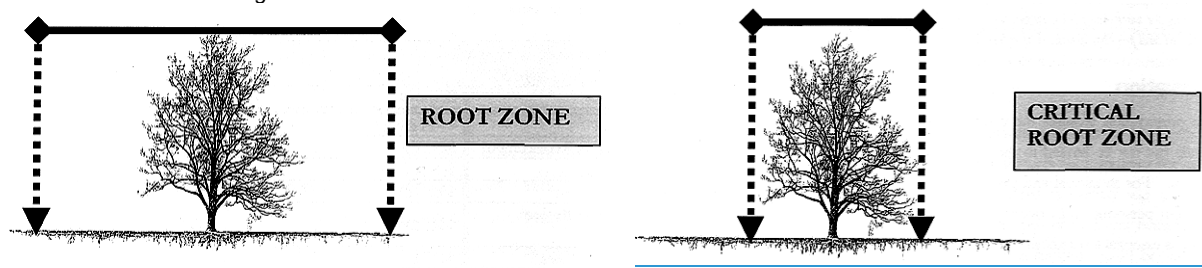
- ❖ Mechanical injury to roots, trunk or branches
- ❖ Compaction of soil, which degrades the functioning roots, inhibits the development of new ones, restricts drainage and soil function
- ❖ Changes in existing grade which can remove or suffocate roots
- ❖ Alteration of the water table - either raising or lowering
- ❖ Microclimate change, exposing sheltered trees to sun or wind
- ❖ Sterile soil conditions, associated with stripping off topsoil

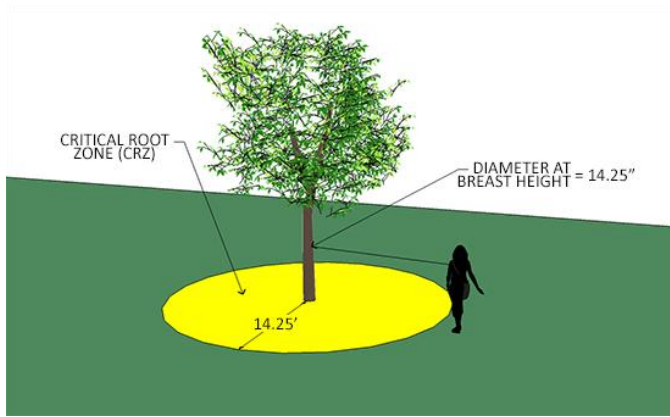
2.2. CRITICAL ROOT ZONE (CRZ)

Each tree to be retained shall have a designated [Critical Root Zone \(CRZ\)](#) identifying the area sufficiently large enough to protect the tree and roots from disturbance. [The Critical Root Zone is one foot of radial distance from the base of the tree for every inch of tree Diameter at Breast Height \(DBH\).](#) ~~The CRZ is defined as a radius equal in feet to the number of inches of the tree's trunk diameter at breast height, with a minimum of eight (8) feet.~~ The CRZ shall be shown on all tree surveys, tree protection plans, tree replacement plans, and construction plans. Improvements or activities such as paving, utility and irrigation trenching and other activities shall occur outside the CRZ, unless authorized by the City ~~Arborist~~ [Forester](#) or Administrator. Unless otherwise specified, the protective fencing shall be placed at the dripline or the CRZ, whichever is greater.

Illustration 2-1: Root zone vs. Critical root zone (CRZ)

From: Urban Forest Management Plan.





2.2.1.

Activities prohibited within the CRZ include:

- Storage or parking vehicles, building materials, refuse, excavated spoils or dumping of poisonous materials on or around trees and roots. Poisonous materials include, but are not limited to, paint, petroleum products, concrete or stucco mix, dirty water or any other material which may be harmful to tree health
- The use of tree trunks as a winch support, anchorage, temporary power pole, sign posts or other similar function
- Cutting of tree roots by utility trenching, foundation digging, placement of curbs and trenches and other miscellaneous excavation without prior approval of the ~~Forestry Manager~~[City Forester or Administrator](#).
- Soil disturbance or grade change
- Impervious paving
- Vehicular traffic
- Drainage changes

2.2.2. **Activities permitted or required within the CRZ include:**

- ~~Mulching.~~ During construction, mulch may be [required to be](#) spread within the CRZ. The mulch may be removed if improvements or other landscaping is required. Where there are areas of unprotected root zones in the CRZ, those areas shall be covered with [four \(4\) to six \(6\)](#) inches of organic mulch to minimize soil compaction. See ~~Chapter~~[Section 3](#) of this Manual for a more thorough discussion on mulching.
- Irrigation, aeration, fertilizing or other beneficial practices that have been specifically approved for use within the CRZ and as defined by the City ~~Arborist~~[Forester](#).

2.2.3. ~~(Erosion Control)~~ [Near Preserved Trees:](#)

If a tree is adjacent to or in the immediate proximity to a grade slope of 8% (23 degrees) or more, then approved erosion control or silt barriers shall be installed outside the CRZ to prevent siltation and/or erosion within the CRZ.

2.3. TREE PROTECTION AND PRESERVATION PLAN & PRE-CONSTRUCTION REQUIREMENTS

Prior to the start of any development project, the property owner shall have prepared and submitted for review a Tree Protection Plan for all [p](#)Protected trees. Tree [P](#)rotection shall be represented on the [P](#)reliminary [plan](#), [C](#)onstruction [plan](#), [S](#)ite [D](#)isturbance [P](#)lans, and [S](#)ite [P](#)lans. The Tree Protection Plan shall consist of three elements:

1. ~~Illustrations~~ Construction details showing options in tree fencing and protection (~~see Refer to construction details illustrations this section within this section~~ related to fencing and protection and provided within the Appendix.)
2. Tree Protection Notes as listed in section 2.3.2 and 2.3.3 of this Manual, as applicable.
3. Tree ~~p~~rotection symbols on the ~~t~~ree ~~p~~rotection ~~p~~lan as discussed in section 2.3.1 and illustrated in Illustration 2-2 of this Manual.

The plan will be reviewed by the City ~~Arborist~~ Forester and/ or Administrator. The following elements will be addressed in the Tree Protection Plan prior to construction:

2.3.1. Site Plan Reflecting Critical Root Zones- In addition to the requirements described in the Tree Survey Standards, the CRZ to be enclosed with the specified tree fencing ~~will~~ shall be indicated on the Tree Replacement Plan and all construction plans as illustrated in figure 2-2.

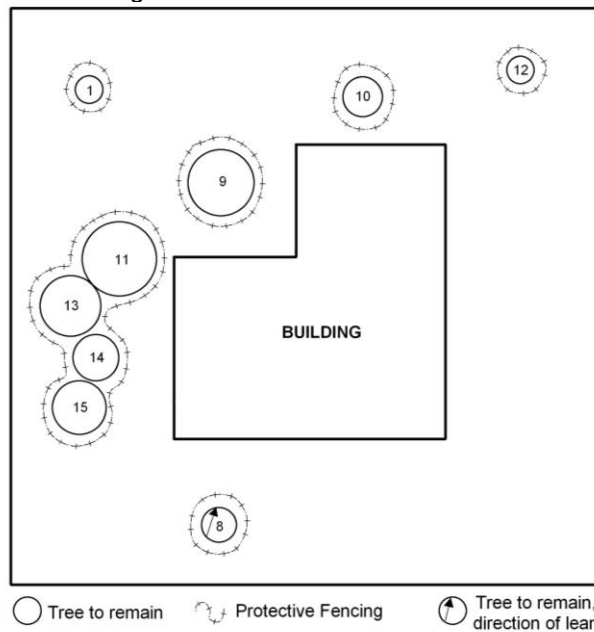


Illustration 2-2: Site plan with tree protection fence illustrated. Circles illustrate the Critical Root Zone.

2.3.2. Standard Tree Protection Notes- The ~~P~~reliminary ~~P~~lan, ~~C~~onstruction ~~P~~lan, ~~S~~ite ~~D~~isturbance ~~P~~lan, and ~~S~~ite ~~P~~lan ~~will~~ shall reflect the following tree protection notes. The following notes must be shown on plans accompanied by the standard tree protection construction details provided within Appendix C. ~~as illustrated on pages 2-5 through 2-9.~~

1. All trees not located within the limits of construction and outside of disturbed areas shall be preserved.
2. All trees shown on this plan to be retained shall be protected during construction with fencing consistent with the City's construction detail(s).
3. Tree protection fences shall be erected according to ~~e~~City standards for tree protection, ~~including types of fencing material,~~ and fence signage.
4. Tree protection fences shall be installed prior to the commencement of any site preparation work (clearing, grubbing, or grading) and shall be maintained throughout all phases of the construction project consistent with the approved plan.
5. Erosion and sedimentation control barriers shall be installed ~~or~~ and maintained in a manner which does not result in trenching or soil build-up within a tree's Critical Root Zone (CRZ)'s or driplines, whichever is greater.
6. **(STANDARD)** Tree protection fences shall completely surround the tree or clusters of trees and be placed at the outermost limits of the tree branches (dripline) or CRZ,

whichever is greater; and shall be maintained throughout the construction project in order to prevent the following:

- a. Soil compaction in root zone area resulting from vehicular traffic or storage of equipment or material.
- b. Root zone disturbances due to grade changes (greater than 6 inches cut or fill) or trenching not reviewed and authorized by the City ~~Arborist~~ Forester or Administrator.
- c. Wounds to exposed roots, trunk, or limbs by mechanical equipment
- d. Other activities detrimental to trees, such as chemical storage, concrete truck cleaning and fires.

7. Any roots exposed by construction activity shall be pruned flush with the soil. Backfill root areas with good quality top soil. If exposed root areas are not backfilled within 2 days, cover them with organic material in a manner which reduces soil temperature and minimizes water loss due to evaporation.

~~7-8.~~ When construction occurs immediately outside of the CRZ or dripline of a preserved tree, a clean cut shall be made between the disturbed and undisturbed root zones with a rock saw or similar equipment prior to excavation or grade cutting. The purpose of this provision is to minimize damage to the remaining roots of preserved trees. The contractor shall contact the City Forester or Administrator for supervision.

~~8-9.~~ When installing concrete adjacent to the root zone of a tree, use a plastic vapor barrier behind the concrete to prohibit leaching of lime into the root zone.

~~9-10.~~ Any trenching shall be as far from existing tree trunks as possible. Trench lines shall not run within the CRZ. Boring, tunneling or other techniques may be approved by the City ~~Arborist~~ Forester or Administrator if there ~~is~~ are no other alternatives available.

~~10-11.~~ No landscape topsoil dressing greater than ~~four~~ six (46) inches shall be permitted within the dripline or CRZ, whichever is greater, of trees. No topsoil is permitted on root flares or within 6 inches of tree trunks.

~~11-12.~~ Pruning to provide clearance for structures, vehicular traffic and construction equipment shall take place before construction begins. All pruning must be done according to City standards pursuant to Section 4 of the Tree Technical Manual and as outlined in literature provided by the International Society of Arboriculture (ISA pruning techniques).

~~12-13.~~ All oak tree cuts, intentional or unintentional, shall be painted immediately (within 10 minutes). Tree paint must be kept on site at all times. All pruning or cutting tools must be sterilized between trees to prevent the spread of disease.

~~13-14.~~ Trees approved for removal shall be removed in a manner which does not impact trees to be preserved. Refer to the City of Pflugerville *Tree Technical Manual* for appropriate removal methods.

~~14.~~ Deviations from the above notes ~~may are be~~ considered ordinance violations if there is substantial noncompliance or if a tree sustains damage as a result.

15.

~~16.~~ (PRE-CONSTRUCTION CONFERENCE) - The demolition, grading and underground contractors, construction superintendent and other pertinent personnel are required to meet with the City ~~Arborist~~ Forester and/or Administrator prior to beginning work to review procedures, tree protection measures and to establish haul routes, staging areas, contacts, watering, etc.

16.

~~17-~~

~~18-17.~~ ~~2.3.4. Verification of tree protection~~ (VERIFICATION OF TREE PROTECTION) The project arborist, landscape architect or contractor shall verify, in writing, that all preconstruction conditions have been met (tree fencing, erosion control, pruning, etc.) and are in place. Written verification must be submitted to and approved by the City ~~Arborist~~ Forester or the Administrator before demolition or grading begins.

2.3.3 Exceptions to Construction within the Critical Root Zone (CRZ)

1. If approved by the City Forester, exceptions to installing tree fences at the tree driplines or CRZ, whichever is greater, may be permitted in the following cases:
 1. Where there is to be an approved grade change, impermeable paving surface, or tree well.
 2. Where permeable paving is to be installed, erect the fence at the outer limits of the permeable paving area.
 3. Where trees are close to proposed buildings, erect the fence no closer than 6 feet to the building, provided that the fence does not encroach into the CRZ by 50% measured from the base of the tree, and fencing remains a minimum of 5' from the base of the tree.
 4. Where there are severe space constraints due to tract size, or other special requirements, contact the City ~~Arborist~~ Forester to discuss alternatives.
2. Where any of the above exceptions result in a fence that is closer than 5 feet to a tree trunk, protect the trunk with strapped-on planking to a height of 8 feet (or to the limits of lower branching) in addition to the reduced fencing provided pursuant to tree protection construction detail.
3. Where any of the above exceptions result in areas of unprotected root zones under the dripline or CRZ, whichever is greater, those areas should be covered with four (4) to six (6) inches of organic mulch to minimize soil compaction.
4. Where any of the above exceptions result in damage to the fine, water absorbing roots, supplemental watering shall be required:
 1. Trees shall be watered once every two weeks during periods of hot, dry weather.
 2. Tree crowns are to be sprayed with water periodically to reduce dust accumulation on leaves.
 3. A signed watering contract shall be required prior to the start of construction.
5. Prior to excavation or grade cutting within tree driplines, a clean cut shall be made between the disturbed and undisturbed root zones with a rock saw or similar equipment to minimize damage to remaining roots. The contractor ~~may~~ shall contact the City ~~Arborist~~ Forester or Administrator for supervision.
6. All grading within protected root zone areas shall be done by hand or with small equipment to minimize root damage. Prior to grading, relocate protective fencing to 2 feet behind the grade change area.

2.3.45. Intent of Tree Fencing for Protected Trees: Fenced enclosures shall be installed at the CRZ or the dripline, whichever is greater, to achieve three primary goals:

1. To keep the foliage crowns and branching structure clear from contact by equipment, materials and activities.
2. To preserve roots and soil conditions in an intact and non-compacted state.
3. To identify the Critical Root Zone (CRZ) in which no soil disturbance is permitted and activities are restricted, unless otherwise approved.

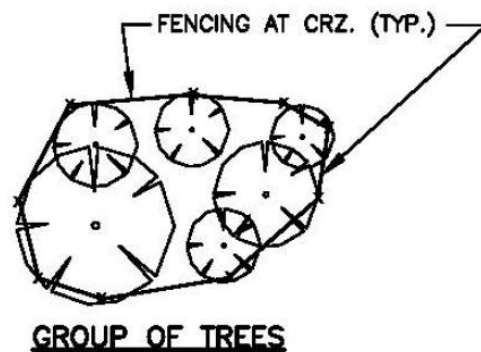
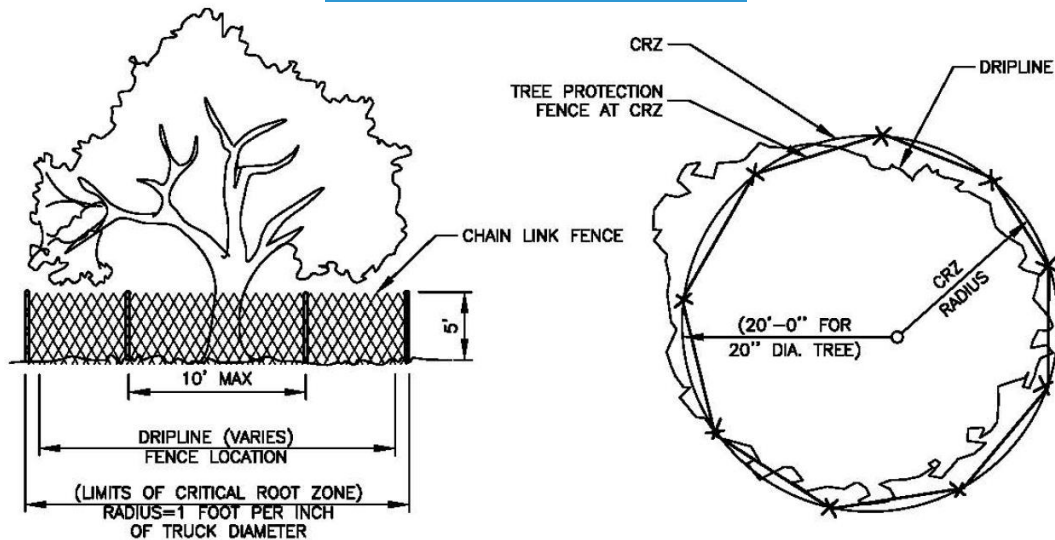
2.3.56. Tree Fencing for Protected Trees Standards:

1. Areas to be fenced

a. Type I Tree Protection (Standard)

The fences shall enclose the entire area under the **dripline** or **CRZ**, whichever is larger, of the tree(s) to be saved throughout the life of the project, or until final improvement work within the area is required, typically near the end of the project. Parking Areas: If the fencing must be located on paving or sidewalk that will not be demolished, the posts may be supported by an appropriate grade level concrete base.

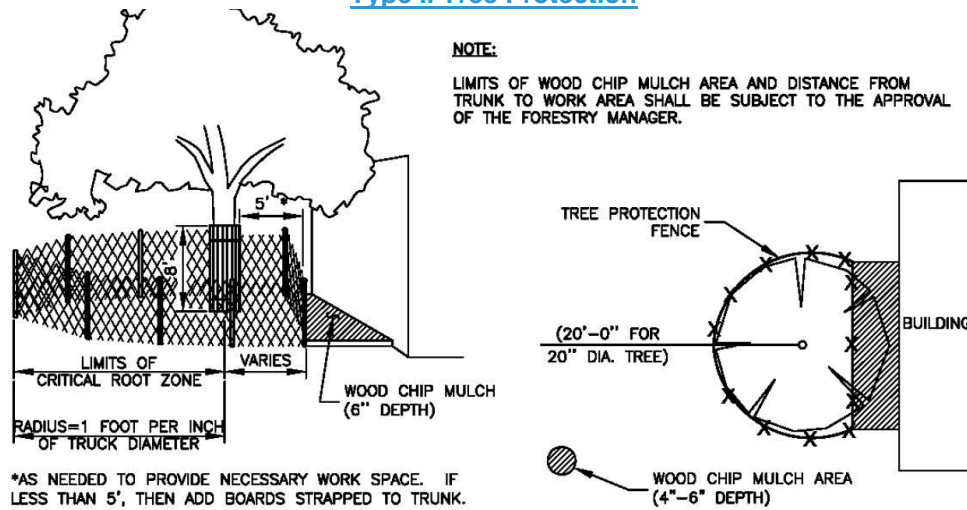
Type I Tree Protection (Standard)



b. Type II Tree Protection (Exception - 1)

For trees situated near buildings, partial fencing within the CRZ may be necessary. For trees situated within a narrow planting strip, only the planting strip shall be enclosed with the required chain link in order to keep the sidewalk and street open for public use. The City Forester may approve this exception provided it meets the criteria provided within this Section. See Illustrations for Type II Tree Protection Fencing as provided below.

Type II Tree Protection



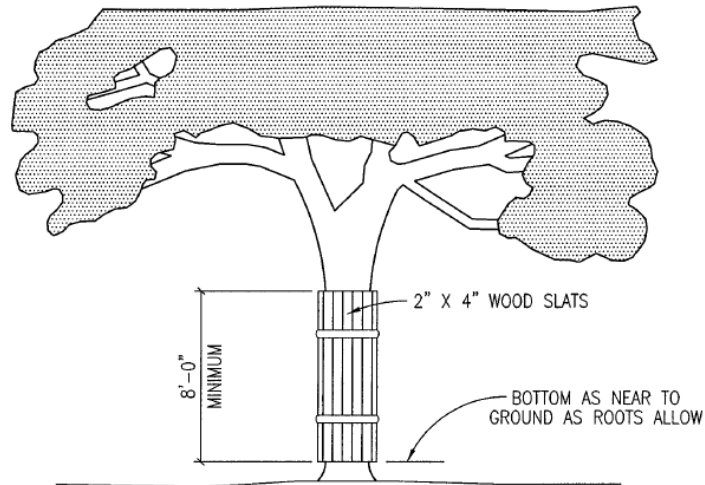
Exceptions to fencing along the CRZ

- Where permeable paving is to be installed, erect the fence at the outer limits of the permeable area
- Where trees are close to proposed buildings, erect the fence no closer than six (6) feet to the building, provided the fencing does not encroach by 50% within the CRZ, and fencing remains a minimum of 5' feet from the base of the tree.
- Where there are severe space constraints due to tract size, or other special requirements, contact the City Forester.

c. **Type III Tree Protection (Exception - 2)**

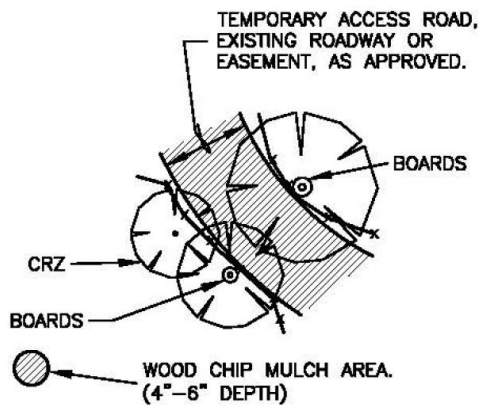
Trees situated in a small tree well or **sidewalk planter pit**, or when (above ground, no grading or trenching within CRZ) construction will come within five (5) feet of a trunk, shall have the trunk protected with strapped-on planking to a height of eight (8) feet or to the limits of lower branches. During installation of the wood slats, caution shall be used to avoid damaging any bark or branches. Major scaffold limbs may also need protection as directed by the City Forester.

Example of bark protection—done when CRZ is less than an 8 foot diameter, upon approval by the City Forester.

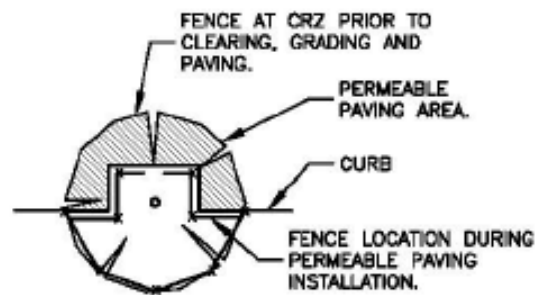


d. **Miscellaneous Tree Protection**

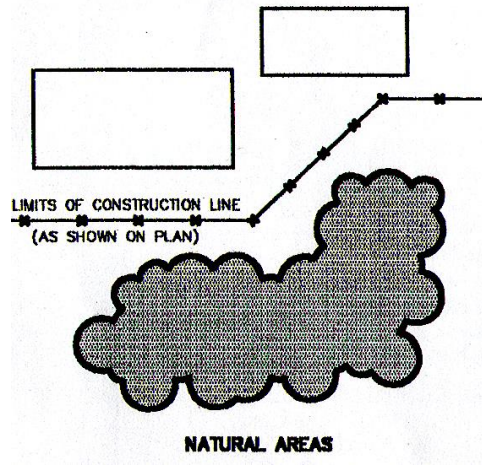
Other tree protective fencing configurations may be approved by the City Forester.



LINEAR CONSTRUCTION THROUGH TREES



TREES IN PAVING AREA



1. ~~Illustration 2-3: Examples of tree protection fencing surrounding the Critical Root Zone—General Instructions~~
From: City of Austin

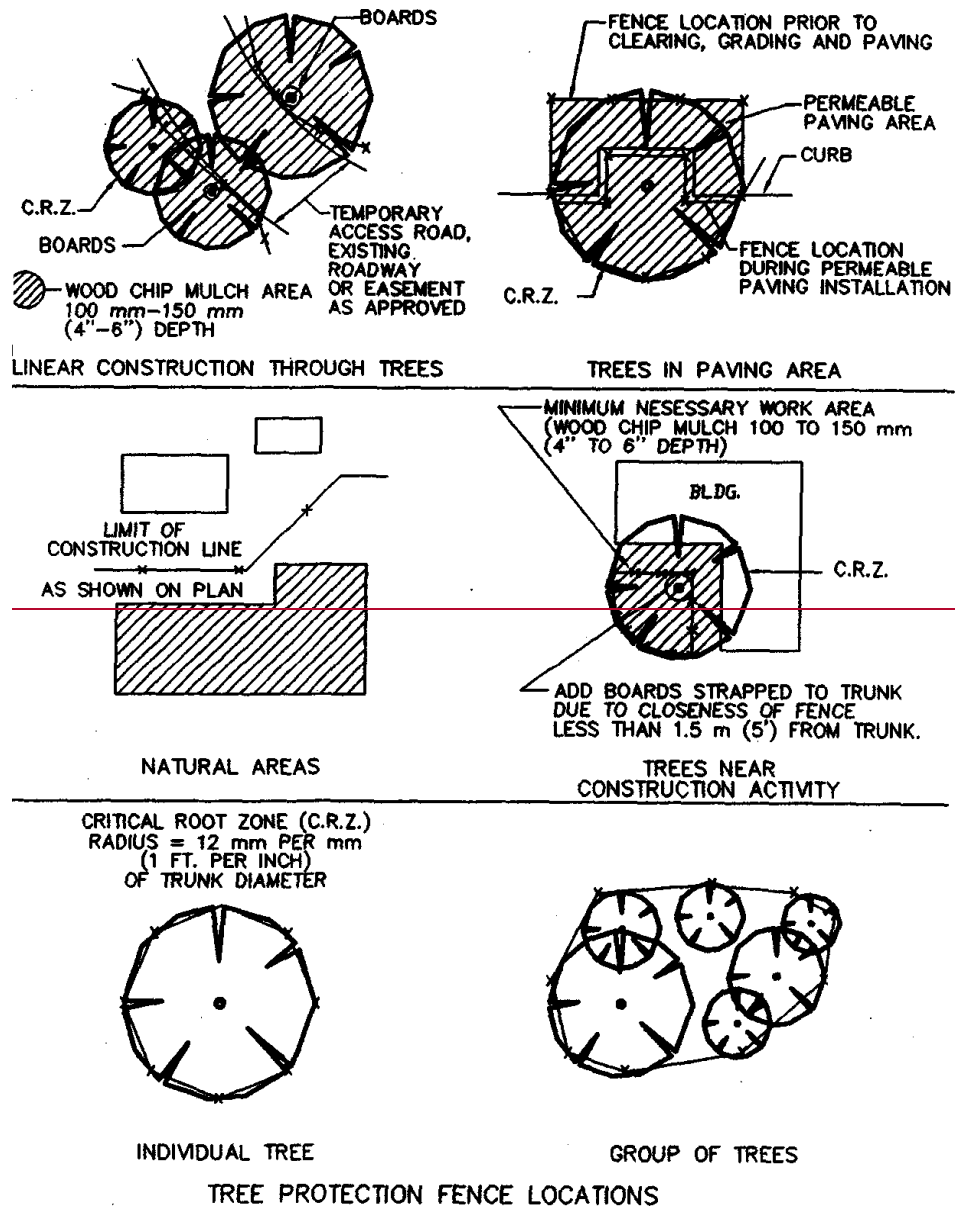
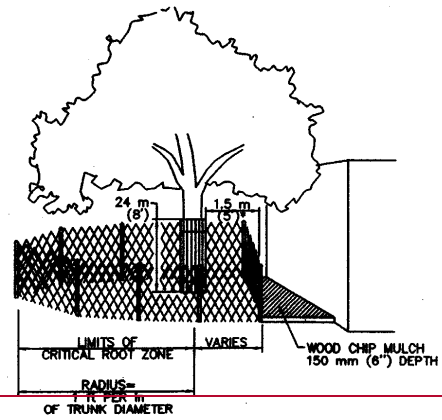
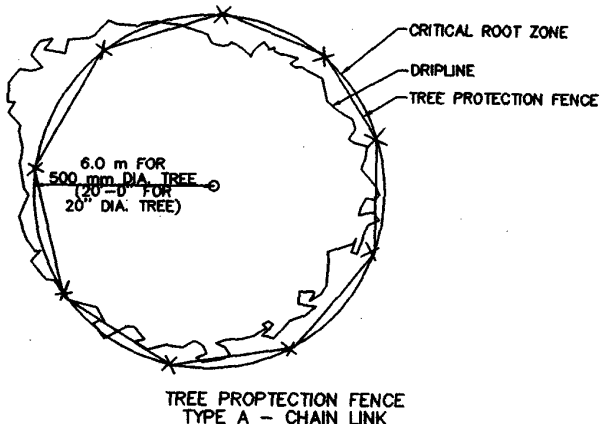
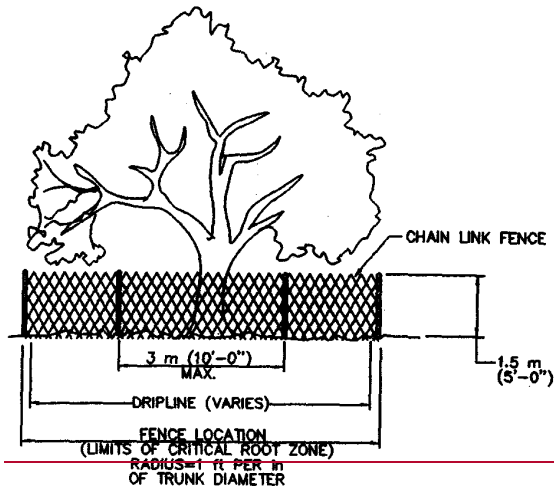


Illustration 2-4: Examples of tree protection fencing surrounding the Critical Root Zone—Chain link fencing, without and with adjacent obstruction
 From: City of Austin



*AS NEEDED TO PROVIDE MINIMUM NECESSARY WORK SPACE.
IF LESS THAN 1.5 m (5'), THEN ADD BOARDS STRAPPED TO TRUNK.

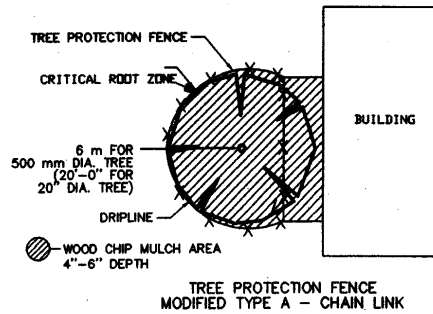
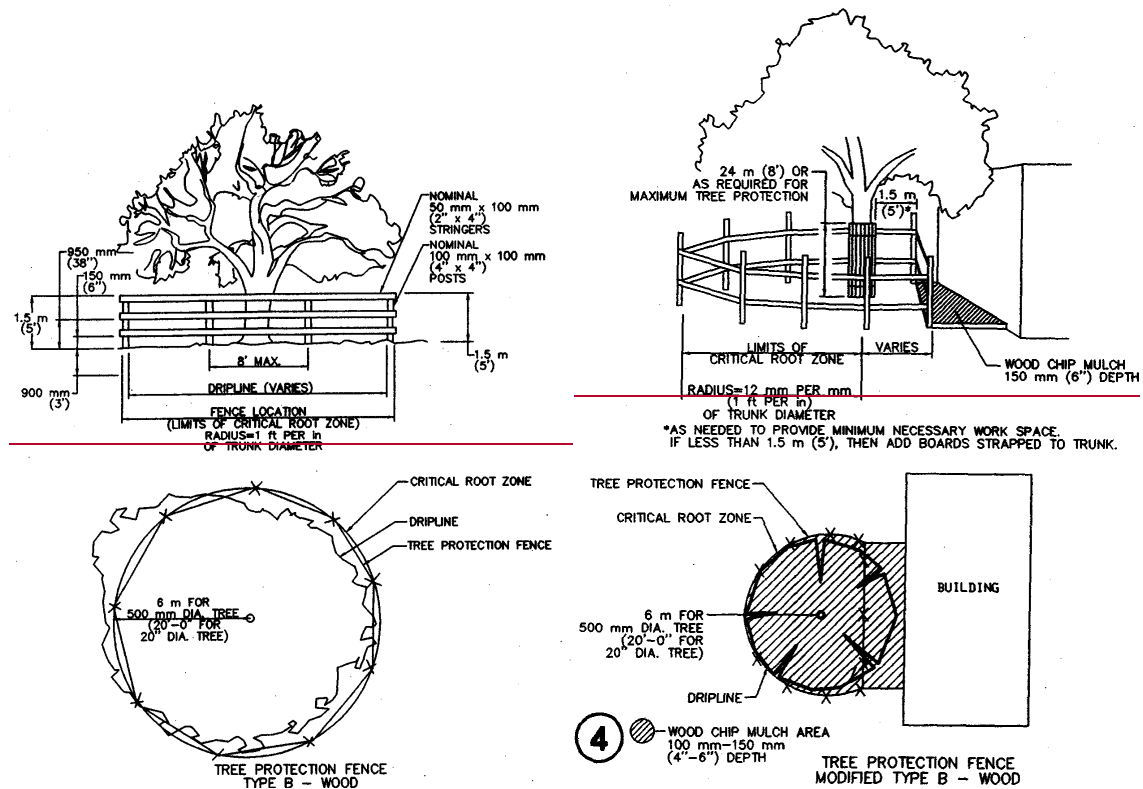


Illustration 2-5: Examples of tree protection fencing surrounding the Critical Root Zone—Wood fencing, without and with adjacent obstruction

From: City of Austin



a. Exceptions to fencing along the CRZ

1. ~~Where permeable paving is to be installed, erect the fence at the outer limits of the permeable area~~
2. ~~Where trees are close to proposed buildings, erect the fence no closer than six (6) feet to the building~~
3. ~~Where there are severe space constraints due to tract size, or other special requirements, contact the City Arborist/Forester.~~

b. Size and type of fence

2. Size and type of fence

Chain Link:

Chain link fences around protected trees shall be a minimum of five (5) feet high. Fences are to be mounted on two inch diameter galvanized iron posts, driven into the ground to a depth of at least 1-foot at no more than 10-foot spacing. This detail shall appear on grading, demolition and improvement plans.

3. Duration

Wood:

~~Wood fencing will consist of vertical planks attached to 2x4 inch horizontal stringers~~

which are supported by 2x4 inch intermediate vertical supports and a 4x4 inch post at every fourth vertical support.

c. Area to be fenced

1. Type I Tree Protection

The fences shall enclose the entire area under the ~~dripline or CRZ~~, whichever is larger, of the tree(s) to be saved throughout the life of the project, or until final improvement work within the area is required, typically near the end of the project.

Parking Areas: If the fencing must be located on paving or sidewalk that will not be demolished, the posts may be supported by an appropriate grade level concrete base.

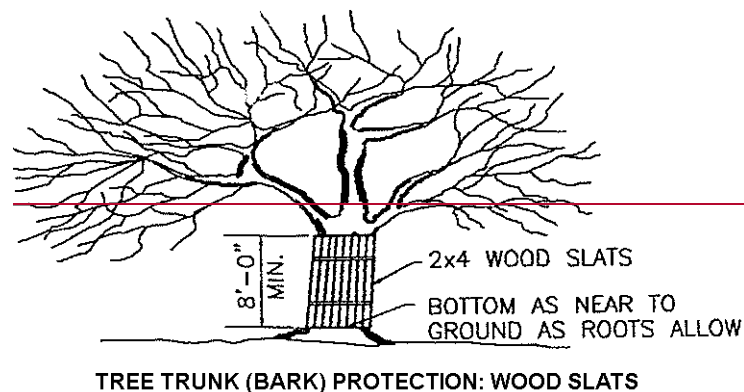
2. Type II Tree Protection

For trees situated within a ~~narrow planting strip~~, only the planting strip shall be enclosed with the required chain link or wood protective fencing in order to keep the sidewalk and street open for public use. For trees **situated near buildings**, partial fencing may be necessary. See Illustrations 2-4 and 2-5 for examples and specifications for partial wood and chain link fencing.

3. Type III Tree Protection

Trees situated in a small tree well or **sidewalk planter pit**, or when construction will come within five (5) feet of a trunk, shall have the trunk protected with strapped-on planking to a height of eight (8) feet or to the limits of lower branches. During installation of the wood slats, caution shall be used to avoid damaging any bark or branches. Major scaffold limbs may also need protection as directed by the City ~~Arborist~~Forester.

Illustration 2-6: Example of bark protection—done when CRZ is less than an 8 foot diameter, upon approval by the City ~~Arborist~~Forester.



2. ~~d. Duration~~

Tree fencing shall be erected before demolition, grading, grubbing, or construction begins and remain in place until the certificate of occupancy has been granted. Removal of the fence during construction must be approved by the City ~~Arborist~~Forester. **Fence removal without the approval of the City ~~Arborist~~Forester or Administrator will result in a stop work order.**

4. 'Warning' Sign

e. 'Warning' sign

A warning sign shall be prominently displayed on each fence. The sign shall be a

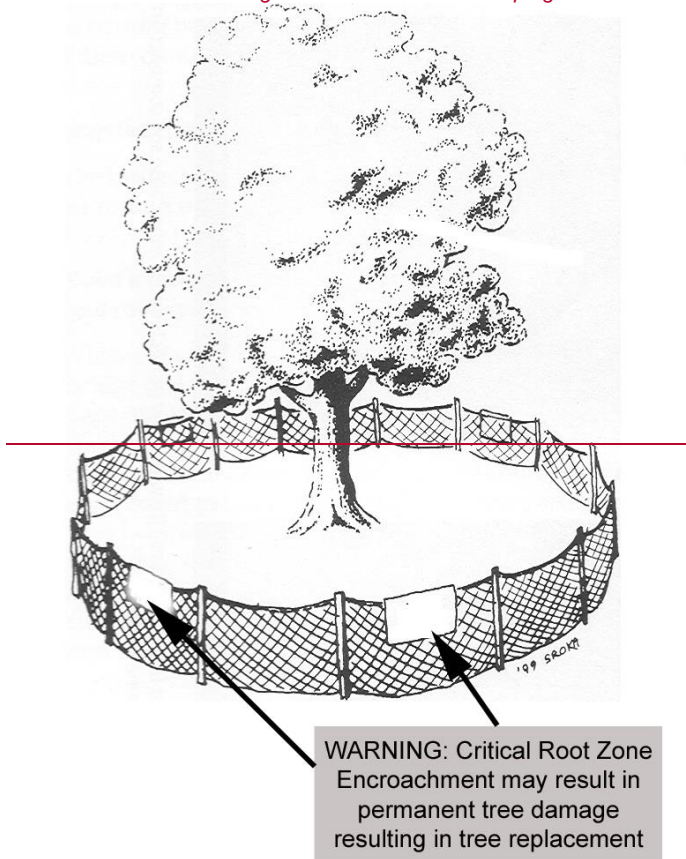
minimum of 16 x 24 inches and clearly state:

WARNING
- Critical Root Zone –
Encroachment may result in
permanent tree damage, resulting
in tree replacement.

~~WARNING – Critical Root Zone – Encroachment may result in permanent tree damage, resulting in tree replacement.~~

Illustration 2-7: Sample signage for CRZ area.

Illustration from: Conserving Wooded Areas in Developing Communities.



2.4. TREE PRUNING ~~AND~~, TREE SURGERY, ~~AND REMOVAL~~, PRIOR TO CONSTRUCTION

2.4.1. Pruning—Prior to construction, various trees may require that branches be pruned clear from structures, activities, building encroachment or may need to be strengthened by means of mechanical support or surgery per approval of the City ~~Arborist~~Forester. All tree pruning and surgery shall be performed by or under the supervision of a Certified Arborist pursuant to the standards and techniques provided with Section 4. ~~The most compelling reason to prune is to develop a strong, safe framework and tree structure. Cosmetic pruning is left to the discretion of the owner. Consult an arborist or landscape architect for best practices if cosmetic pruning is desired. However, practices such as ‘limbing up’ should be avoided.~~

~~Heavy pruning just after the spring growth flush should be avoided. This is when trees have just expended a great deal of energy to produce foliage and early shoot growth. Removal of a large percentage of foliage at this time can stress the tree.~~

a. All trees except oaks (Recommended):

~~Most routine pruning to remove weak, diseased, or dead limbs can be accomplished at any time during the year with little effect on the tree. As a rule, growth is maximized and wound closure is fastest if pruning takes place between November and February, the dormant period for Central Texas trees.~~

b. Oak trees:

~~Due to oak wilt disease, avoid pruning of all oak species between February and June. Clean cutting tools with a disinfectant between each tree pruned. Tree pruning paint must shall be used on all pruning cuts on all oak species regardless of the time of year of pruning.~~

c. Pruning limitations:

1. **Minimum pruning**—If the project arborist or landscape architect recommends that trees be pruned, and the type of pruning is left unspecified, the standard pruning shall consist of ‘crown cleaning’ as described below. Trees shall be pruned to reduce hazards and develop a strong, safe framework.

2. **Maximum Pruning**—Maximum pruning should only occur in the rarest situation and be approved by the City Arborist. No more than one fourth (25 percent) of the functioning leaf and stem area may be removed within one calendar year of any protected tree. It must be recognized that trees are individual in form and structure, and that pruning needs may not always fit strict rules. The project arborist or landscape architect shall assume all responsibility for special pruning practices that vary from the standards outlined in this manual.

3. **Tree Workers (Recommended)**—Pruning shall not be attempted by construction or contractor personnel, but shall be performed by a qualified tree care specialist or certified arborist.

4. Types of pruning

i. Cleaning:

~~The removal of dead, dying, diseased, crowded, weakly attached and low-vigor branches from the crown of a tree.~~

2. Thinning:

~~The selective removal of branches to increase light penetration and air movement through the crown. Thinning opens the foliage of a tree, reduces weight on heavy limbs and helps retain the tree's natural shape.~~

iii. **Raising:**

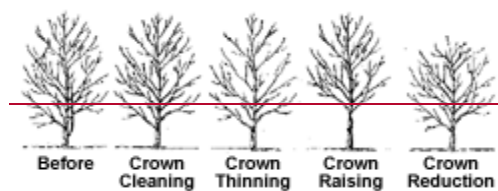
~~Removes the lower branches from a tree in order to provide clearance for buildings, vehicles, pedestrians and vistas. (Also known as 'limbing up')~~

iv. **Reduction:**

~~Reduces the size of a tree, often for clearance for utility lines. Reducing the height or spread of a tree is best accomplished by pruning back the leaders and branch terminals to lateral branches that are large enough to assume the terminal roles (at least 1/3 the diameter of the cut stem). Compared to topping, this helps maintain the form and structural integrity of the tree.~~

Illustration 2-8: Types of crown pruning

From: International Society of Arboriculture

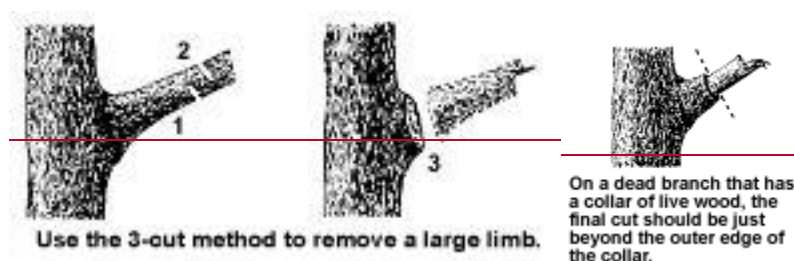


5. Making Proper Pruning Cuts

- ~~Tree topping is prohibited and may result in tree replacement.~~
- ~~Stub cuts are prohibited.~~
- ~~Cuts will be made just beyond the outer edge of the collar of live wood. See Illustration 2-9 for an example.~~
- ~~Don't use pruning paint or so called wound dressings, except for tree pruning cuts on all oak species at all times due to the threat of oak wilt disease.~~
- ~~If a large limb is to be removed, its weight should first be reduced. This is done by making an undercut about 12-18 inches from the limb's point of attachment. A second cut is made from the top, directly above or a few inches further out on the limb. This removes the limb leaving the 12-18 inch stub. The stub is removed by cutting back to the branch collar. This technique reduces the possibility of tearing the bark.~~

Illustration 2-9: Proper tree cuts

From: International Society of Arboriculture



2.4.2. Tree Surgery ~~If it is necessary to promote health and prolong useful life or the~~

structural characteristics, trees shall be provided the appropriate treatments (e.g. cavity screening, bark tracing, wound treatment, cables, rods or pole supports) as specified by the project arborist or landscape architect.

~~2.4.3. Tree Removal Adjacent to Protected Trees~~ When trees are removed and adjacent trees must be protected (as shown on the approved site plans), then the following tree removal practices apply:

a. **~~Tree Removal~~** Removal of trees that extend into the branches or roots of protected trees shall not be attempted performed by demolition or construction personnel, grading or other heavy equipment. A certified arborist or tree worker shall remove the tree carefully in a manner that causes no damage above or below ground to trees that remain.

b. **~~Stump Removal~~** Before performing stump extraction, the developer shall first consider whether or not roots may be entangled with trees that are to remain. If so, these stumps shall have their roots severed before extracting the stump. Removal shall include the grinding of stump and roots to a minimum depth of 24 inches but expose soil beneath stump to provide drainage. In sidewalk or small planter areas to be replanted with a new tree, the entire stump shall be removed and the planting pit dug to a depth of 30 inches. If dug below 30 inches, compact the backfill to prevent settling. Large surface roots three feet from the outside circumference shall be removed, including the spoils and backfilled with City approved topsoil to grade and the area tamped to settle the soil.

2.5. ACTIVITIES DURING CONSTRUCTION & DEMOLITION NEAR TREES

Soil disturbance or other injurious and detrimental activity within the CRZ is prohibited unless approved by the ~~Forestry Manager~~[City Forester or Administrator](#). If an injurious event inadvertently occurs, or soil disturbance has been specifically conditioned for project approval, then the following mitigation is required:

2.5.1. Soil compaction- If compaction of the soil occurs, it shall be mitigated as outlined in Section 2.5.5.

2.5.2. Grading limitations within the Critical Root Zone-

- Grade changes within the CRZ are not normally permitted.
- If grading within the CRZ is approved, grading shall be done by hand or with small equipment to minimize root damage.
- Grade changes outside the CRZ shall not significantly alter drainage to the tree
- Grade changes under specifically approved circumstances shall not allow more than ~~four-six~~ (46) inches of fill soil added or allow more than ~~four-six~~ (46) inches of existing soil to be removed from natural grade unless mitigated.
- Grade fills over ~~four-six~~ (46) inches or impervious overlay shall incorporate an approved permanent aeration system, permeable material or other approved mitigation.
- Grade cuts exceeding ~~four-six~~ (46) inches shall incorporate retaining walls or an appropriate transition equivalent.

Illustration 2-10: Options in tree preservation due to grade change

From: City of Austin

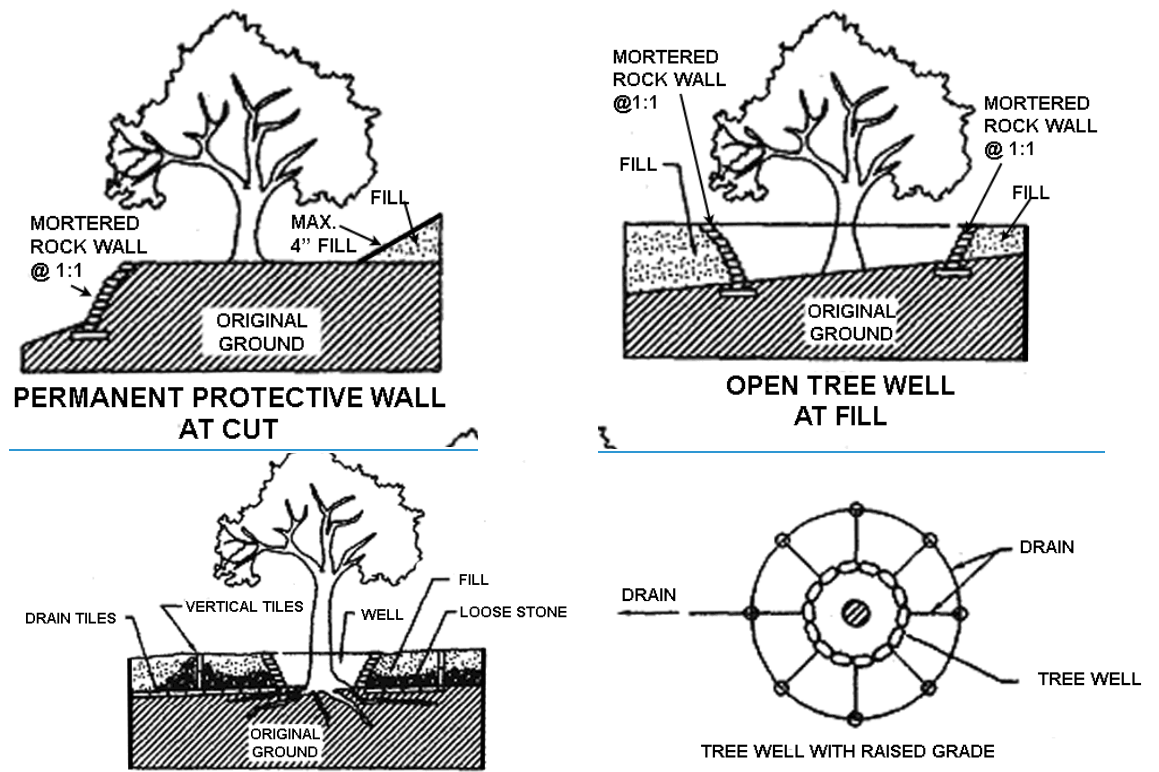


Illustration 2-11: Changing grade around tree trunk by grading or fill. Trees which have too high of a grade during or after construction will lack the root flare.

From: A Guide to Preserving Trees in Development Projects.

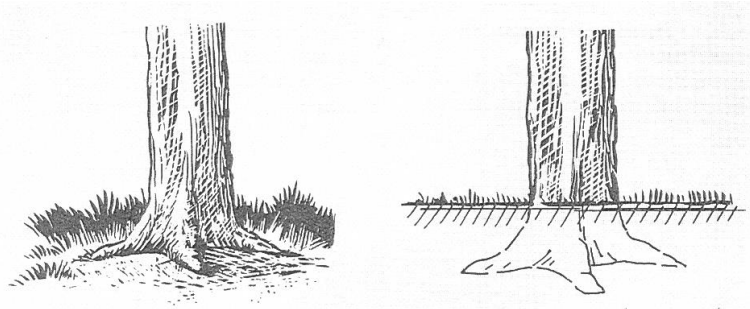
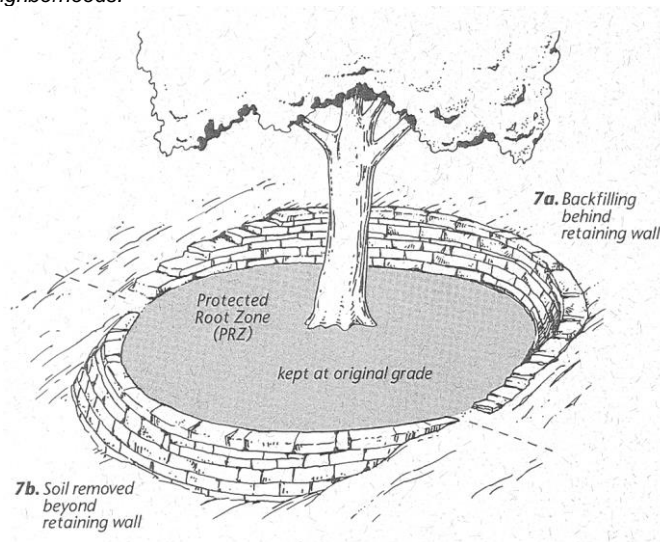


Illustration 2-12: Using retaining walls when natural grade must be raised or lowered.

From: Building Greener Neighborhoods.



2.5.3. Trenching, excavation and equipment use- Normally, trenching is allowed outside of the CRZ. Trenching, excavation or boring activity within the CRZ is restricted to the following activities, conditions and requirements if approved by the City ~~Arborist~~[Forester](#). Mitigating measures shall include prior notification to and direct supervision by the project arborist or landscape architect.

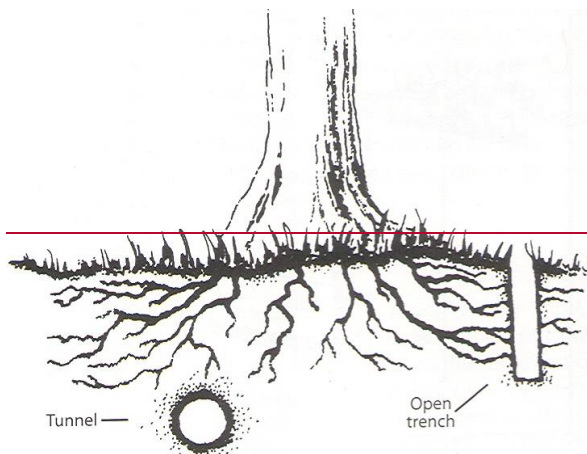
- a. Notification. Contractor shall notify the project arborist or landscape architect a minimum of 24 hours in advance of the activity in the CRZ. As noted above, the project arborist or landscape architect must notify the City ~~Arborist~~[Forester or Administrator](#) before any work begins in the CRZ.
- b. Root Severance. Roots that are encountered shall be pruned flush with the soil. Backfill root areas with good quality top soil within the same day. If exposed root areas are not backfilled within the same day, cover them with organic material in a manner which reduces soil temperatures and minimizes water loss due to evaporation.
- c. Excavation. Any approved excavation, demolition or extraction of material shall be performed with equipment sitting outside the CRZ. [If approved by the City Forester, Methods permitted are by hand digging, hydraulic or pneumatic air excavation technology may occur within the CRZ provided the work is performed by or under the supervision of a certified arborist.](#)

If excavation or trenching for drainage, utilities, irrigation lines, etc., it is the duty of the contractor to tunnel under any roots 2 inches in diameter and greater.

(Prior to excavation for foundation/footings/walls) If grading or trenching within the CRZ is approved by the City Forester, ~~Prior to excavation for foundation/footings/walls, grading or trenching within the CRZ,~~ the roots shall first be severed cleanly 1 foot outside the CRZ and to the depth of the future excavation. The trench must then be hand dug and roots pruned with a saw, narrow trencher with sharp blades or other approved root pruning equipment.

- d. Heavy Equipment. The ~~Use~~ of backhoes, steel tread tractors, skid steer or any heavy vehicles within the CRZ is prohibited, unless approved by the City ~~Arborist~~ Forester. If allowed, a protective root buffer is required.
- e. Structural design. If injurious activity or interference with roots greater than 2-inches will occur within the CRZ, plans shall specify a design of special foundation, footing, walls, concrete slab or pavement designs subject to City ~~Arborist~~ Forester approval. Discontinuous foundations such as concrete pier and structural grade beam must maintain natural grade (not to exceed a 4-inch cut), to minimize root loss and allow the tree to use the existing soil. Basement excavations shall be designed outside the CRZ of all protected trees and shall not be harmful to other mature or neighboring property trees.

Illustration 2-13: Trenching and boring options illustrated.
From: Conserving Wooded Areas in Developing Communities



2.5.4. Tunneling and directional drilling- If tunneling or pipe installation has been approved within the CRZ, the trench shall be either cut by hand, air-spade, hydraulic vac-on excavation, or by mechanically boring the tunnel under the roots with a horizontal directional drill and hydraulic or pneumatic air excavation technology. In all cases, install the utility pipe immediately, backfill with soil and soak with water within the same day. Installation of private utility improvements shall be tunnel bored beneath the tree and roots ~~per~~ pursuant to the following trenching limitations and boring requirements described in Illustration 2-14. Trenching Tunneling and Distances. ~~Table in Illustration 2-14.~~

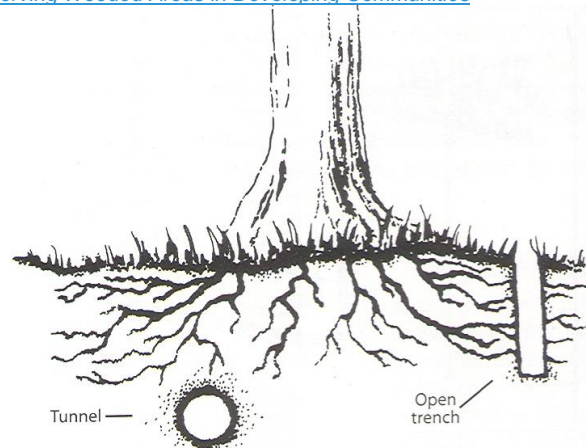
Emergency utility repairs shall be exempt from the above restriction zones within the CRZ. The City ~~Arborist~~ Forester shall be contacted after any such repairs that may result in significant tree damage or removal.

|

Illustration 2-14: Trenching and boring distances.

TRENCHING DISTANCE	
↔	
Tree DBH	Trenching will be replaced with boring if the CRZ is being encroached.
8-19" Tree	8'-19' (trenching from base of tree)
20"+	20'+ (trenching from base of tree)
DEPTH OF TUNNELING	
⬇	
Tree DBH	Depth of Tunneling within the CRZ
9" or less	2.5'
10-14"	3'
15-19"	3.5'
More than 19"	4.0'

Illustration 2-13: Trenching and boring options illustrated.
From: Conserving Wooded Areas in Developing Communities



TRENCHING DISTANCE	
↔	
<p>No trenching shall occur within the Critical Root Zone (CRZ) unless otherwise approved by the City. However, trenching shall not occur within 50% of the CRZ measured from the base of the tree or within 5 feet from the base of the tree. The Critical Root Zone (CRZ) shall be measured one foot of radial distance for every inch of tree Diameter at Breast Height (DBH). When trenching is not permitted, boring will be an acceptable alternative pursuant to the tunneling depth requirements based on the respective tree diameters (DBH) provided below.</p>	
DEPTH OF TUNNELING	
⬇	
Tree DBH	Depth of Tunneling within the CRZ

<u>9" or less</u>	<u>2.5'</u>
<u>10-14"</u>	<u>3'</u>
<u>15-19"</u>	<u>3.5'</u>
<u>More than 19"</u>	<u>4.0'</u>

2.5.5. Construction impact mitigation- A mitigation program is required if the approved development will cause drought stress, dust accumulation, ~~or~~ soil compaction to trees that are to be saved or construction (including trenching) is permitted within the CRZ. To help reduce impact injury, one or more of the following mitigation measures shall be implemented and supervised by the project arborist or landscape architect as follows:

- a. Irrigation program- Irrigate or water once every two weeks with 10 gallons of water per diameter inch within the CRZ until project completion. Irrigation may be suspended when normal rainfall equals the required application rate within 10 days of the required application. The owner or general contractor shall select a watering or irrigation contractor. The signed contract shall be ~~included-provided with-~~ to the City prior to the approval of the Tree Protection and Preservation Plan (Section 2.3).
- b. Dust control program- During periods of extended drought, wind or grading, spray water on the trunk, limbs and foliage to remove accumulated construction dust.
- c. Soil compaction damage- Compaction of the soil is the largest killer of trees on construction sites due to suffocation of roots and ensuing decline of tree health. If compaction occurs to the upper 12-inches of soil within the CRZ by any means, then one or more of the following mitigation measures shall be implemented.
 - i. Type I Mitigation. If an approved paving, hardscape or other compromising material encroaches within the CRZ, an aeration system shall be designed by the project arborist or landscape architect and used within this area (subject to approval by the City ~~Arborist~~ Forester).
 - ii. Type II Mitigation. If inadvertent compaction of the soil has occurred within the CRZ, the soil shall be loosened by one or more of the following methods to promote favorable root conditions: vertical mulching, soil fracturing, core-venting, radial trenching or other method approved by the City ~~Arborist~~ Forester.

2.6. DAMAGE TO TREES

2.6.1. Reporting- Any damage or injury to trees shall be reported the same day to the project arborist, landscape architect, job superintendent and City ~~Arborist~~ Forester so that mitigation can take place. All mechanical or chemical injury to branches, trunk or roots over 2 inches in diameter shall be reported. In the event of injury, the following mitigation and damage control measures shall apply:

a. Root injury: If trenches are cut and tree roots 2 inches or larger are encountered they must be cleanly cut back to a sound wood lateral root. The end of the root shall be sawed off with a clean cut. All exposed root areas within the CRZ shall be backfilled or covered the same day. Exposed roots may be kept from drying out by temporarily covering the roots and draping layered burlap or carpeting over the upper 3 feet of trench walls. The materials must be kept wet until backfilled to reduce evaporation from the trench walls.

b. Bark or trunk wounding: Current bark tracing and treatment methods shall be performed by or under the supervision of a ~~qualified tree care specialist~~ certified arborist within two days.

c. Scaffold branch or leaf canopy injury: Remove by clean cutting broken or torn branches back to an appropriate branch capable of resuming terminal growth within five days. If leaves are heat scorched from equipment exhaust pipes, consult the project arborist or landscape architect the same day.

2.6.2. Penalty for damage to protected trees- In the event that protected trees or their roots have been damaged, replacement ~~may~~ shall be required if the City ~~Arborist~~ Forester deems that the trees are irreparable harm and need to be replaced. Damaged trees will be replaced according to Subchapter 12 of the ~~Ordinance~~ Unified Development Code.

2.7. PAVEMENT AND HARDSCAPE CONFLICTS WITH TREE ROOTS

Conflicts may occur when tree roots grow adjacent to paving, foundations, sidewalks or curbs (hardscape). Improper or careless extraction of these elements can cause severe injury to the roots and instability or even death of the trees. The following alternatives must first be considered before root pruning within the CRZ of a protected tree.

2.7.1. Removal and replacement of pavement or sidewalk:

- a. Removal of existing pavement over tree roots shall include the following precautions: Break hardscape into manageable pieces with a jackhammer or pick and hand load the pieces onto a loader. The loader must remain on undisturbed pavement or off exposed roots. Do not remove base rock that has been exploited by established absorbing roots. Apply untreated wood chips over the exposed area within one hour, then wet the chips and base rock and keep moist until overlay surface is applied.
- b. Replacement of pavement or sidewalk: An alternative to the severance of roots greater than 2 inches in diameter should be considered before cutting roots. If an alternative is not feasible, remove the sidewalk and grind roots only as approved by the City ~~Arborist~~Forester. Use a wire mesh reinforcement if within 10 feet of the trunk of a protected tree.

2.7.2. Alternative methods to prevent root cutting (Recommended):

The following remedies should be considered before cutting tree roots that may result in tree instability or decline:

- a. Grinding a raised sidewalk edge.
- b. Ramping the walking surface over the roots or lifted slab with pliable paving.
- c. Routing the sidewalk around the tree roots.
- d. Flexible paving or rubberized sections.
- e. On private property, new sidewalk or driveway design should offer alternatives to conventional pavement and sidewalk materials. Substitute permeable materials for typical asphalt or concrete overlay, sub-base or footings to consider are: permeable paving materials, interlocking pavers, flexible paving, wooden walkways, porches elevated on posts and brick or flagstone walkways on sand foundations.

2.7.3. Avoiding conflict (Recommended)

Conflicts and associated costs can be avoided or reduced by the following planting practices:

- Plant deep rooted trees that are proven to be non-invasive.
- Over soil that shrinks and swells, install a sidewalk with higher strength that has wire mesh and/or expansion slip joint dowel reinforcement.
- Follow soil loosening planting techniques to promote deep rooting.
- Install root barrier only along the hardscape area of the tree (but allow roots to use open lawn or planter strip areas).

2.7.4. Alternative base course materials (Recommended)

When designing hardscape areas near trees, the project architect or engineer should consider the use of recommended base course material such as an engineered structural soil mix. Structural soil mix will allow a long term cost effective tree and infrastructure compatibility that is particularly suited for the following types of development projects: repair or replacement of sidewalk greater than 40 feet in length; subdivisions with new street tree plantings; planting areas that are designed over structures or parking garages; confined parking lot median and islands or other specialized conditions as warranted.

SECTION 3: TREE REMOVAL, REPLACEMENT, PLANTING, AND MAINTENANCE STANDARDS

3.1. INTRODUCTION

A protected tree may not be removed without City review and approval, except in certain emergencies. The purpose of City review is to verify that the removal is allowed under the Ordinance, and to prevent unnecessary tree removal. This section discusses conditions for tree removal, replacement of protected trees, planting and pruning of replacement trees and maintenance.

3.2. TREE REMOVAL

3.2.1. Allowable removal- Tree removal is approved as part of the subdivision construction, site disturbance (grading) and site plan processes; ~~or Site disturbance permit allows for tree removal and/or grading in the case of individual trees, through the tree removal permit process.~~ These three processes are defined in the Ordinance. ~~A tree removal permit must be granted, or a site or subdivision plan with a tree survey and Tree Replacement Plan approved, b~~Before removing a protected tree, regardless of the condition of the tree, a subdivision construction plan, site disturbance or a site development permit shall be granted must be approved by the City.

3.2.2. Protected Tree Removal (Site Disturbance) Permit Application- ~~Tree removal~~Site Disturbance Permit applications (allowing for tree removal) are available at the City of Pflugerville Planning Department. ~~The form is required ONLY when a request for tree removal originates with an owner of fully developed land, including a single family house under construction. All other requests for removal of protected trees take place during the subdivision and site development processes as defined in the Ordinance.~~

~~Additional information may be required by the City Arborist. An application for a Protected Tree Removal Permit shall be processed within fifteen (15) working days from the date the application is received.~~

3.3. TREE REPLACEMENT PLAN





Replacement requirements are defined in Subchapter 12, and are limited to protected trees. It is important to note that tree replacements during the site plan process will be addressed in both the Tree Preservation Ordinance (Subchapter 12) and the Landscape Ordinance (Subchapter 11). In selecting trees to be replaced, the types of trees removed will be replaced with the same or similar species. ~~Each replacement tree shall be a minimum of three inches (3") caliper, a minimum of ten feet (10') in height, and a minimum of five (5) feet in spread when planted.~~ Illustration 3-1 shows the type of information required on a tree replacement plan.

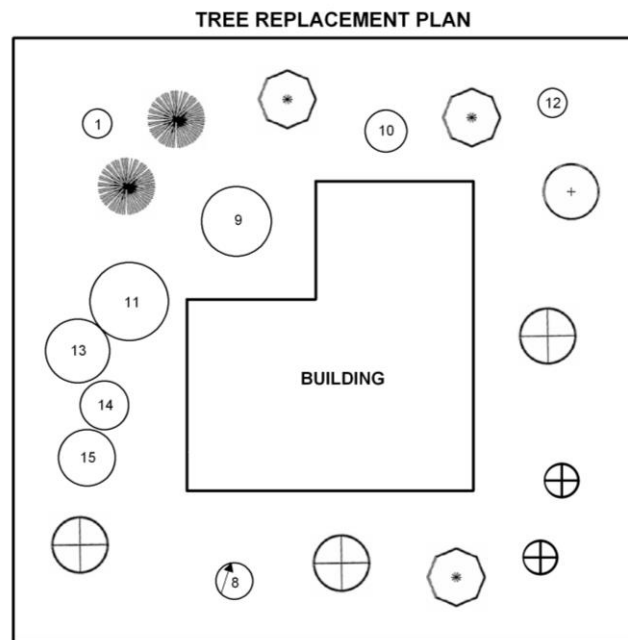
The Tree Replacement Plan will include four elements: 1) a table including the common and Latin name; tree size in caliper inches, height, and spread; tree symbols; and quantity; 2) a tree planting plan (may be combined with the Landscape Plan); 3) proper tree planting details including planting hole, tree planting, staking, and mulching; 4) notes on proper tree planting as described in section 3.7 of this Manual.

Illustration 3-1 shows the type of information required on a tree replacement plan.

Illustration 3-1: Tree Replacement Plan

(Values reference Elements of a Tree Survey: Illustration 1-2)

Symbol	# of trees	Species	Caliper Size	Height	Spread
	2	Cedar Elm <i>Ulmus crassifolia</i>	3" caliper 10'-12' high 5' spread	10'-12' high	5' spread
	5	Chinquapin Oak <i>Quercus muehlenbergii</i>	3" caliper 10'-12' high 5' spread	10'-12' high	5' spread
	1	Pecan <i>Carya illinoensis</i>	3" caliper 10'-12' high 5' spread	10'-12' high	5' spread
	3	Live Oak <i>Quercus virginiana (fusiformis)</i>	3" caliper 10'-12' high 5' spread	10'-12' high	5' spread
Required Replacement: 63 inches Total replacement on site: 11 trees @ 3" cal. = 33 inches Tree Fee in-lieu: 30 diameter inches remaining x \$150 per diameter inch = \$4,500 to Tree Fund					



3.4. TREE PLANTING REQUIREMENTS

3.4.1. Species- The replacement trees shall be the same or similar species, unless the City ~~Arborist~~ Forester or Administrator determines that another species would be more suitable for the location or if there is a need to promote diversity of species. Factors to be considered include the long term health of the tree in the location and its compatibility with adjacent uses, as well as design considerations.

The Tree Replacement Plans shall be designed to avoid creating monocultures, or areas of plantings made up of only one species of trees. Monocultures are undesirable because if a certain species is prone to a particular disease or is more susceptible to storm damage or temperature extremes, then it is likely the entire stand could die or be destroyed by a single disease or weather event. Creating planting areas of several species creates a more diverse, and therefore more resistant, urban forest.

Hackberry, Chinese Tallow, Chinaberry, Mulberry, Arizona Ash, Cottonwood, Poplar, Silver Maple, Mimosa, American Sycamore and Willow trees shall not be planted along city streets due to damaging surface roots and the possibility of causing damage to sidewalks, utilities and curbs. These trees also have short lifespans, weak wood, and susceptibility to disease and insects.

With the exceptions noted above, other species shall be chosen from the Approved Tree List: Subchapter 11, Table ~~5~~11.11.3.

3.4.2. Planting distances/spacing requirements:

- a. Minimum distance between newly planted trees (Recommended):

Tree Spacing			
Tree Size	Small	Medium	Large
Small	20 feet	25 feet	20 feet
Medium	25 feet	30 feet	30 feet
Large	20 feet	30 feet	40 feet

- b. Minimum distance from any underground utility, water meter boxes, and fire hydrant: 5 feet
- c. Minimum distance from trees to curb, sidewalk, or driveway: 4 feet
- d. Planting strips shall be a minimum of 8.5 feet wide.
- e. Minimum distance from buildings and similar structures (Recommended):
Large size tree: 30 feet;
Medium size tree: 20 feet; and,
Small size tree: 10 feet.
- f. Recommended minimum distance from overhead utility lines. Trees cannot be planted under utility lines. In order to avoid future interference of limbs, planting may take place as follows:
Large trees: 30 feet from line;
Medium trees: 20 feet from line; and
Small trees: 10 feet from line.
- g. From curb line of an intersection: 30 feet, which is subject to visibility triangles.
- h. Minimum distance from stop or yield signs: 20 feet.
- i. Distance from directional traffic sign: 10 feet.
- j. Distance from street lights: 25 feet for large or medium tree, 15 feet for small tree.

Variations from the requirements listed above ~~must~~shall be approved by the City ~~Arborist~~Forester.

3.5. TREE STOCK AND MATERIALS

3.5.1. Quality- It is the contractor's responsibility to supply tree stock that meets standards addressed in this Manual.

- All trees and plant material installed within the City of Pflugerville shall conform to the *American Standard for Nursery Stock* ANSI Z60.1 - 2004.
- Trees shall be sound, healthy, vigorous, and free of plant disease and insect pests or ~~their~~other damage.
- Container grown trees shall be grown for at least 8 months in containers in which delivered and shall not be root bound or have girdling roots. The root ball will be moist and the roots will be contained within the container.

- Trees shall not have been topped or headed.
- The tree will have healthy leaves if it is the time of year for trees to have leaves.
- There will be no weeds growing out of the container.
- If the tree is multi-stemmed, the stems will not be squeezing against each other or the trunk of the tree.
- Trees with broken tops, branches, injured trunks, poor structure, low branching, poor vigor, and apparent poor quality shall be rejected; the City ~~Arborist~~ [Forester or Administrator](#) has the right to reject trees that do not meet the quality standards.

3.5.2 Container grown/ball and burlapped trees- From April 1-September 30, only container grown trees will be planted. From October 1-March 31, either container grown or ball and burlapped (B&B) trees may be planted.

Recommendation: It is recommended that container grown trees be used all year.

3.5.3 Miscellaneous materials- The following materials shall be used unless otherwise specified:

- Tree stakes. Metal T-posts shall be used.
- Tree Ties. Tree ties may include one of two types. The first is a 10 gauge wire, cushioned with a rubber hose around the trunk. The wire should not touch the trunk. The second is a plastic chain lock, also called twist brace.
- Mulch. All newly planted trees should be mulched with 2-4 inches of organic mulch. Mulch should never be placed against the trunk of a tree. There should be a space of 1-2 inches between the trunk and mulch where the root flare is visible. Mulch should cover the entire tree planting hole.
- Root Control Barriers. Use along all public sidewalks, and indicate on approved plans and drawings.
- Tree guards. For trees in turf areas requiring regular mowing and/or weed eating, the tree trunk shall be protected with TreeGuard or equivalent.
- Tree grates. Where sidewalk width is less than 8 feet and new trees will be installed in a tree well, metal tree grates may be used and approved by the DRC. Minimum size grates shall be [minimum](#) 4' x 4' unless specified otherwise. All tree grates shall be mounted in frames, inset into a concrete foundation within the sidewalk or surface material, and shall be flush with the surrounding surface.

3.6. PLANTING SITE PREPARATION

3.6.1. Soil preparation and conditioning- All debris, wood chips, pavement, concrete and rocks over 2 inches in diameter shall be removed from the planting pit to a minimum of 24-inch depth and a width in accordance with the minimum planting requirements established in Subchapter 11, Table ~~5~~[11.11.3](#), unless specified otherwise.

3.6.2. Planter pit preparation

- *Trees in a confined planter pit or sidewalk area:* The planting hole shall be excavated to a minimum of 30 inches deep x the width of the exposed area. Scarify the sides of the pit. Soil beneath the root ball shall be compacted to prevent settling.
- *Trees in all other areas:*
 - a. Mark out a planting area 2 to 3 times wider than the rootball diameter (the wider the better). Loosen this area to about an 8" depth. This will enable your

tree to extend a dense mat of tiny roots well out into the soil in the first one to ten weeks in the ground.

- b.** Excavate the hole's width a minimum of two times the diameter of the container, and deep enough to allow the root ball of the container to rest on firm soil with the top of the root ball even with the grade. Scarify the sides and the bottom of the pit.

3.6.3 Drainage

Adequate drainage must be provided to the surrounding soil for the planting of new trees. If the trees are to be planted in impermeable or infertile soil, and water infiltration rates are less than two (2) inches an hour, then one of the following drainage systems or other approved measures must be implemented:

- French drain, a minimum of three (3) feet in depth
- Drain tiles or lines beneath the trees
- Auger six drain holes at the bottom perimeter of the planting pit, at a minimum of four (4) inches in diameter, twenty-four (24) inches deep and filled with medium sand or fine gravel

3.7. PLANTING THE TREE

After the hole has been prepared as described in Section 3.6 above, the tree is ready to be planted.

3.7.1. Container grown tree

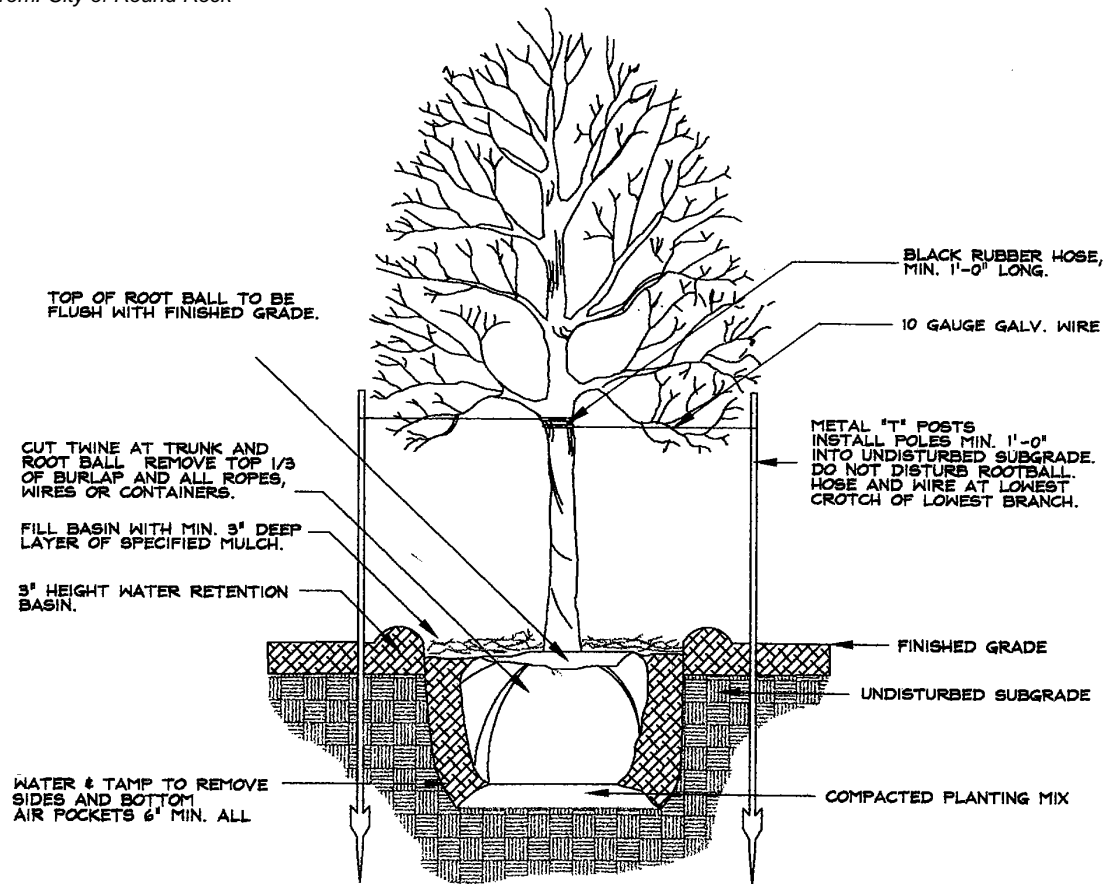
Pull the container away from the root ball. Don't pull the tree out by its trunk. Container-grown trees often have circling or girdling roots running along the edge of the root ball. If they exist in this area, cut them and spread them apart. Place the root ball in the center of the hole and adjust the tree so it is straight and at the proper level. Make any adjustments prior to filling the hole with dirt.

3.7.2. Ball and burlapped tree

Rest the root ball in the center of the hole, and reshape the hole so the tree will be straight and at the proper level. After adjusting the tree, pull the burlap and any other material away from the sides and top of the root ball. Do not remove the burlap from the bottom. If you adjust or lift the tree after the burlap has been removed you run the risk of damaging the root system.

Illustration 3-2: Tree planting detail graphic

From: City of Round Rock



3.7.3. Backfill soil, amended soil

Backfill with the original soil, unless the original soil has been removed or the soil is poor. If soil must be amended, consult with a landscape architect or certified arborist in identifying the most appropriate soil mix.

3.7.4. Filling the hole

Fill until the hole is half full. Flood the hole with a slow hose or tamp gently with your foot to firm the soil. Repeat until the hole is full. Do not press too firmly-only firm enough to hold the tree upright. Backfilling with soil and water or gently tamping will remove large air pockets.

3.7.5. Constructing a berm or dam

Construct a small dam or berm three (3) feet in diameter around the tree. The berm should be approximately three (3) inches high.

3.7.6. Mulching

Cover the entire loosened area of soil with 2 to 4 inches of mulch composed of shredded wood or bark in the entire planting area. Mulch will be placed one to two inches away from the trunk of the tree. The root flare shall be visible after mulching.

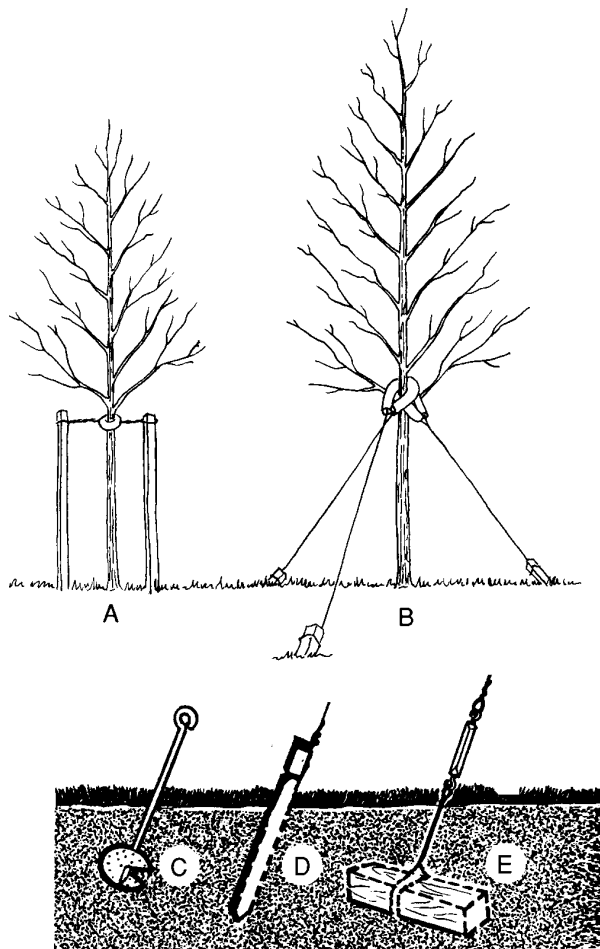
3.7.7. Staking or guying

Bamboo stakes, if any, will be removed. Staking or guying is to prevent movement of the lower trunk and root system. Movement of the top is desirable and will strengthen the tree. The stakes will be installed 12-18 inches in undisturbed soil outside of the planting hole. Depending on height and size of the tree, stakes shall be six, eight, or ten feet tall. Trees shall be staked with 3 metal T-posts. Metal stakes will not rub against tree trunks. Tree ties will be located near the lowest main branch on the tree. Check a staked or guyed tree monthly during the growing season and after storms or strong wind. The system will be snug, but not to the point of making an impression on the stem or trunk. If that happens, loosen the tie or wire around the trunk. Do not stake a tree any longer than necessary. One or two growing seasons is all that is needed.

Illustration 3-2 and 3-3 show the proper staking and guying techniques. In Illustration 3-3 A, trees 3-4 inches in diameter are supported by three stakes. Branches should not rub against the stakes. For trees over four (4) inches, guy wires should be used, with a minimum of three guys. Cable or wire is attached to the tree by running wires through a piece of hose or by using lag hooks on large trees. The guys should be secured to arrowhead-shaped land anchors (C), wooden stakes (D), or deadmen buried in the soil (E).

Illustration 3-3: Staking and Guying Trees

From: *Principles and Practice of Planting Trees and Shrubs*



3.8. PRUNING NEWLY PLANTED TREES

Young trees are pruned to allow for proper growth through the years. If the tree is of high quality, it should need little pruning. It is no longer common practice to automatically trim a certain percentage of limbs from a newly planted tree. The tree needs as much foliage as can be available to assure rapid growth and solid leaf structure. This includes refraining from “limbing up” and topping.

3.8.1. Prohibitions

- _____ Topping trees — tree replacement may shall be required if this is done
- _____ Limbing up trees (the practice of cutting the lowest branches to a desired height)

3.8.2. Pruning guidelines (Recommended)

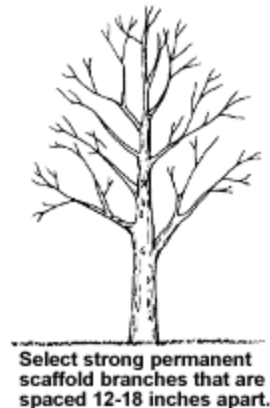
Scaffolding/ permanent branches. Identify the scaffolding/permanent branches. The lowest permanent branch should have a diameter of one-half or less of the trunk diameter where the branch attaches to the trunk. The vertical spacing of permanent scaffold branches should equal a distance equal to 3% of the tree's eventual height. Thus, a tree that will be 50 feet tall should have permanent scaffold branches spaced about 18 inches apart along the trunk. Avoid allowing two scaffold branches to arise

~~one above the other on the same side of the tree. Maintain radial balance with branches growing outward in each direction.~~

3.8.3. Limb removal (Recommended)

~~The following may be removed.~~

- ~~7. Torn, damaged, dead branches. Remove the branch just outside of the branch collar. See Illustration 2-9.~~
- ~~8. Double Leaders: Maintain a dominant trunk for at least six to eight feet without a major fork. If the trunk divides into two or more relatively equal stems, favor one strong stem and remove the others. Cut one stem back to a lateral branch.~~
- ~~9. Rubbing branches: Eliminate branches that are rubbing or will soon rub against another branch.~~
- ~~10. Crowding: Give each branch room to grow with minimal competition for sunlight. When possible, have major lateral branches evenly spaced eight to ten inches apart along the trunk. If the tree by its nature would lose too much foliage in the process of eliminating crowding, maintain at least half the foliage on branches in the lower 2/3 of the tree.~~
- ~~11. Narrow Branch Angles/Included Bark: Remove one branch if the angle is 40° or narrower or if it appears that the bark from the branch is becoming pinched between the branch and the trunk.~~
- ~~12. Sprouts and Suckers: Remove sprouts and suckers.~~
- ~~13. Temporary branches: Leave temporary branches that are not competing with permanent, scaffolding branches.~~



3.9.8. TRANSPLANTING TREES

3.8.1. General

Transplanting large trees is difficult, expensive, and requires expertise and equipment. Pre-approval from the City ~~Arborist~~ [Forester](#) and periodic inspections will be required for the transplanting of a protected tree. Such trees will be under warrantee as if it is a new tree, and will need to follow replacement requirements should the tree die or severely decline. When transplanting protected trees eight (8) inches and larger from existing landscapes it is important to select healthy, vigorous trees, dig an appropriate size root ball, select a site that is consistent with the tree's cultural needs, provide a saucer shaped planting hole approximately three times the root ball width, and then protect the root ball, trunk, and crown during lifting, transportation, and storage. The most important and hardest part in tree transplanting is creating and implementing a multi-year aftercare program, providing adequate moisture to the root ball.

When a tree is dug for transplanting, as much as 90% of its root system is left behind, severed in the process of digging for transplanting. The tree has a hard time relying on 5-10 percent of its root system doing the work of the 90 percent that was lost. Until it is well established, the root system will have difficulty supplying enough water to the leaves. This stress impacts vigor of the tree and also exposes the tree to the risk of being vulnerable to pests and diseases, as well as less able to adapt to or withstand drought, extreme cold, and drying winds.

3.8.2. Considerations

The following issues should assist in providing a successful transplanting. Considering the size of the protected trees being transplanted, a professional arborist is required to assist in the process.

- **Site-** Before transplanting make sure the tree is a good match for the new site.
- **Timing-** Recommended timing for transplanting trees is during the dormant season, when the tree is not trying to support its leafy crown.
- **Health of tree-** Select a tree that is in good health and shape and has no major defects in its trunk branch structure.
- **Success rate-** Different species have different success rates in transplanting. Consult with your certified arborist on the success rate of the tree you want to transplant.
- **Tree size-** Most commonly transplanted trees range in size from 5-15 diameter inches.

3.8.2. Transplanting process-

a. Digging up the tree-

- Dig up a wide root ball with appropriate depth and wrap burlap material with wire and twine to save as much of root ball as you can intact.
- A rule of thumb for trees over six inches in diameter is that a root ball = 10 inches in diameter for every tree trunk diameter measured at 4 ½ feet above the ground (see Chapter 2 for a discussion on measuring the tree diameter in unusual situations). In other words, a 10-inch tree should have a 100 inch diameter. Likewise, the ball depth should be about 60% of the ball diameter. The same 10-inch tree should have a 60 inch depth.
- While smaller trees can be transplanted using a tree spade or other specialty equipment/techniques, larger trees will require mechanical digging equipment and appropriate hoists and heavy equipment for moving the tree.

b. Transporting the tree-

During transportation the tree crown should always be covered with tarp to protect the tree from drying out and windburn.

c. After transplanting-

- Keep the root ball moist at all times. Anticipate watering three times a week, or in very hot weather every day. Continued watering will be required for several years.
- **Do not prune newly transplanted trees to reduce crown and compensate for root loss. That will only further weaken the tree.**
- Mulch the transplanted tree with 2-4 inches of organic mulch to cover root ball.
- The process of regenerating a normal root system will take several years, especially for large trees. Immediately after transplanting, the tree will be susceptible to extreme stress. Moisture is a critical factor in new root growth. Compacted soils and soil temperature also impact the growth of roots.

(Abridged from “Transplanting Trees”, by Patrice Peltier and Gary W. Watson. *Arbor Age*, January-March 2000.)

3.109. IRRIGATION PLAN

The City of Pflugerville promotes water conservation by:

- Requiring native and adapted tree species (See Approved Tree List: Subchapter 11, Table 511.11.3).
- Requiring irrigation zones to be grouped by water requirements of plants.
- Requiring ~~drip emitters~~bubblers for new trees.
- Promoting gray water recycling systems and cisterns to supplement irrigation systems.
- Providing a recommended watering schedule for new tree establishment:
 - Irrigation frequency and amount depend on several factors including the size of the rootball, season, tree species, soil infiltration rate, drainage, slope, and rainfall.
 - Generally, a newly planted tree requires 2 gallons of water per caliper inch at each watering event. A 3" caliper tree would require 6 gallons of water per watering event.
 - A newly planted 3" caliper tree requires water:
 - Daily for two weeks (may omit if planting between November and March)
 - Every other day for 4 months
 - Weekly for the remainder of the year
 - Once every two weeks the following year
 - Once a month the third year and or as needed if droughty
 - If the tree has been successfully established during the first three years, the water absorbing roots will be far beyond the drip emitters and those zones can be turned off.

Irrigation Plan Notes: The following requirements are mandatory for all irrigation plans and are in addition to any applicable notes referenced in Chapter 113, Irrigators.

1. An automatic irrigation system shall be installed. All automatic irrigation systems shall be equipped with an electronic controller capable of dual or multiple programming.
2. Controller(s) shall have multiple cycle start capacity and a flexible calendar program, including the capability of being set to water every five days.
3. All automatic irrigation systems shall be equipped with a rain and freeze sensor shut-off device.
4. The irrigation system must be designed by a licensed irrigator.
- 4.5. Irrigated turf grass area is limited to 33% of the total landscape area provided.
- ~~5. Tree irrigation zones shall not share the same irrigation zones, including valves and circuits, as shrubs and plants due to different watering requirements.~~
6. A minimum of one (1) ~~drip emitter~~bubbler shall be provided for all newly planted trees. Trees larger than 3 inches in caliper shall have two (2) ~~drip emitters~~bubblers. The bubbler(s) shall be installed at each tree, located 12-18 inches from the trunk, and shall operate on valves separate from the spray zones. Tree irrigation zones shall not share the same irrigation zones, including valves and circuits, as shrubs and plants due to different watering requirements.
- ~~7. Drip emitters shall be located 12-18 inches from the trunk.~~
- ~~8.7.~~ No trenching or boring shall occur within the tree protection fencing or CRZ without prior approval from the City ~~Arborist~~Forester.
8. Irrigation shall be design and installed in accordance with Subchapter 11 of the Unified Development Code and Chapter 113: Irrigators.
- ~~9. Please refer to the Unified Development Code Subchapter 11 of the and Chapter 113: Irrigators, within the Code of Ordinances for other specifications not addressed in this section~~
- ~~10.9.~~ Irrigation plans need to shall be submitted and approved prior to irrigation installation and final site inspection.

3.11-10 MAINTENANCE

All newly planted trees shall be maintained by the owner pursuant to Section 4. Maintenance practices shall consist of all regular and normal maintenance of trees, including but not limited to irrigation, pruning, stake adjustment and removal, and disease control. Plant material that exhibits severe levels of insect or pest infestation, disease and/or damage, shall be appropriately treated, and all dead trees shall be removed and replaced with living trees where required according to the city approved Tree Replacement Plan or Site Plan for the site.

SECTION 4: TREE PRUNING, SURGERY, AND MAINTENANCE

~~2.44.1.~~ GENERAL TREE PRUNING AND TREE SURGERY

~~2.44.1.1.~~ Pruning:

The most compelling reason to prune is to develop a strong, safe framework and tree structure. Heavy pruning just after the spring growth flush shall be avoided. This is when trees have just expended a great deal of energy to produce foliage and early shoot growth. Removal of a large percentage of foliage at this time can stress the tree. Pruning may be performed provided it is conducted pursuant to standards provided herein, and the tree's natural shape is preserved.

~~4.1.2.~~ Certified Arborist Required:

All tree pruning and surgery shall be performed by or under the supervision of a Certified Arborist pursuant to the standards and techniques provided herein. For all properties exempt from the tree preservation standards of Subchapter 12 of the Unified Development Code, the pruning and maintenance standards provided within the section shall serve as best management practices.

~~4.1.3.~~ Time of Year for Pruning:

All trees except oaks (Recommended):

- a. Most routine pruning to remove weak, diseased, or dead limbs can be accomplished at any time during the year with little effect on the tree. As a rule, growth is maximized and wound closure is fastest if pruning takes place between November and February, the dormant period for Central Texas trees.

Oak trees:

- b. Due to oak wilt disease, avoid pruning of all oak species between February and June. Clean cutting tools with a disinfectant between each tree pruned. Tree pruning paint ~~must~~shall be used on all pruning cuts on all oak species regardless of the time of year of pruning.

~~4.1.4.~~ Pruning limitations:

- a. **Minimum pruning-** If the project arborist or landscape architect recommends that trees be pruned, and the type of pruning is left unspecified, the standard pruning shall consist of 'crown cleaning' only, as described below in Section 4.1.5. Trees shall be pruned to reduce hazards and develop a strong, safe framework.
- b. **Maximum Pruning-** Proceed with caution. Maximum pruning by thinning, raising or reduction of canopy ~~should~~shall only occur in the rarest situation and shall be approved by the City Forester. Provided that the Two Thirds - Live Crown Ratio is maintained for medium to large canopy trees (Type A and B trees per Subchapter 11), ~~No~~ no more than one fourth (25 percent) of the functioning leaf and stem area may be removed within one calendar year of any protected tree. It must be recognized that trees are individual in form and structure, and that pruning needs may not always fit strict rules, whereby deviation from the standards may be approved by the City Forester. ~~The project arborist or landscape architect shall assume all responsibility for special pruning practices that vary from the standards outlined in this manual.~~

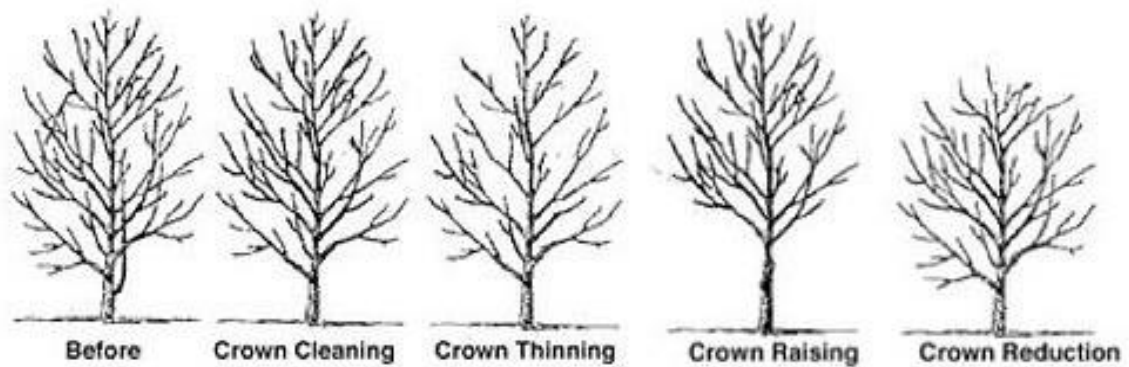
- ~~3. **Tree Workers (Recommended)-** Pruning shall not be attempted by construction or contractor personnel, but shall be performed by a qualified tree~~

~~care specialist or certified arborist.~~

4.1.5 Types of pruning:

Illustration 4-3: Types of crown pruning

From: International Society of Arboriculture



- a. **Cleaning:** The removal of dead, dying, diseased, ~~crowded~~, weakly attached and low-vigor branches from the crown of a tree.
- b. **Thinning:** The selective removal of smaller crowded (less than two inch diameter) branches, evenly throughout the crown by a maximum of 25% of the total tree foliage, in order to increase light penetration and air movement through the crown. Thinning opens the foliage of a tree, reduces weight on heavy limbs and helps retain the tree's natural shape. (Thinning shall not be used for vision clearance of private site signage.)



Image – Left:

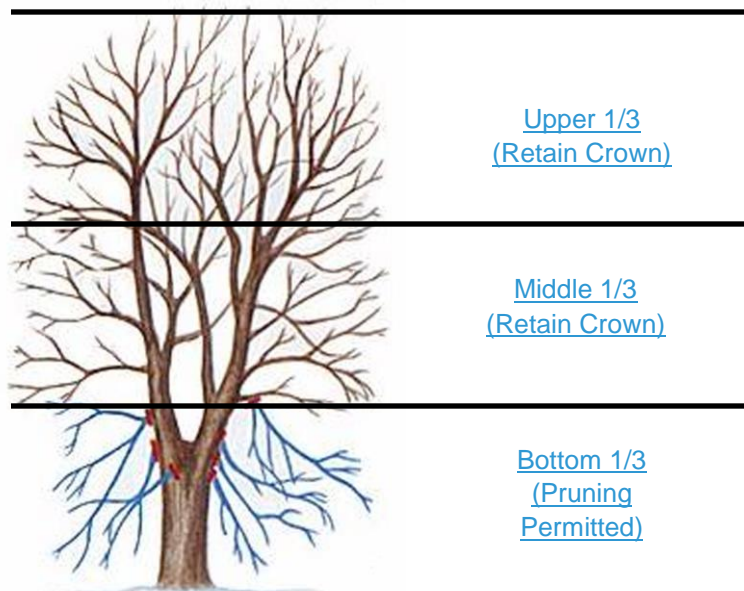
Thinning removes relatively small branches in the upper/outer tree canopy.

Thinning does NOT remove large branches, creating a gap in the tree canopy or affect the tree's shape, size or appearance.

c. **Raising:** Removes the lower branches from a tree in order to provide clearance for buildings, vehicles, pedestrians and vistas. Raising should be done gradually over a period of time. (Raising shall not be used for vision clearance of private site signage.) (Also known as 'limbing up') Crown raising shall be limited to:

- Removal of relatively smaller limbs (preferred cut diameter is less than two to four inches);
- Removal of only a few branches at one time, gradually over a period of time;
- Removal of branch does not exceed ½ the size of the diameter of the trunk; and
- Crown raising does not remove more than 1/3 of the tree crown and 2/3 of the tree crown is maintained. (Measurement shall be total height of tree, prior to any pruning, divided into thirds. Crown raising may only occur within the bottom third of the tree.)
- When removing lower branches, maintain at least one-half of the foliage in the lower two-thirds of the tree. The lowest branch should be in the bottom 40% of the tree's height.

Illustration 4-2: Two Thirds - Live Crown Ratio



From: U.S. Department of Agriculture

~~b.~~ **Reduction:**

d. Reduces the size of a tree, often for clearance for utility lines, by the selective shortening or removal of branches, by a maximum of 25% of the total tree foliage. Reducing the height or spread of a tree is best accomplished by pruning

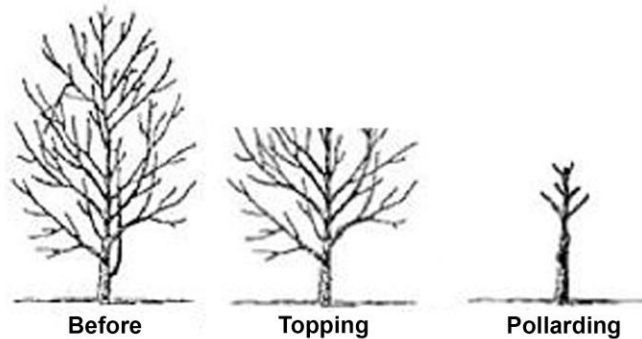
back the leaders and branch terminals to [secondary](#) lateral branches that are large enough to assume the terminal roles (at least 1/3 the diameter of the cut stem). Compared to topping, this helps maintain the form and structural integrity of the tree. [\(Reduction shall not be used for vision clearance of private site signage.\)](#)

4.1.6 Types of Pruning Prohibited

[Tree topping or pollarding is prohibited and shall result in tree replacement or mitigation. Tree topping is the indiscriminate cutting of tree branches to stubs or to lateral branches that are not large enough to assume a terminal role. Other names include “heading”, “tipping”, “hat-racking”, and “rounding over.”](#)

Illustration 4-4: Pruning Prohibited

From: International Society of Arboriculture

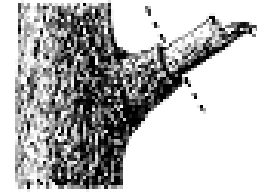
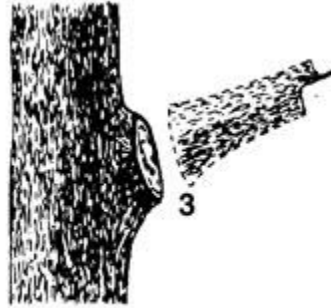
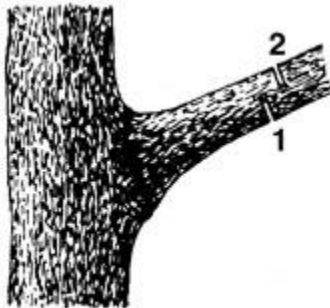


4.1.7 Making Proper Pruning Cuts

- ~~a.~~ ~~Tree topping is prohibited and may result in tree replacement.~~
- ~~b.~~ ~~a.~~ Stub cuts are prohibited.
- ~~c.~~ ~~b.~~ Cuts will be made just beyond the outer edge of the collar of live wood. See Illustration ~~2-9~~ [4-5](#) for an example.
- ~~d.~~ ~~c.~~ Don't use pruning paint or so called wound dressings, except for tree pruning cuts on all oak species at all times due to the threat of oak wilt disease.
- ~~e.~~ ~~d.~~ If a large limb is to be removed, its weight should first be reduced. This is done by making an undercut about 12-18 inches from the limb's point of attachment. A second cut is made from the top, directly above or a few inches further out on the limb. This removes the limb leaving the 12-18 inch stub. The stub is removed by cutting back to the branch collar. This technique reduces the possibility of tearing the bark. [See Illustration 4-5 for an example.](#)

Illustration 4-5: Proper tree cuts

From: International Society of Arboriculture



Use the three-cut method to remove a large limb.

On a dead branch that has a collar of live wood, the final cut should be just beyond the outer edge of the collar.

4.1.8. Tree Surgery

If it is necessary to promote health and prolong useful life or the structural characteristics, trees shall be provided the appropriate treatments (e.g. cavity screening, bark tracing, wound treatment, cables, rods or pole supports) as specified by the project arborist~~-or landscape architect.~~

4.1.9 Tree Removal Adjacent to Protected Trees- When trees are removed and adjacent trees must be protected (as shown on the approved site plans), then the following tree removal practices apply:

- a. **Tree Removal-** Removal of trees that extend into the branches or roots of protected trees shall not be ~~attempted~~performed by demolition or construction personnel, grading or other heavy equipment. A certified arborist or tree worker under the supervision of a certified arborist shall remove the tree carefully in a manner that causes no damage above or below ground to trees that remain. After the removal of the tree, the certified arborist shall provide the City with a concurrence letter certifying the work performed was supervised and followed all requirements of the Tree Technical Manual, as applicable.
- b. **Stump Removal-** Before performing stump extraction, the ~~developer~~project arborist shall first consider whether or not roots may be entangled with trees that are to remain. If so, these stumps shall have their roots severed before extracting the stump. Removal shall include the grinding of stump and roots to a minimum depth of 24 inches but expose soil beneath stump to provide drainage. In sidewalk or small planter areas to be replanted with a new tree, the entire stump shall be removed and the planting pit dug to a depth of 30 inches. If dug below 30 inches, compact the backfill to prevent settling. Large surface roots three feet from the outside circumference shall be removed, including the spoils and backfilled with City approved topsoil to grade and the area tamped to settle the soil.

4.2. PRUNING NEWLY PLANTED TREES

Young trees ~~are~~may be pruned to allow for proper growth through the years. If the tree is of high quality, it should need little pruning. It is no longer common practice to automatically trim a certain percentage of limbs from a newly planted tree. The tree needs as much ~~foliage~~foliage as can be available to assure rapid growth and solid leaf structure. This includes refraining from "limbing up" and topping. Pruning of newly planted or young trees shall be performed by or under the supervision of a certified arborist, or a landscape architect for newly planted trees.

4.2.1. Type of Pruning ~~Prohibitions~~Prohibited

~~—~~The following types of pruning techniques are prohibited on newly planted or young trees:

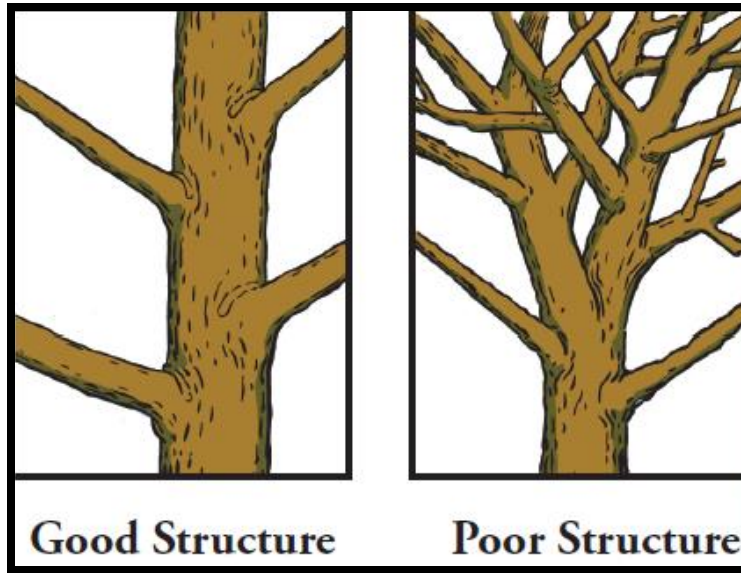
- a. ~~Topping trees~~The topping or pollarding of trees is strictly prohibited on all trees. When topping or pollarding occurs, tree replacement or other mitigation, as outlined in Subchapter 12 of the Unified Development Code, shall be required.~~if this is done~~
- a.
- b. ~~Crown raising or "Limbing up"~~Limbing up trees (the practice of cutting the lowest branches to a desired height) shall be prohibited, unless otherwise approved by the City Forester. If approved by the City, all pruning shall be performed by or under the supervision of a certified arborist pursuant to the standards provided in Section 4.1.

4.2.2. Pruning guidelines (Recommended)

Scaffolding/ permanent branches. Identify the scaffolding/permanent branches. The lowest permanent branch should have a diameter of one-half or less of the trunk diameter where the branch attaches to the trunk. The vertical spacing of permanent scaffold branches should equal a distance equal to 3% of the tree's eventual height. Thus, a tree that will be 50 feet tall should have permanent scaffold branches spaced about 18 inches apart along the trunk. Avoid allowing two scaffold branches to arise one above the other on the same side of the tree. Maintain radial balance with branches growing outward in each direction.

Illustration 4-6: Strong Scaffold Structure

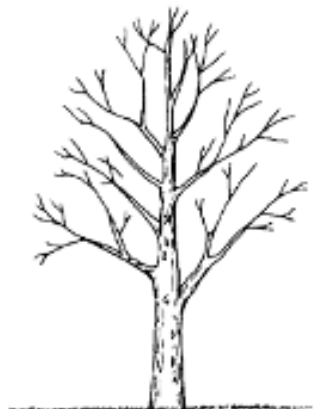
From: International Society of Arboriculture - Trees Are Good (treesaregood.org)



4.2.3. Limb removal (Recommended)

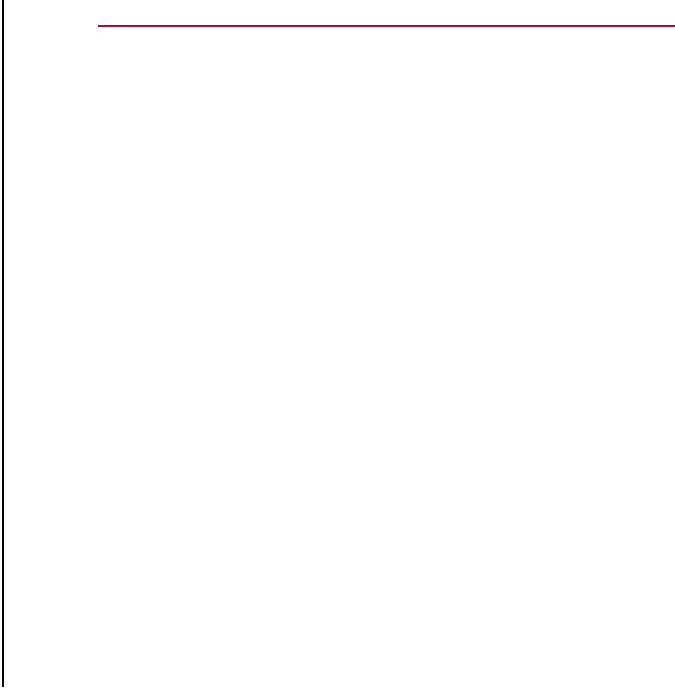
The following may be removed.

- a. Torn, damaged, dead branches. Remove the branch just outside of the branch collar. See Illustration [2-94-5](#).
- b. Double Leaders: Maintain a dominant trunk for at least six to eight feet without a major fork. If the trunk divides into two or more relatively equal stems, favor one strong stem and remove the others. Cut one stem back to a lateral branch.
- c. Rubbing branches: Eliminate branches that are rubbing or will soon rub against another branch.
- d. Crowding: Give each branch room to grow with minimal competition for sunlight. When possible, have major lateral branches evenly spaced eight to ten inches apart along the trunk. If the tree by its nature would ~~lose~~lose too much foliage in the process of eliminating crowding, maintain at least half the foliage on branches in the lower 2/3 of the tree.
- e. Narrow Branch Angles/Included Bark: Remove one branch if the angle is 40% or narrower or if it appears that the bark from the branch is becoming pinched between the branch and the trunk.
- f. Sprouts and Suckers: Remove sprouts and suckers.



Select strong permanent scaffold branches that are spaced 12-18 inches apart.

- g. Temporary branches: Leave temporary branches that are not competing with permanent, scaffolding branches.



SECTION 45: ADMINISTRATION, INSPECTION, AND ENFORCEMENT

45.1 ADMINISTRATION

The Ordinance and the standards in this Manual will be administered and updated by the City ~~Forester~~ Arborist and/or Administrator.

45.2 INSPECTION

45.2.1. *Inspection by owner*

The project arborist or landscape architect retained by the applicant shall conduct the following required inspections of construction sites containing protected trees. Inspections shall verify that the type of tree protection and/or plantings are consistent with the standards outlined within this Manual. For each required inspection or meeting, a written summary of the changing tree related conditions and actions taken shall be provided to the City ~~Arborist~~ Forester.

- a. Pre-Construction Meeting. Prior to commencement of construction, the applicant or contractor shall conduct a pre-construction meeting to discuss tree protection with the job site superintendent, grading equipment operators, project arborist or landscape architect, and City ~~Arborist~~ Forester. At this time all tree protection fencing approved in the permit plans must be installed correctly.
- b. Inspection of Rough Grading. The project arborist or landscape architect shall perform an inspection during the course of rough grading adjacent to the CRZ to ensure trees will not be injured by compaction, cut or fill, drainage and trenching, and if required, inspect aeration systems, tree wells, drains and special paving. The contractor shall provide the City ~~Arborist~~ Forester at least 48 hours advance notice of such activity.
- c. Monthly Inspections. The project arborist or landscape architect shall perform monthly inspections to monitor changing conditions and tree health. The City Forester shall be in receipt of an inspection summary if there are any changes to the approved plans, tree health conditions, or protection measures. If the City Forester is not in receipt of inspection summaries prior to final inspection, ~~he~~ the City will assume that no change in tree conditions have occurred in the field during construction.
- d. Special activity within the Critical Root Zone. Work in this area (CRZ) requires the direct onsite supervision of the project arborist or landscape architect.
- e. Landscape Architect and/or Project Arborist Inspection. Prior to the issuing of the certificate of occupancy in the City or acceptance of public infrastructure associated with a construction plan in the ETJ, the applicant or contractor shall contact the landscape architect and/or Project Arborist, as applicable, to perform an on-site inspection of all plant stock, quality of the materials and planting and that the irrigation is functioning consistent with the approved site or public infrastructure construction plans. The City shall be in receipt of a letter of compliance from the landscape architect or project arborist prior to scheduling the final inspection, unless otherwise approved.

45.2.2. *Inspection by City representative*

There are four types of inspections that may be performed by the City ~~Arborist~~ Forester and/or Administrator. They include the following:

- a. Site inspections at ~~during~~ the site development plan, construction plan or

- preliminary plan ~~submit~~ review process.
- b. Tree fencing inspection and other tree preservation measures prior to construction, typically conducted at the time of erosion and sedimentation (E&S) preliminary inspection.
 - c. Unscheduled site visits during construction.
 - d. Final inspection.

45.3 ENFORCEMENT

The ~~Ordinance~~ Subchapter 12 of UDC and the standards in this Manual are enforced by the City ~~Arborist~~ Forester and/or the Administrator, or their respective designees. Enforcement is described in Subchapter 11 and 12 of the Unified Development Code.

APPENDIX A: DEFINITIONS

For the purposes of this Manual the following definitions apply. Additional definitions may be found in the Ordinance.

Administrator (of the Tree Technical Manual) is the Assistant City Manager over Development Services, or their designee.

City Forester is an individual designated by the Administrator to oversee the City's urban forestry program and serve as an advisor to Development Services. In doing so, the City Forester or designee shall implement, administer, and oversee the provisions, terms and conditions of all aspects of public tree planting and the Public Tree Care Ordinance, and relevant provisions and procedures for tree preservation and landscaping throughout the development process. In the absence of a City Forester the powers and duties shall be the responsibility of the Administrator or their designee.

Certified Arborist is an individual who has demonstrated knowledge and competency through obtainment of the current International Society of Arboriculture arborist certification, or who is a member of the American Society of Consulting Arborists.

~~Compaction means compression of the soil structure or texture by any means that creates an upper layer that is impermeable. Compaction is injurious to roots and the health of a tree.~~

Dangerous tree see Hazardous tree.

Dead Tree means a tree that is dead or that has been damaged beyond repair or is in an advanced state of decline (where an insufficient amount of live tissue, green leaves, limbs or branches, exists to sustain life) and has been determined to be such by a certified arborist. If the tree has been determined to be dead, removal is permitted as defined in the ordinance.

Disturbance refers to all of the various activities from construction or development that may damage trees.

Dripline refers to the periphery of the area underneath a Tree that would be encompassed if perpendicular lines were dropped from the farthest edges of the crown of the tree.

Excessive Pruning means removing in excess, one-fourth (25 percent) or greater, of the functioning leaf, stem or root area. Pruning in excess of 25 percent is injurious to the tree and is a prohibited act. Excessive pruning typically results in the tree appearing as a 'bonsai', 'lion's-tailed', 'lolly-popped' or overly thinned.

- *Unbalanced Crown.* Excessive pruning also includes removal of the leaf or stem area predominantly on one side, topping, or excessive tree canopy or crown raising. Exceptions are when clearance from overhead utilities or public improvements is required or to abate a hazardous condition or a public nuisance.
- *Roots.* Excessive pruning may include the cutting of any root two (2) inches or greater in diameter and/or severing in excess of 25 percent of the roots.

Hazardous Tree refers to a tree that possesses a structural defect which poses an imminent risk if the tree or part of the tree that would fall on someone or something of value (target). Structural defect means any structural weakness or deformity of a tree or its parts. A tree with a structural defect can be verified to be hazardous by a certified arborist and confirmed as such by the City ~~Arborist~~Forester. The City ~~Arborist~~Forester retains discretionary right to

approve or amend a hazardous rating, in writing, and recommend any action that may reduce the condition to a less-than significant level of hazard. If the tree has been determined to be hazardous, removal of the tree is permitted as provided for in the [Ordinance Subchapter 12 of the UDC](#).

Manual means this Tree Technical Manual: Standards and Specifications.

Project Arborist means a certified arborist retained by a property owner or development applicant for the purpose of overseeing on-site activity involving the welfare of the trees to be retained. The project arborist shall be responsible for all reports, appraisals, tree preservation plans, or inspections as required.

Protective Tree Fencing means a temporary enclosure erected around a tree to be protected at the boundary of the tree protection zone. The fence serves three primary functions: 1) to keep the foliage crown, branch structure and trunk clear from direct contact and damage by equipment, materials or disturbances; 2) to preserve roots and soil in an intact and non-compacted state; and 3) to identify the tree protection zone in which no soil disturbance is permitted and activities are restricted.

Root Buffer means a temporary layer of material to protect the soil texture and roots. The buffer shall consist of a base course of tree chips or mulch spread over the root area to a minimum of 6-inch depth.

Root Flare refers to the area where the trunk meets the roots and a significant amount of taper is visible. This area should never be covered by soil or mulch and should be visible after planting.

Site Plan means a set of drawings (e.g. preliminary drawings, site plan, grading, demolition, building, utilities, landscape, irrigation, tree survey, etc.) that show existing site conditions and proposed landscape improvements, including trees to be removed, relocated or to be retained. Site plans shall include the following minimum information that may impact trees:

- Surveyed tree location, species, size, dripline area (including trees located on neighboring property that overhang the project site) and protected trees within 30-feet of the project site.
- Paving, concrete, trenching or grade change located within the tree protection zone.
- Existing and proposed utility pathways.
- Surface and subsurface drainage and aeration systems to be used.
- Walls, tree wells, retaining walls and grade change barriers, both temporary and permanent.
- Landscaping, irrigation and lighting within dripline of trees, including all lines, valves, etc.
- Location of other landscaping and significant features.
- All of the final approved site plan sheets shall reference tree protection instructions.

Soil Compaction means the compression of soil particles that may result from the movement of heavy machinery and trucks, storage of construction materials, structures, paving, etc. within the tree protection zone. Soil compaction can result in atrophy of roots and potential death of the tree, with symptoms often taking 3 to 10-years to manifest.

Soil Fracturing means the loosening of hard or compacted soil around a tree by means of a pneumatic soil probe that delivers sudden bursts of air to crack, loosen or expand the soil to improve the root growing environment.

Target is a term used to include people, vehicles, structures or something subject to damage by a tree. Note: A tree may not be a hazard if a "target" is absent within the falling distance of a tree or its

parts (e.g., a defective tree in a non-populated area away from pathways may not be considered a hazard)

Tree Damage (or Injury) means a wound resulting from any activity, including but not limited to 'excessive pruning', cutting, trenching, excavating, altering the grade, paving or compaction within the tree protection zone of a tree. Injury shall include bruising, scarring, tearing or breaking of roots, bark, trunk, branches or foliage, herbicide or poisoning, or any other action foreseeable leading to the death or permanent damage to tree health.

Trenching means any excavation to provide irrigation, install foundations, utility lines, services, pipe, drainage or other property improvements below grade. Trenching within the CRZ is injurious to roots and tree health and is prohibited, unless approved. If trenching is approved within the CRZ, it must be in accordance with the instructions and table outlined in this Manual.

Tree Topping refers to the indiscriminate cutting of tree branches to stubs or lateral branches that are not large enough to assume the terminal role. Topping shall include 'heading', 'hat racking', and 'rounding over'.

Verification of Tree Protection means the project arborist shall verify, in writing, that all pre-construction conditions have been met (tree fencing, erosion control, pruning, etc.) and are in place. An initial inspection of protective fencing and written verification must be submitted to the City Arborist prior to demolition, grading or building permit issuance.

Vertical Mulching means augering, hydraulic or air excavation of vertical holes within a tree's root zone to loosen and aerate the soil, typically to mitigate compacted soil. Holes are typically penetrated 4- to 6-feet on center, 2- to 3-feet deep, 2- to 6-inches in diameter and backfilled with either perlite, vermiculite, peat moss or a mixture thereof.

APPENDIX B: BIBLIOGRAPHY

Sources Cited

- American Forests and National Association of Home Builders. Building Greener Neighborhoods. 2nd ed. Washington, DC: American Forests, 1998.
- Burditt Associates. Urban Forest Management Plan, City of College Station, Texas. Conroe, TX: Burditt Associates, 2002.
- Council of Tree and Landscape Appraisers. Guide for Plant Appraisal. 9th ed. Champaign, IL: International Society of Arboriculture, 2000.
- Dockter, Dave. Tree Technical Manual, Standards and Specifications. Palo Alto, CA: City of Palo Alto, Department of Planning and Community Development, 2001.
- Elmendorf, William. A Guide to Preserving Trees in Development Projects. University Park, PA: Pennsylvania State University, School of Forest Resources, 1999.
- Minnesota Department of Natural Resources, Division of Forestry. Conserving Wooded Areas in Developing Communities: Best Management Practices in Minnesota. St Paul, MN: Minnesota Department of Natural Resources, Division of Natural Resources, 1999.
- Peltier, Patrice and Gary W. Watson. "Transplanting Trees, Part 1: Preparing the Plant and Site for a Successful Move." Arbor Age January 2000: 8-15.
- Peltier, Patrice and Gary W. Watson. "Transplanting Trees, Part 2: Improve Your Tree Transplanting Survival Rates with These Transportation and Storage Tips." Arbor Age February 2000: 8-13.
- Peltier, Patrice and Gary W. Watson. "Transplanting Trees, Part 1: The "After Care" of Transplanting Trees Is the Most Critical Step." Arbor Age March 2000: 8-15.
- Seattle, Urban Forest Coalition. A City Among the Trees, An Urban Forestry Resource Guide. Seattle, WA: City of Seattle, 1998.
- TreeFolks. Tree Planting Guide. Austin, Texas: Tree Folks, 2000.
- Watson, Gary W. and E. B. Himelick. Principles and Practice of Planting Trees and Shrubs. Savoy, IL: International Society of Arboriculture, 1997.

Additional Resources

- American Nursery and Landscape Association. American Standard for Nursery Stock, ANSI Z60.1-2004. Washington, DC: American Nursery and Landscape Association, 2004.
- ANSI Z133.1-2006. American National Standards Institute Standard for Tree Care Operations—Pruning, Trimming, Repairing, Maintaining and Removing Trees, and Cutting Brush—Safety Standard.
- ANSI A300-2005. American National Standards Institute Standard for Tree Care Operations—Pruning, Trimming, Repairing, Maintaining, and Removing Trees and Cutting Brush—Standard Practice.

Clark, James R., Richard W. Harris and Nelda P. Matheny. Arboriculture Integrated Management of Landscape Trees, Shrubs, And Vines. 3rd ed. Upper Saddle River, NJ: Prentice Hall, 1999.

Gilman, Edward F. An Illustrated Guide to Pruning. 2nd ed. Albany, NY: Delmar, 2002.

Matheny, Nelda and James R. Clark. Trees and Development, A Technical Guide to Preservation of Trees During Land Development. Champaign, IL: International Society of Arboriculture, 1998.

Miller, Nancy L., David M. Rathke, and Gary R. Johnson. Protecting Trees from Construction Damage, A Homeowner's Guide. St. Paul, MN: University of Minnesota, Minnesota Extension Service, 1993.

Moll, Gary and Stanley Young. Growing Greener Cities A Tree-Planting Handbook. Venice, CA: Living Planet Press, 1992.

Pirone, Thomas P., John R. Hartman and Mary Ann Sall. Pirone's Tree Maintenance. 7th ed. Oxford, NY: Oxford University Press, 2000.

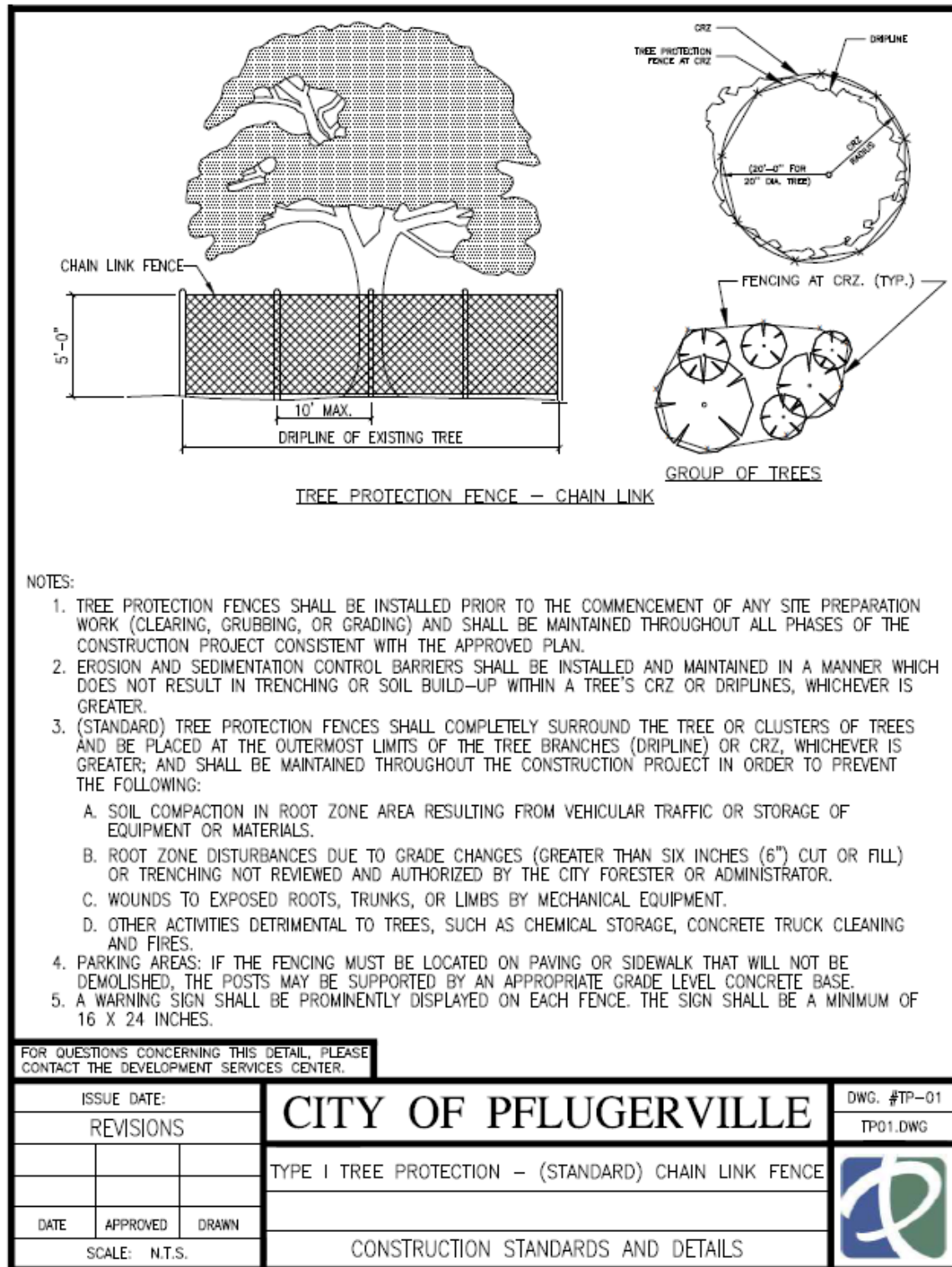
Shigo, Alex L. Tree Pruning A Worldwide Photo Guide. Durham, NH: Shigo and Trees, Associates, 1989.

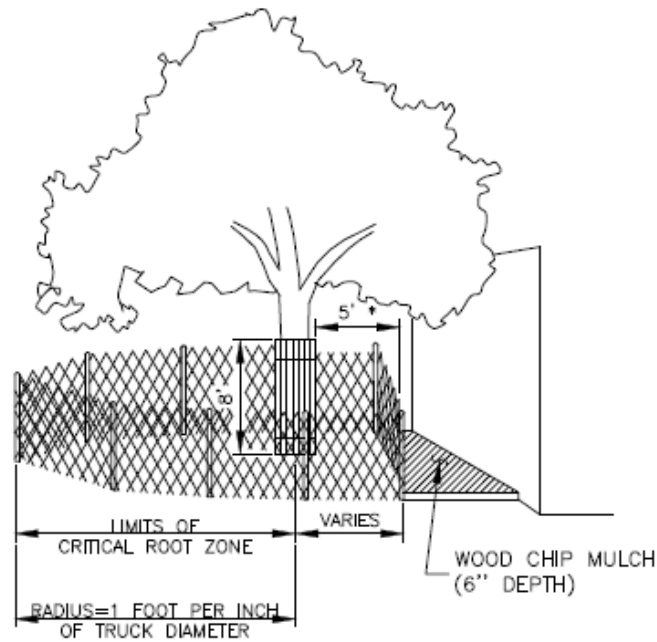
Texas Association of Nurseryman. Grades and Standards. Austin, TX: Texas Association of Nurseryman, n.d.

TreePeople. The Simple Act of Planting a Tree: A Citizen Arborist's Guide to Healing Your Neighborhood, Your City, and Your World. Los Angeles, CA: Tarcher, 1990.

APPENDIX C: TREE PROTECTION CONSTRUCTION DETAILS

<u>Table of Contents</u>	
<u>TP-01</u>	<u>Type I Tree Protection – (Standard) Chain-Link Fence</u>
<u>TP-02a</u>	<u>Type II Tree Protection – (Modified) Chain-Link Fence</u>
<u>TP-02b</u>	<u>Type II Tree Protection – (Modified) Chain-Link Fence</u>
<u>TP-03</u>	<u>Type III Tree Protection – (Modified) Wood Slats</u>
<u>TP-04</u>	<u>Tree Protection – Fence Locations (Misc.)</u>
<u>TP-05</u>	<u>Tree Protection – Warning Sign</u>
<u>TP-06</u>	<u>Tree Protection – Tree Wells</u>
<u>TP-07</u>	<u>Tree Protection – Trenching & Boring Standards</u>
<u>TP-08</u>	<u>Standard Tree Protection Notes</u>

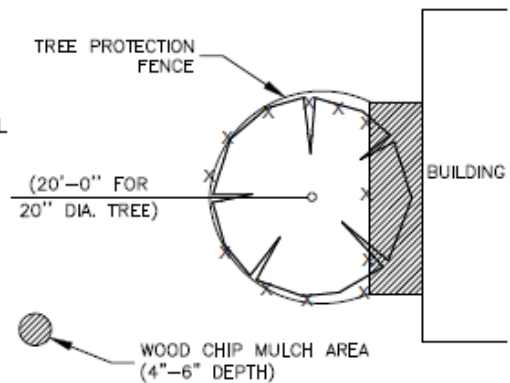




*AS NEEDED TO PROVIDE NECESSARY WORK SPACE. IF LESS THAN 5', THEN ADD BOARDS STRAPPED TO TRUNK.


NOTE:

LIMITS OF WOOD CHIP MULCH AREA AND DISTANCE FROM TRUNK TO WORK AREA SHALL BE SUBJECT TO THE APPROVAL OF THE CITY FORESTER.



TREE PROTECTION FENCE (MODIFIED) – CHAIN LINK

FOR QUESTIONS CONCERNING THIS DETAIL, PLEASE CONTACT THE DEVELOPMENT SERVICES CENTER.


ISSUE DATE:			CITY OF PFLUGERVILLE	DWG. #TP-02a
REVISIONS				TP02a.DWG
			TYPE II TREE PROTECTION – (MODIFIED) CHAIN LINK FENCE	
DATE	APPROVED	DRAWN		
SCALE: N.T.S.			CONSTRUCTION STANDARDS AND DETAILS	

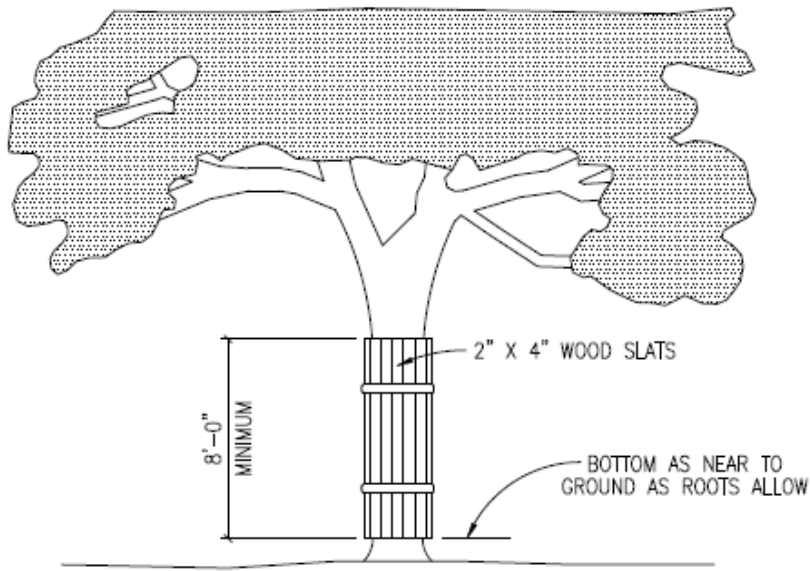
TREE PROTECTION FENCE (MODIFIED) – CHAIN LINK
EXCEPTIONS

EXCEPTIONS TO FENCING ALONG THE CRZ:

1. IF APPROVED BY THE CITY FORESTER, EXCEPTIONS TO INSTALLING TREE FENCES AT THE TREE DISCIPLINES OR CRZ, WHICHEVER IS GREATER, MAY BE PERMITTED IN THE FOLLOWING CASES:
 - A. WHERE THERE IS TO BE AN APPROVED GRADE CHANGE, IMPERMEABLE PAVING SURFACE, OR TREE WELL.
 - B. WHERE PERMEABLE PAVING IS TO BE INSTALLED, ERECT THE FENCE AT THE OUTER LIMITS OF THE PERMEABLE PAVING AREA.
 - C. WHERE TREES ARE CLOSE TO PROPOSED BUILDINGS, ERECT THE FENCE NO CLOSER THAN SIX (6') FEET TO THE BUILDING, PROVIDED THAT THE FENCE DOES NOT ENCROACH INTO THE CRZ BY 50% MEASURED FROM THE BASE OF THE TREE, AND FENCING REMAINS A MINIMUM OF FIVE (5') FEET FROM THE BASE OF THE TREE.
 - D. WHERE THERE ARE SEVERE SPACE CONSTRAINTS DUE TO TRACT SIZE, OR OTHER SPECIAL REQUIREMENTS, CONTACT THE CITY FORESTER TO DISCUSS ALTERNATIVES.
2. WHERE ANY OF THE ABOVE EXCEPTIONS RESULT IN A FENCE THAT IS CLOSER THAN 5 FEET TO A TREE TRUNK, PROTECT THE TRUNK WITH STRAPPED-ON PLANKING TO A HEIGHT OF 8 FEET (OR TO THE LIMITS OF LOWER BRANCHING) IN ADDITION TO THE REDUCED FENCING.
3. WHERE ANY OF THE ABOVE EXCEPTIONS RESULT IN AREAS OF UNPROTECTED ROOT ZONES UNDER THE DRIPLINE OR CRZ, WHICHEVER IS GREATER, THOSE AREAS SHOULD BE COVERED WITH 4-6 INCHES OF ORGANIC MULCH TO MINIMIZE SOIL COMPACTION.
4. WHERE ANY OF THE ABOVE EXCEPTIONS RESULT IN DAMAGE TO THE FINE, WATER ABSORBING ROOTS, SUPPLEMENT WATERING SHALL BE REQUIRED:
 - A. TREES SHALL BE WATERED ONCE EVERY TWO WEEKS DURING PERIODS OF HOT, DRY WEATHER.
 - B. TREE CROWNS ARE TO BE SPRAYED WITH WATER TO REDUCE DUST ACCUMULATION ON LEAVES.
 - C. A SIGNED WATERING CONTRACT SHALL BE REQUIRED PRIOR TO THE START OF CONSTRUCTION.
5. PRIOR TO EXCAVATION OR GRADE CUTTING WITHIN TREE DRIPLINES, A CLEAN CUT SHALL BE MADE BETWEEN THE DISTURBED AND UNDISTURBED ROOT ZONES WITH A ROCK SAW OR SIMILAR EQUIPMENT TO MINIMIZE DAMAGE TO REMAINING ROOTS. THE CONTRACTOR SHALL CONTACT THE CITY FORESTER OR ADMINISTRATOR FOR SUPERVISION.
6. ALL GRADING WITHIN PROTECTED ROOT ZONES AREAS SHALL BE DONE BY HAND OR WITH SMALL EQUIPMENT TO MINIMIZE ROOT DAMAGE. PRIOR TO GRADING, RELOCATE PROTECTIVE FENCING TO TWO (2') FEET BEHIND THE GRADE CHANGE AREA.
7. A WARNING SIGN SHALL BE PROMINENTLY DISPLAYED ON EACH FENCE. THE SIGN SHALL BE A MINIMUM OF 16 X 24 INCHES.

FOR QUESTIONS CONCERNING THIS DETAIL, PLEASE CONTACT THE DEVELOPMENT SERVICES CENTER.

ISSUE DATE:			CITY OF PFLUGERVILLE		DWG. #TP-02b
REVISIONS			TYPE II TREE PROTECTION – (MODIFIED) CHAIN LINK FENCE		TP02b.DWG
					
DATE	APPROVED	DRAWN	CONSTRUCTION STANDARDS AND DETAILS		
SCALE: N.T.S.					



EXAMPLE OF BARK PROTECTION — DONE WHEN CRZ IS LESS THAN AN EIGHT (8') FOOT DIAMETER, UPON APPROVAL BY THE CITY FORESTER.

NOTES:

1. WHERE ANY EXCEPTIONS RESULT IN A FENCE BEING CLOSER THAN FIVE FEET (5'-0") TO A TREE TRUNK; PROTECT THE TRUNK WITH STRAPPED-ON-PLANKING TO A HEIGHT OF EIGHT FEET (8'-0"), OR TO THE LIMITS OF LOWER BRANCHING IN ADDITION TO THE REDUCED FENCING PROVIDED. MAJOR SCAFFOLD LIMBS MAY ALSO NEED PROTECTION AS DIRECTED BY THE CITY FORESTER.
2. TREES SITUATED IN A SMALL TREE WELL OR SIDEWALK PLANTER PIT, OR WHEN (ABOVE GROUND, NO GRADING OR TRENCHING WITHIN CRZ) CONSTRUCTION WILL COME WITHIN FIVE (5') FEET OF A TRUNK, SHALL HAVE THE TRUNK PROTECTED WITH STRAPPED-ON PLANKING TO A HEIGHT OF EIGHT (8') FEET OR TO THE LIMITS OF LOWER BRANCHES. MAJOR SCAFFOLD LIMBS MAY ALSO NEED PROTECTION AS DIRECTED BY THE CITY FORESTER.

FOR QUESTIONS CONCERNING THIS DETAIL, PLEASE CONTACT THE DEVELOPMENT SERVICES CENTER.

ISSUE DATE:		
REVISIONS		
DATE	APPROVED	DRAWN
SCALE: N.T.S.		

CITY OF PFLUGERVILLE

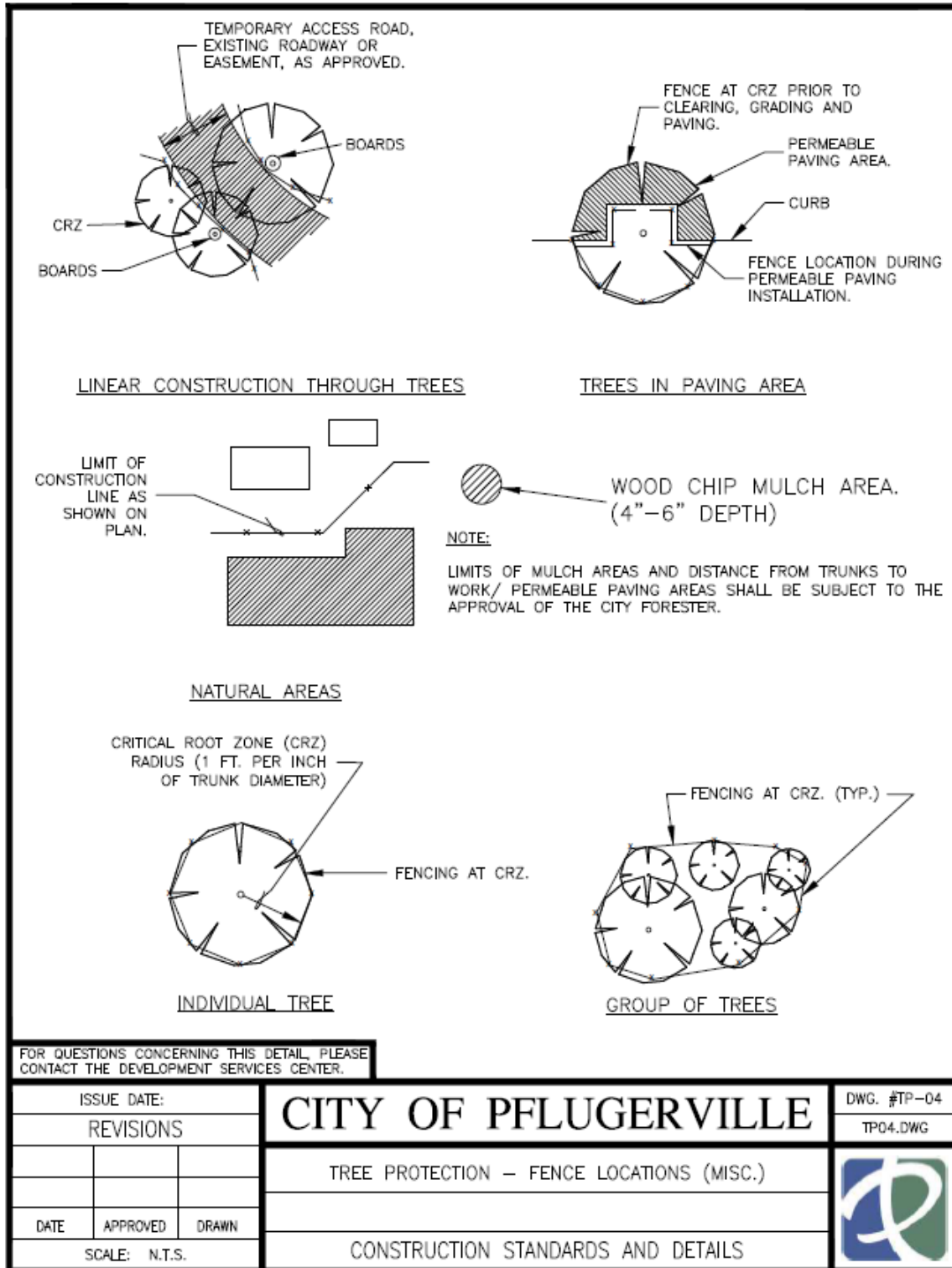
TYPE III TREE PROTECTION — (MODIFIED) WOOD SLATS

CONSTRUCTION STANDARDS AND DETAILS

DWG. #TP-03

TP03.DWG



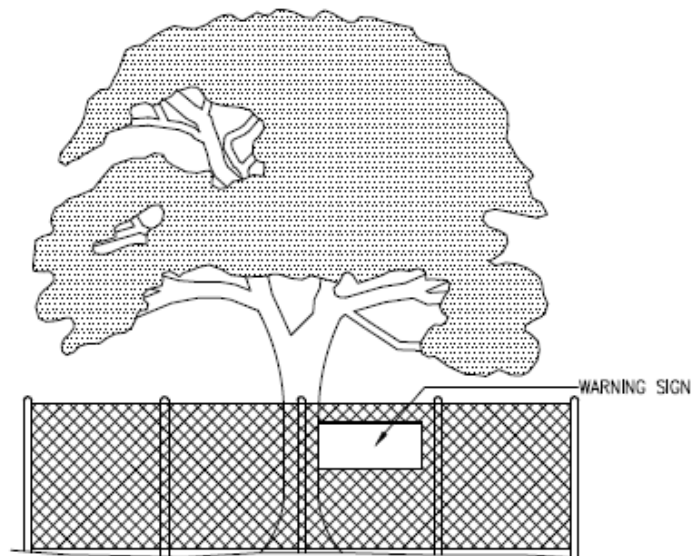


Sign Verbiage

WARNING
—CRITICAL ROOT ZONE—
ENCROACHMENT MAY RESULT IN
PERMANENT TREE DAMAGE, RESULTING
IN TREE REPLACEMENT.

¡ADVERTENCIA!
—ZONA DE RAÍZ CRÍTICA—
LA INVASIÓN PUEDE OCASIONAR DAÑOS
PERMANENTES A LOS ÁRBOLES, EL
RESULTADO ES EL REEMPLAZO DE LOS
ÁRBOLES.

WARNING SIGN PLACEMENT



NOTES:

1. A WARNING SIGN SHALL BE PROMINENTLY DISPLAYED ON EACH FENCE. THE SIGN SHALL BE A MINIMUM OF 16 X 24 INCHES.

FOR QUESTIONS CONCERNING THIS DETAIL, PLEASE
CONTACT THE DEVELOPMENT SERVICES CENTER.

ISSUE DATE:		
REVISIONS		
DATE	APPROVED	DRAWN
SCALE: N.T.S.		

CITY OF PFLUGERVILLE

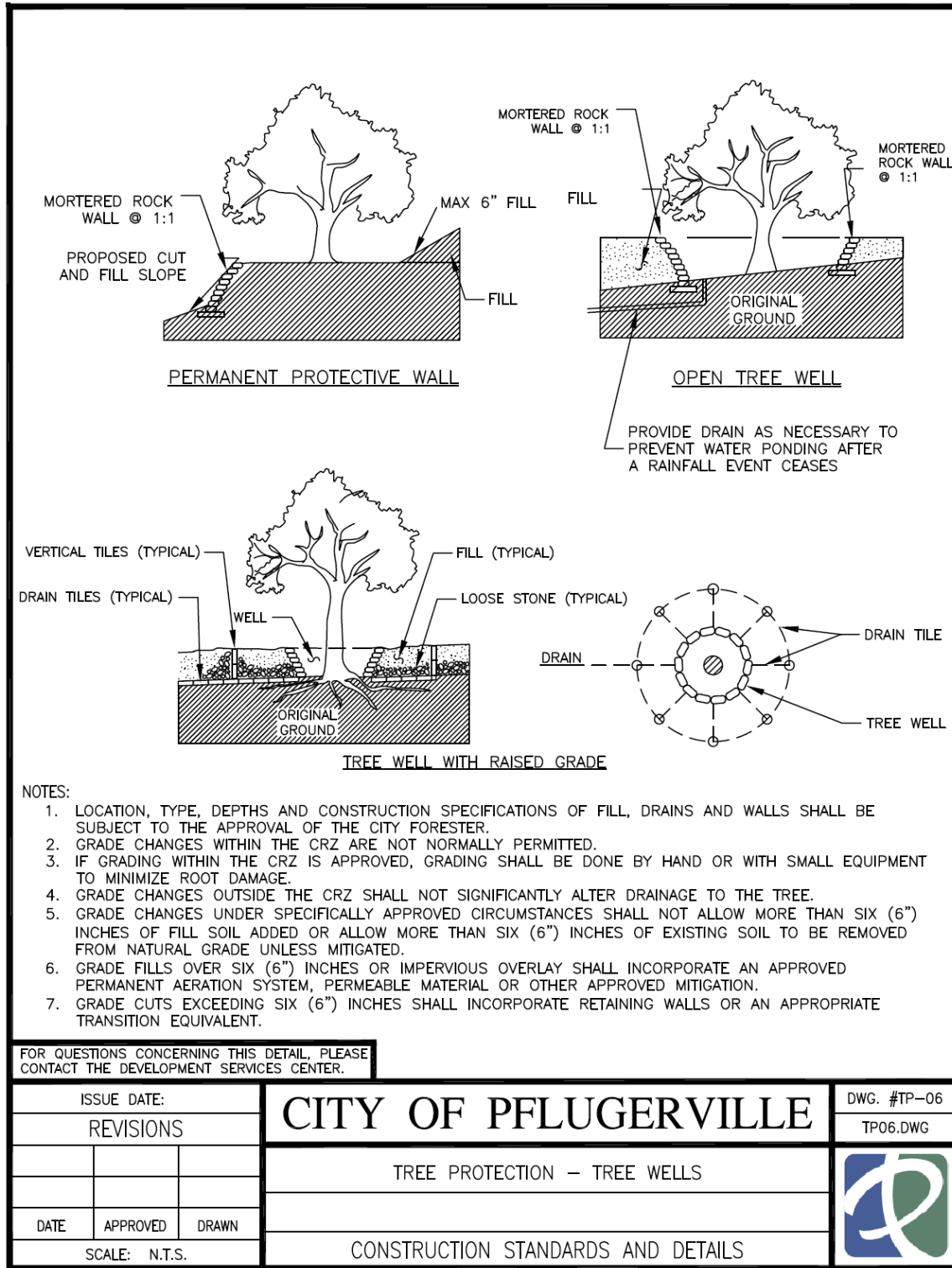
TREE PROTECTION – WARNING SIGN

CONSTRUCTION STANDARDS AND DETAILS

DWG. #TP-05

TP05.DWG





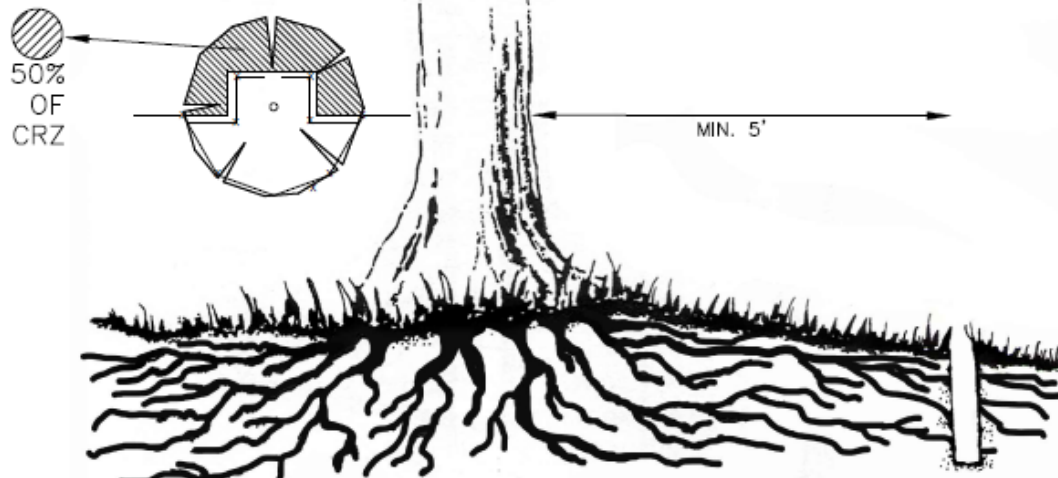
TRENCHING LIMITATIONS IN CRZ – DISTANCE FROM BASE OF TREE



NO TRENCHING SHALL OCCUR WITHIN THE CRITICAL ROOT ZONE (CRZ) UNLESS OTHERWISE APPROVED BY THE CITY. HOWEVER, TRENCHING SHALL NOT OCCUR WITHIN FIFTY (50%) PERCENT OF THE CRZ MEASURED FROM THE BASE OF THE TREE OR WITHIN FIVE (5') FEET FROM THE BASE OF THE TREE. THE CRITICAL ROOT ZONE (CRZ) SHALL BE MEASURED ONE (1') FOOT OF RADIAL DISTANCE FOR EVERY INCH OF TREE DIAMETER AT BREAST HEIGHT (DBH).

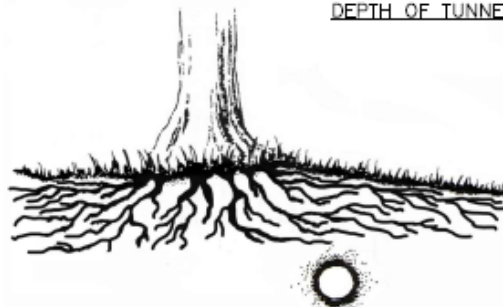
NO TRENCHING WITHIN 50% OF CRZ

MIN. 5-FOOT DISTANCE FROM BASE OF TREE



WHEN TRENCHING IS NOT PERMITTED, BORING (TUNNELING) WILL BE AN ACCEPTABLE ALTERNATIVE PURSUANT TO THE TUNNELING DEPTH REQUIREMENTS BASED ON THE RESPECTIVE TREE DIAMETERS (DBH) PROVIDED BELOW.

DEPTH OF TUNNEL BORING – WITHIN CRZ



DEPTH OF TUNNEL BORING



9" DBH OR LESS	2.5' DEPTH OF BORE
10-14" DBH	3' DEPTH OF BORE
15-19" DBH	3.5' DEPTH OF BORE
MORE THAN 19" DBH	4.0' DEPTH OF BORE

DBH = TREE DIAMETER AT BREAST HEIGHT

FOR QUESTIONS CONCERNING THIS DETAIL, PLEASE CONTACT THE DEVELOPMENT SERVICES CENTER.

ISSUE DATE:		
REVISIONS		
DATE	APPROVED	DRAWN
SCALE: N.T.S.		

CITY OF PFLUGERVILLE

DWG. #TP-07

TP07.DWG

TREE PROTECTION – TRENCHING & BORING STANDARDS


CONSTRUCTION STANDARDS AND DETAILS



STANDARD TREE PROTECTION NOTES:

1. ALL TREES NOT LOCATED WITHIN THE LIMITS OF CONSTRUCTION AND OUTSIDE OF DISTURBED AREAS SHALL BE PRESERVED.
2. ALL TREES SHOWN ON THIS PLAN TO BE RETAINED SHALL BE PROTECTED DURING CONSTRUCTION WITH FENCING CONSISTENT WITH THE CITY'S CONSTRUCTION DETAIL(S).
3. TREE PROTECTION FENCES SHALL BE ERECTED ACCORDING TO CITY STANDARDS FOR TREE PROTECTION, FENCE MATERIAL, AND FENCE SIGNAGE.
4. TREE PROTECTION FENCES SHALL BE INSTALLED PRIOR TO THE COMMENCEMENT OF ANY SITE PREPARATION WORK (CLEARING, GRUBBING, OR GRADING) AND SHALL BE MAINTAINED THROUGHOUT ALL PHASES OF THE CONSTRUCTION PROJECT CONSISTENT WITH THE APPROVED PLAN. TREE PROTECTION FENCES SHALL COMPLETELY SURROUND THE TREE OR CLUSTERS OF TREES AND BE PLACED AT THE OUTERMOST LIMITS OF THE TREE BRANCHES (DRIPLINE) OR CRZ, WHICHEVER IS GREATER.
5. EROSION AND SEDIMENTATION CONTROL BARRIERS SHALL BE INSTALLED AND MAINTAINED IN A MANNER WHICH DOES NOT RESULT IN TRENCHING OR SOIL BUILD-UP WITHIN A TREE'S CRZ OR DRIPLINES, WHICHEVER IS GREATER.
6. ANY ROOTS EXPOSED BY CONSTRUCTION ACTIVITY SHALL BE PRUNED FLUSH WITH THE SOIL. BACKFILL ROOT AREAS WITH GOOD QUALITY TOP SOIL AS SOON AS POSSIBLE. IF EXPOSED ROOT AREAS ARE NOT BACKFILLED WITHIN TWO (2) DAYS, COVER THEM WITH ORGANIC MATERIAL IN A MANNER WHICH REDUCES SOIL TEMPERATURE AND MINIMIZES WATER LOSS DUE TO EVAPORATION.
7. WHEN CONSTRUCTION OCCURS IMMEDIATELY OUTSIDE OF THE CRZ OR DRIPLINE OF A PRESERVED TREE, A CLEAN CUT SHALL BE MADE BETWEEN THE DISTURBED AND UNDISTURBED ROOT ZONES WITH A ROCK SAW OR SIMILAR EQUIPMENT PRIOR TO EXCAVATION OR GRADE CUTTING. THE PURPOSE OF THIS PROVISION IS TO MINIMIZE DAMAGE TO THE REMAINING ROOTS OF PRESERVED TREES. THE CONTRACTOR SHALL CONTACT THE CITY FORESTER OR ADMINISTRATOR FOR SUPERVISION.
8. WHEN INSTALLING CONCRETE ADJACENT TO THE ROOT ZONE OF A TREE, USE A PLASTIC VAPOR BARRIER BEHIND THE CONCRETE TO PROHIBIT LEACHING OF LIME INTO THE ROOT ZONE.
9. ANY TRENCHING SHALL BE AS FAR FROM EXISTING TREE TRUNKS AS POSSIBLE. TRENCH LINES SHALL NOT RUN WITHIN THE CRZ. BORING, TUNNELING OR OTHER TECHNIQUES MAY BE APPROVED BY THE CITY FORESTER OR ADMINISTRATOR IF THERE ARE NO OTHER ALTERNATIVES AVAILABLE. REFER TO TREE PROTECTION DETAIL - TRENCHING AND BORING STANDARDS.
10. NO LANDSCAPE TOPSOIL DRESSING GREATER THAN SIX (6") INCHES SHALL BE PERMITTED WITHIN THE DRIPLINE OR CRZ, WHICHEVER IS GREATER, OF TREES. NO TOPSOIL IS PERMITTED ON ROOT FLARES OR WITHIN SIX (6") INCHES OF TREE TRUNKS.
11. TREES MOST HEAVILY IMPACTED BY CONSTRUCTION ACTIVITIES SHALL BE WATERED DEEPLY ONCE A WEEK DURING PERIODS OF HOT, DRY WEATHER. TREE CROWNS SHALL BE SPRAYED WITH WATER PERIODICALLY TO REDUCE DUST ACCUMULATION ON THE LEAVES.
12. PRUNING TO PROVIDE CLEARANCE FOR STRUCTURES, VEHICULAR TRAFFIC AND CONSTRUCTION EQUIPMENT SHALL TAKE PLACE BEFORE CONSTRUCTION BEGINS. ALL PRUNING MUST BE DONE ACCORDING TO CITY STANDARDS PURSUANT TO SECTION 4 OF THE TREE TECHNICAL MANUAL AND AS OUTLINED IN LITERATURE PROVIDED BY THE INTERNATIONAL SOCIETY OF ARBORICULTURE (ISA PRUNING TECHNIQUES).
13. ALL OAK TREE CUTS, INTENTIONAL OR UNINTENTIONAL, SHALL BE PAINTED IMMEDIATELY (WITHIN 10 MINUTES). TREE PAINT MUST BE KEPT ON SITE AT ALL TIMES. ALL PRUNING OR CUTTING TOOLS MUST BE STERILIZED BETWEEN TREES TO PREVENT THE SPREAD OF DISEASE.
14. TREES APPROVED FOR REMOVAL SHALL BE REMOVED IN A MANNER WHICH DOES NOT IMPACT TREES TO BE PRESERVED. REFER TO THE CITY OF PFLUGERVILLE TREE TECHNICAL MANUAL FOR APPROPRIATE REMOVAL METHODS.
15. DEVIATIONS FROM THE ABOVE NOTES ARE CONSIDERED ORDINANCE VIOLATIONS IF THERE IS SUBSTANTIAL NONCOMPLIANCE OR IF A TREE SUSTAINS DAMAGE AS A RESULT.
16. (PRE-CONSTRUCTION CONFERENCE) THE DEMOLITION, GRADING AND UNDERGROUND CONTRACTORS, CONSTRUCTION SUPERINTENDENT AND OTHER PERTINENT PERSONNEL ARE REQUIRED TO MEET WITH THE CITY FORESTER AND/OR ADMINISTRATOR PRIOR TO BEGINNING WORK TO REVIEW PROCEDURES, TREE PROTECTION MEASURES AND TO ESTABLISH HAUL ROUTES, STAGING AREAS, CONTACTS, WATERING, ETC.
17. (VERIFICATION OF TREE PROTECTION) THE PROJECT ARBORIST, LANDSCAPE ARCHITECT OR CONTRACTOR SHALL VERIFY, IN WRITING, THAT ALL PRECONSTRUCTION CONDITIONS HAVE BEEN MET (TREE FENCING, EROSION CONTROL, PRUNING, ETC.) AND ARE IN PLACE. WRITTEN VERIFICATION MUST BE SUBMITTED TO AND APPROVED BY THE CITY FORESTER OR THE ADMINISTRATOR BEFORE DEMOLITION OR GRADING BEGINS.

FOR QUESTIONS CONCERNING THIS DETAIL, PLEASE
CONTACT THE DEVELOPMENT SERVICES CENTER.

ISSUE DATE:			CITY OF PFLUGERVILLE	DWG. #TP-08
REVISIONS				TP08.DWG
			STANDARD TREE PROTECTION NOTES	
DATE	APPROVED	DRAWN	CONSTRUCTION STANDARDS AND DETAILS	
SCALE: N.T.S.				