



## **Urban Forestry Review Overview**

**URBAN FORESTRY REVIEW** is required for any tree removal, construction of new buildings or additions, building demolition, and site work including grading, filling, excavating, or clearing. Review may also be required as part of zoning and platting cases. See Chapter 5 of the Land Development Code for details and any exemptions.

**PERMIT SUBMITTALS** requiring Urban Forestry Review must submit the following information:

- Tree Survey (See attached list for detailed requirements)
- Urban Forestry Plan (see attached list for detailed requirements)

**PROTECTED TREES** are trees that have attained Diameter Breast Height (DBH) of six (6) inches or more and have an overall height of at least fifteen (15) feet. Mesquite (*Prosopis glandulosa*), Hackberry/Sugarberry (*Celtis laevigata*), Chinese Tallow (*Triadica sebifera*), Hercules' Club (*Zanthoxylum clava-herculis*), Honeylocust (*Gleditsia triacanthos*), Osage Orange (*Maclura pomifera*), Callery Pear (*Pyrus calleryana*), Chinaberry (*Melia azedarach*), Eastern Cottonwood (*Populus deltoides*) less than 18 inches DBH, and Eastern Redcedar (*Juniperus virginiana*) less than 13 inches DBH are excluded from this category and are considered Non-Protected Trees. Any Non-Protected Tree used as a replacement (mitigation) tree or as a required tree on a commercial landscape plan shall require replacement itself (if removed) with a tree or trees that meet the caliper or canopy requirements for that lot, land use, or district.

**TREE REMOVAL PERMIT** is only required in those cases involving tree removal. Fees for this are calculated with a \$50.00 base fee plus an additional \$25.00 per tree that is to be removed. Non-protected and dead/declining/hazard trees are excluded. Trees within the exempt area of the building envelope are included in fee calculation.

### **APPROVAL PREREQUISITES AND TIMING**

- If the tree removal is related to a demolition, new construction, grading, building addition, or new subdivision, then the Urban Forestry Review for that parent permit or project shall be approved prior to issuing a tree removal permit. The Tree Survey and/or Urban Forestry Plan should be reviewed and approved under that parent permit or project and only submitted as an approved copy with this permit.
- Where required, tree protection must be installed and inspected prior to issuance of any building, tree removal, or grading permits.



## Urban Forestry Review Required Documentation

The following is an itemized list of content required on a Tree Survey and Urban Forestry Plan sufficient for review of new development, construction, site grading and clearing, or tree removal per Chapter 5 of the Land Development Code. **All submittals must be in PDF format.**

**Tree Survey** (existing conditions only – do not show any proposed site changes)

1. General document information (title block or side bar):
  - a. Address and Lot/Block/Subdivision
  - b. Plan preparer name and contact information
  - c. Date of preparation
  - d. North arrow and scale (bar and text)
  - e. Provide a label for the page/document size (i.e. "Scaled at 24 x 36 in. page size")
2. Location of all existing trees (Non-protected trees may be omitted, but if they are surveyed anyway it may expedite review to include them.)
  - a. Trees must be labeled with unique ID number. Physically ID tagging trees on site is suggested but not required.
3. List of existing trees: List in a table all surveyed and numbered trees. Alternatively, fill out an ***Urban Forestry Workbook*** (spreadsheet) available through our website and submit the file with your plans. Include a column for:
  - a. Tree ID#
  - b. Common Name (be specific, i.e. "post oak" or "American elm")
  - c. Trunk Diameter (measured in inches at 4.5 ft. above grade): For trees that have grown together below the 4.5 ft. mark (you can see a thin line in the bark nearly to the ground) they should be surveyed as separate trees OR you must use the following formula to determine the combined diameter AND you must list each additional trunk measurement in a comments column of the tree list.
    - i. Combined trunk diameter value: = square root ( $diameter\ 1^2 + diameter\ 2^2 + diameter\ 3^2 + diameter\ 4^2$ ). Don't include trunks less than 6 in. diameter.
  - d. Exclusions (does not factor into any calculations for preservation or mitigation)
    - i. NON-P: Non-protected trees (see ***Urban Forestry FAQ*** for definition) or any tree less than 6 inches DBH.
    - ii. OFFISTE: not on subject property
    - iii. DDH: Dead, declining, or hazardous (may require evaluation by City)
  - e. Comments (if needed to clarify something)
4. Existing structures and paving: buildings, pools, decks, fences, and all paving including sidewalks and patios
5. Existing topography: 1 ft. contour intervals preferred unless the site is very large
6. Show and label all property lines and easements.

**Urban Forestry Plan** \* In some cases it may be easier to use the grading plan file as the base layer to create this plan, with non-needed layers turned off for clarity.

1. General document information (title block or side bar):
  - a. Address and Lot/Block/Subdivision
  - b. Plan preparer name and contact information
  - c. Date of preparation (include any revision dates)
  - d. North arrow and scale (bar and text)
  - e. Provide a label for the page/document size (i.e. "Scaled at 24 x 36 in. page size").
2. Location of all trees from the Tree Survey
  - a. Numbered and labeled per the Tree Survey
  - b. Place an "X" on or uniquely symbolize trees to be removed.
3. Critical root zone must be drawn
  - a. This is a circular ground area around each tree which outlines the minimum area of root zone needed to sustain it. Measurement is 1 ft. radius (from trunk) per 1 in. of trunk diameter (i.e. a 10 in. tree would have a 10 ft. radius circle drawn).
  - b. Trees being removed, non-protected, and dead/declining/hazard trees may be excluded.
  - c. Only slight encroachments (paving; structures; grading) in those root areas will be allowed unless approved during the review.
4. The location of proposed tree protection measures
  - a. See the **Tree Protection Guidelines** for specifications on those measures.
  - b. Must be designed and located so construction activity, persons, and equipment are blocked from accessing the aforementioned critical root zones of preserved trees.
  - c. Must be drawn to specify the exact placement location.
  - d. In any case where the fencing will not fully protect the critical root zone of a tree, a dimension must be added to the plan to specify the distance from tree to fence.
  - e. Signage will be required on the fencing to match the following: Type can be rearranged some if needed. Must be all-weather material, laminated, or in a protective sleeve. Minimum size 8.5 x 11 inches.



- As an alternative to 5 through 7 you can fill out an **Urban Forestry Workbook** (spreadsheet) available through our website and submit with the plans and we will provide the calculations and summaries.
5. List of existing trees: Provide same columns as for the Tree Survey and the following additions:
    - a. Canopy area (same area as critical root zone) =  $\text{canopy radius}^2 \times \pi$ , where each inch of trunk diameter is equal to one foot of canopy radius.
    - b. Status (to remove or preserve)
    - c. Exempt Area (located in an exempt area; no effect on tree preservation calculations)
      - i. RBE: Residential building envelope (building foundation plus 10ft buffer)
      - ii. CBE: Commercial building envelope (building foundation plus 5ft buffer)
    - d. Mitigation (removal of Heritage Trees only; Yes/No, don't include actual numbers)
  6. Tree Preservation Summary: leave out any tree that has an exclusion or is in an exempt area
    - a. Total canopy of trees outside of exempt areas
    - b. Required minimum 50% preservation of same trees
    - c. Provided preservation of same trees
    - d. Required mitigation planting (canopy area). 5X canopy of Heritage Trees to remove
    - e. Required mitigation payment (option). \$100 per dbh inch of Heritage Trees to remove
  7. Site Canopy Summary:
    - a. Total area of lot
    - b. Area of the residential or commercial building envelope.
    - c. Required tree canopy coverage area: 50% x (7.a minus 7.b)
    - d. Preserved tree canopy area (from 6.c above)
    - e. Provided tree planting canopy area credit (See **Tree Planting List & Credits**)
    - f. Total provided site canopy (7.d plus 7.e)
    - g. Proposed structures, including accessory buildings, pools, decks, fences, and all paving including sidewalks and driveways.
  8. Existing and proposed topography (we must be able to clearly discern existing vs. proposed). In some cases it may be easier to use the grading plan file as the base layer to create this urban forestry plan, with non-needed layers turned off for clarity.
  9. Boundary of grade change (from areas with no cut or fill). Optional, but suggested to expedite review.
  10. Property lines and easements.
  11. Location, species, and caliper size of tree plantings. Optional, but suggested.

**Large Canopy Trees:**credit/spacing = 2000 ft<sup>2</sup>/30ft

<b>Common Name</b>	<b>Species</b>
green ash	<i>Fraxinus pennsylvanica</i>
American elm	<i>Ulmus americana</i>
cedar elm	<i>Ulmus crassifolia</i>
lacebark elm	<i>Ulmus parvifolia</i>
deodar cedar	<i>Cedrus deodara</i>
Eastern cottonwood	<i>Populus deltoides</i>
'Skyline' thornless honeylocust	<i>Gleditsia triacanthos</i> ' Skyline'
Southern magnolia	<i>Magnolia grandiflora</i>
bur oak	<i>Quercus macrocarpa</i>
chinquapin oak	<i>Quercus muhlenbergii</i>
live oak	<i>Quercus virginiana</i>
post oak	<i>Quercus stellata</i>
Shumard oak	<i>Quercus shumardii</i>
Texas red oak	<i>Quercus buckleyi</i>
pecan	<i>Carya illinoensis</i>
London planetree	<i>Platanus x acerifolia</i>
Mexican sycamore	<i>Platanus mexicana</i>
American sycamore	<i>Platanus occidentalis</i>
black walnut	<i>Juglans nigra</i>

**Medium Canopy Trees:**credit/spacing =1000 ft<sup>2</sup>/15ft

<b>Common Name</b>	<b>Species</b>
Texas ash	<i>Fraxinus texensis</i>
Kentucky coffeetree	<i>Gymnocladus dioicus</i>
pond cypress	<i>Taxodium ascendens</i>
bald cypress	<i>Taxodium distichum</i>
Montezuma cypress	<i>Taxodium mucronatum</i>
ginkgo	<i>Ginkgo biloba</i>
bigtooth maple	<i>Acer grandidentatum</i>
Caddo maple	<i>Acer barbatum</i> var. <i>caddo</i>
chalk maple	<i>Acer leucoderme</i>
'Jeffersred' Freeman's maple	<i>Acer x freemanii</i> 'Jeffersred'
Shantung maple	<i>Acer truncatum</i>
common persimmon	<i>Diospyros virginiana</i>
golden raintree	<i>Koelreuteria paniculata</i>
Eastern redcedar	<i>Juniperus virginiana</i> var. <i>virginiana</i>
Texas walnut	<i>Juglans microcarpa</i>
'Bracken's Brown Beauty' Southern magnolia	<i>Magnolia grandiflora</i> 'Bracken's Brown Beauty'
'Bracken's Claudia Wannamaker' magnolia	<i>Magnolia grandiflora</i> 'Claudia Wannamaker'
'DD Blanchard' Southern magnolia	<i>Magnolia grandiflora</i> 'DD Blanchard'
blackjack oak	<i>Quercus marilandica</i>
Monterrey oak	<i>Quercus polymorpha</i>
'Aristocrat' Callery pear	<i>Pyrus calleryana</i> 'Aristocrat'
'Autumn Blaze' Callery pear	<i>Pyrus calleryana</i> 'Autumn Blaze'
'Chanticleer' Callery pear	<i>Pyrus calleryana</i> 'Chanticleer'
Eldarica (Afghan) pine	<i>Pinus eldarica</i>

Italian stone pine	<i>Pinus pinea</i>
Chinese pistache	<i>Pistacia chinensis</i>
Lacey oak	<i>Quercus laceyi</i>
Western soapberry	<i>Sapindus drummondii</i>

### Small Canopy Trees:

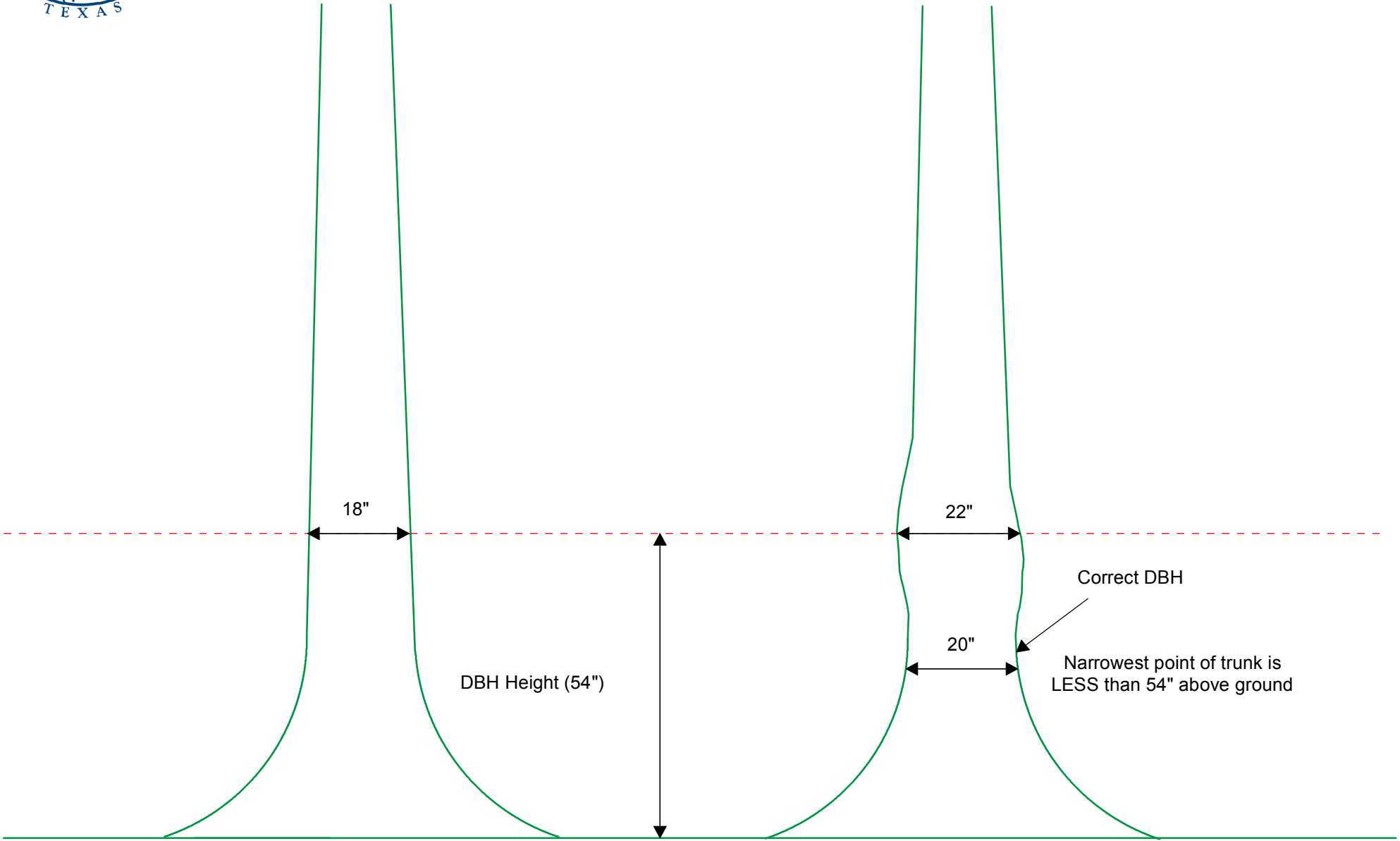
credit/spacing = 100 ft<sup>2</sup>/8ft

Common Name	Species
fragrant ash	<i>Fraxinus cuspidata</i>
rusty blackhaw	<i>Viburnum rufidulum</i>
common button-bush	<i>Cephalanthus occidentalis</i>
Mexican buckeye	<i>Ungadia speciosa</i>
Carolina buckthorn	<i>Frangula caroliniana</i>
vitex, Chase tree	<i>Vitex agnus-castus</i>
rough-leaf dogwood	<i>Cornus drummondii</i>
possumhaw (deciduous holly)	<i>Ilex decidua</i>
'Savannah' holly	<i>Illex x attenuata</i> 'Savannah'
yaupon holly	<i>Ilex vomitoria</i>
ash juniper	<i>Juniperus ashei</i>
'Torulosa' juniper	<i>Juniperus chinensis</i> 'Torulosa'
Texas mountain laurel	<i>Sophora secundiflora</i>
'Little Gem' Southern magnolia	<i>Magnolia grandiflora</i> 'Little Gem'
Japanese maple	<i>Acer palmatum</i>
crape myrtle	<i>Lagerstroemia indica</i>
Eve's necklace	<i>Sophora affinis</i>
Bigelow oak (white shin oak)	<i>Quercus sinuata</i> var. <i>breviloba</i>
Texas persimmon	<i>Diospyros texana</i>
Mexican plum	<i>Prunus mexicana</i>
eastern redbud (inlc. Texas & Mexican varieties)	<i>Cercis canadensis</i>
American smoke tree	<i>Cotinus obovatus</i>
prairie sumac, flameleaf sumac	<i>Rhus lanceolata</i>
desert willow	<i>Chilopsis linearis</i>



Normal Tree Measurement

Abnormal Tree Measurement  
(enlargement at 4.5 ft)



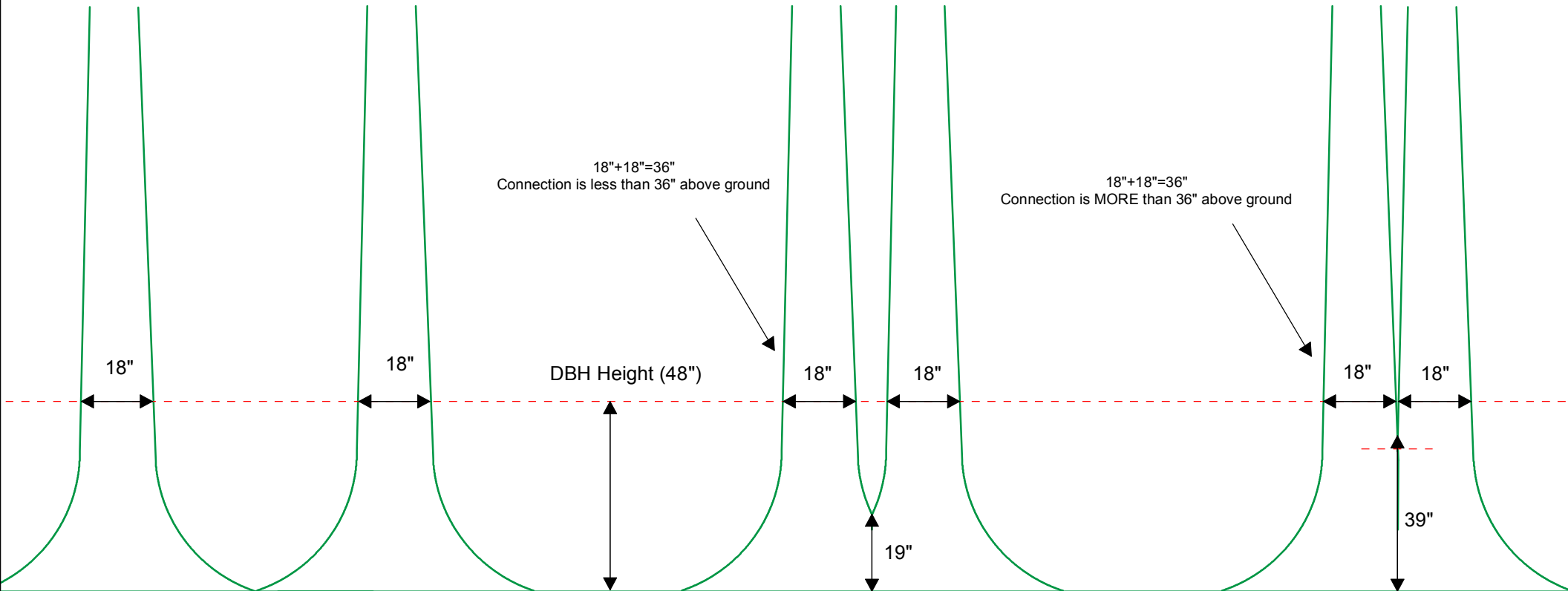
# Tree Diameter Measurement



Two separate trees  
Record separately

Two separate trees  
Record separately

Two separate trees  
Record as one



Clustered Tree Measurement: Trees that have grown together should be recorded as separate trees unless the height of their connection is greater than the sum of their diameters.

True multi-stem trees that are the result of a low branching co-dominant stem (from the same seedling or vegetative sprout) should have each trunk recorded as follows: Tree #(x) - diameter 1; diameter 2, diameter 3, etc.

Calculation of final dbh of multi-trunk trees should be as follows: Square root ( (dbh1 x dbh1) + (dbh2 x dbh2) + (dbh3 x dbh3) )





## **Tree Protection Guidelines**

The following procedures shall be followed for all construction projects which involve activity that requires Urban Forestry Review, unless an alternative is deemed appropriate by the Administrative Official.

- A. Pre-Construction: The ensuing procedures shall be followed prior to construction.
1. All Preserved Trees shall have protective fencing located at the tree's critical root zone. The protective fencing shall be comprised of orange vinyl construction fencing, with a minimum of four-foot (4') approximate height.
  2. Lumber shall be wrapped vertically around the tree trunk and held in place with wire or any other non-damaging method if a tree is within ten (10) feet of the construction of a building or any other situation determined by the Administrative Official that would pose a physical risk to the tree trunk.
  3. In order to prevent damage to low hanging limbs, anything that may be impacted by equipment shall be pruned according to ANSI A300 standards.
  4. Each area of tree protection shall require temporary signage that indicates the area is a "Tree Protection Area" and to "Keep Out". A wording standard will be developed, updated, and maintained by the Administrative Official. The wording shall be in English and Spanish and include the appropriate contact phone number with the City to report violations.
- B. During Construction: The following procedures shall be followed within the limits of the Critical Root Zone (CRZ) of any Preserved Tree for any activity that is subject to the requirements of this chapter.
1. No placement of materials intended for use in construction or waste materials accumulated due to excavation or demolition.
  2. No equipment may be cleaned or other liquids deposited. This would include but not be limited to, paint, oil, solvents, asphalt, concrete, mortar or other materials.
  3. No signs, wires or other attachments, other than those of a protective nature shall be attached to the trees.
  4. No vehicular and construction equipment traffic or parking.
  5. Underground utilities shall be bored underneath trees' CRZ unless pre-approved by the Administrative Official.
  6. Irrigation systems shall be designed to NOT require trenching across the critical root zone of any tree unless otherwise approved by the Administrative Official.
  7. No digging, building, paving, or elevation changes.



## Best Management Practices for Tree Protection

### Purpose

Provide the basic Best Management Practices (BMPs) that can be implemented within any Texas community to initiate the protection and preservation of existing community trees and natural populations of forest and woodlands.

### Benefits

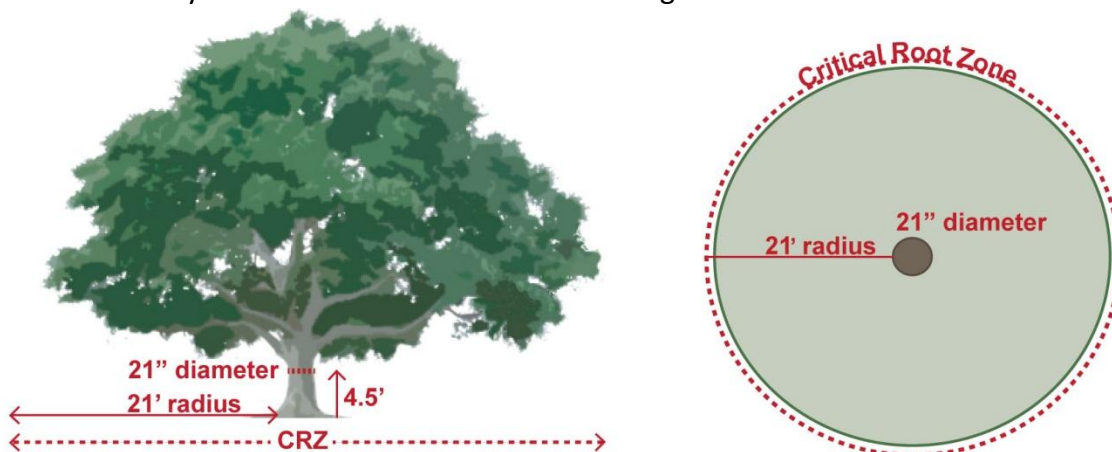
Trees provide a variety of social, economic, and environmental benefits to the community that often times go unnoticed. Trees increase property values, lower energy costs, improve air quality, reduce stormwater runoff, promote walkable communities and increase business sales, among many other benefits. These are some of the reasons many communities have already implemented tree protection codes.

With this in mind, it is crucial to implement BMPs for tree protection early on to ensure trees remain healthy and continue to provide benefits long-term. Since tree roots are not visible to the naked eye, they are often crushed, cut and suffocated during construction. A healthy mature tree has stored energy resources within it and can sometimes withstand temporary disturbances to its roots. However, damage to tree roots and surrounding soils are often permanent and compromise tree health in the short- and long-term. Continual disturbance overtime from pedestrian, vehicle, and construction activities only perpetuate the declining health of the tree and eventually leads to structural failure (dropping of dead limbs or the entire tree falling over), which can damage property and even cause injury to people. Implementing basic BMPs for tree protection early on reduces the likelihood of tree decline and failure due to construction activities.

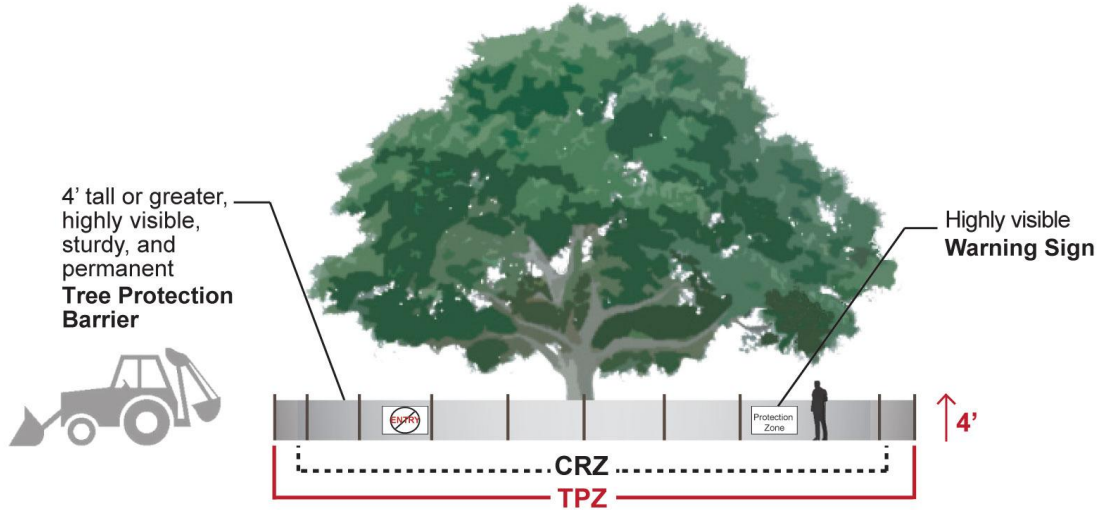
### Definitions

Best Management Practices (BMPs) are general guidelines used in many different disciplines to help define the best currently known or accepted practice for an optimal outcome.

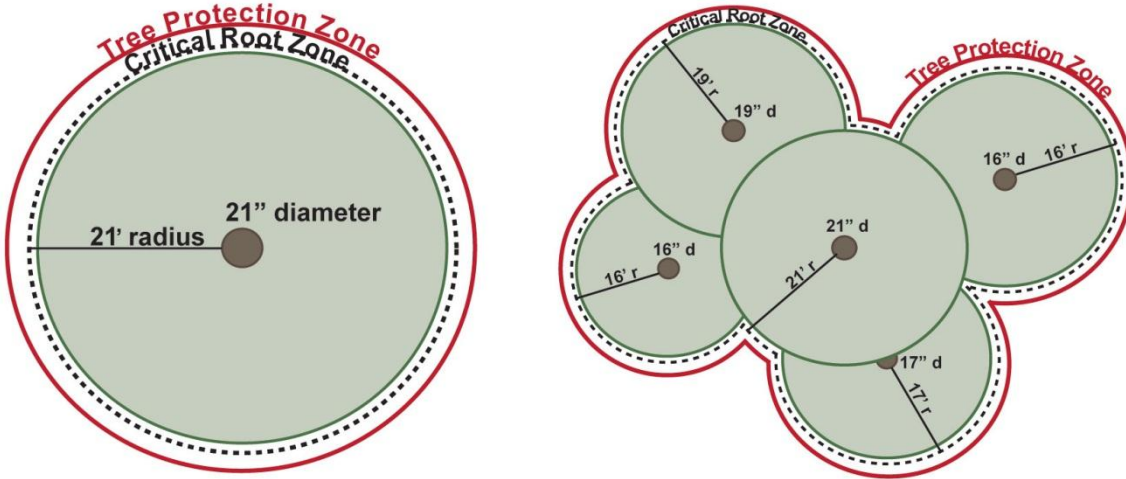
Critical Root Zone (CRZ) is the area of soil extending from the tree trunk where roots required for future tree health and survival are located. This area can also be defined as a circle with a *minimum radius* of 1' for every 1" in trunk diameter at 4.5" above ground.



Tree protection barrier encloses the Tree Protection Zone and is at least 4' tall, highly visible, sturdy, permanent and has warning signs on or near it for the duration of any construction activities.



Tree Protection Zone (TPZ) is an area where construction activities are prohibited or restricted to prevent injury to preserved trees, especially during pre- construction and construction, and includes the Critical Root Zone and/or beyond.



### Best Management Practices

To promote the health of trees and stands of trees before, during, and after construction activities, follow these basic BMPs:

#### Planning Phase

1. Before assessing trees and other site structures and conditions, mark the site boundaries on plans and in the field to delineate which trees and stands of trees will be inventoried.
2. Perform a tree inventory that includes at minimum the location, size, and health of each tree and delineates quality stands of trees. Scope of the inventory should be based on communication and needs of the project team (developer, planner, engineer, architect,

landscape architect, and other professionals involved), as well as City ordinances. This is the time to confer with the project team on conceptualizations for site design, so that way long-term tree protection and health gets integrated into the design.

#### Tips

- When selecting trees to be saved on site, other factors to consider include tree structure, tree species and tolerance to construction activity, age and health of trees, and soil properties.
- In addition to preserving existing trees on site, consider communicating with the project team on areas suitable for future tree planting so that way healthy soils can be preserved during and after construction activities for the preservation of all trees on site.
- It could be useful to write a tree management report that identifies which trees are most suitable for preservation and those that should be removed due to potential impacts from construction activities or structures and infrastructure.

#### *Design Phase*

3. Communicate with the project team to accurately site structures and utilities and determine the trees to remain on site. Conserve and protect trees in stands or groups where possible. Make sure the trees and stands of trees selected to be saved go into plans and construction documents. Include in all plans the Tree Protection Zone (TPZ) for all saved trees to avoid conflict with the protected area and placement of structures and utilities during construction.

#### Tips

- Consider protecting beyond the Critical Root Zone (CRZ) of a tree to further protect the roots and soil essential to tree health and structural stability.
- If there are grade changes occurring on site, work with the landscape architect or engineer to incorporate the use of tree islands and wells to prevent disturbance to tree roots.

#### *Pre-construction Phase*

4. Prior to pre-construction activities, including tree removal, access roads, construction staging areas, and building layout, erect tree protection barriers to visually indicate TPZs. Be sure to:
  - Use tree protection barriers that are highly visible, sturdy, and restrict entry into the TPZ.
  - Install or erect signs along the tree protection barrier stating that no one is allowed to disturb this area.
  - Remove any branches or trees that pose an immediate risk to structures or people prior to any construction activities.

#### Tips

- Include highly visible language on all signs that specifies the financial penalties for violating policies.

#### *Construction Phase*

5. Communicate the intent of the tree protection barriers to the construction manager and workers to ensure that TPZs are not disturbed during construction activities. Have the construction manager sign a contract of compliance.

6. Prohibit these activities in the TPZ:
  - Stockpiling of any type, including construction material, debris, soil, and mulch
  - Altering soils, including grade changes, surface treatment, and compaction due to vehicle, equipment, and foot traffic
  - Trenching for utility installation or repair and irrigation system installation
  - Attaching anything to trunks or use of equipment that causes injury to the tree
7. Schedule site visits to ensure the contract is being met by the construction manager and that tree health is not being compromised by construction activity. Inspect and monitor trees for any decline or damages.
8. Keep in place all tree protection barriers until the project is completed.

#### Tips

- Sometimes site boundaries and existing site conditions prevent complete protection of the CRZ, so consider performing construction activities in these areas manually and installing trunk protection to prevent mechanical damage to the trunk.
- Apply at least 6" of mulch within the TPZ to prevent disturbance to tree roots and soil.
- Prior to any construction activity, consider taking photographs of the trees to be saved and surrounding areas to identify any construction damage caused to trees during construction.
- Add a penalty clause in the contract of compliance that prevents moving or altering the tree protection barrier and entering the TPZ.

#### Post-construction Phase

9. Perform a final inspection and continue monitoring after construction. Monitoring includes maintaining mulch, managing soil moisture, assessing tree damage, inspecting for insects and pests, and fertilization if needed.

#### Resources

- For information on managing trees during construction and guidelines for determining tree protection zones, see *Best Management Practices: Managing Trees During Construction*
- For more information on tree protection BMPs on construction and development sites, see *A Best Management Practices Guidebook for the Pacific Northwest*  
<http://oregoncommunitytrees.org/tree-faqs/additional-resources/how-to-plant-a-tree/> and *A Community Forestry and Development Guide*  
<http://www.urbanforestrysouth.org/resources/library/tree-protection-bmps-for-contractors-and-builders/view?searchterm=urban>
- For information on conserving wooded areas in developing communities see *Best Management Practices in Minnesota*  
<http://www.dnr.state.mn.us/forestry/urban/bmps.html>
- Visit the Arlington Virginia webpage for standards on construction drawings  
<http://www.arlingtonva.us/departments/CPHD/planning/docs/CPHDPlanningDocsLandscapeDocs.aspx>