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Allandale Neighbor

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11/01/2010

To: Zoning and Platting Commission
Ref: Heritage Tree Variance Request for 4709 Highland Terrace
Hearing Date: 11/02/2010
COA Contact: Keith Mars

Because Allandale Neighborhood is home to many heritage trees that enhance the lives and property of our community, the Allandale Neighborhood Association supports the Heritage Tree Ordinance and the protection it gives to older trees here and throughout Austin. With the increase in developmental pressure, the City of Austin's commitment to this preservation must be a priority.

Previous action by ZAP on this retroactive variance request was based on the (proposed) mitigation rate of $200 per inch X3 for Heritage trees. Their action was also based on the need for more extensive mitigation concerning non-compliant removals.

In that ANA finds heritage trees are of great value to our community and that they are irreplaceable, we wholeheartedly support these criteria for mitigation.

Cynthia B. Keohane
President, Allandale Neighborhood Association

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Anguiano, Dora

From: Mars, Keith
Sent: Tuesday, November 02, 2010 9:45 AM
To: Anguiano, Dora
Cc: Embesi, Michael
Subject: FW: Statement on Agenda Item

FYI: Comment from the public for 4709 Highland Terrace.

From: andrea torres [redacted]
Sent: Tuesday, November 02, 2010 9:15 AM
To: Mars, Keith
Cc: Krista Saeger; Tonianne Soster
Subject: Statement on Agenda Item

Mr. Mars,
Please accept this statement from the Highland Park West Balcones Area Neighborhood Association (HPWBANA) regarding agenda item #1, Retroactive Variance at 4709 Highland Terrace for the Zoning & Platting Commission meeting on Tuesday, November 2, 2010.

Thank you.
Andrea Torres
President
Highland Park West Balcones Area Neighborhood Association

The Highland Park West Balcones Area Neighborhood Association (HPWBANA) is made up of properties with many large trees, including many old oak and pecan trees. The trees are a draw for those looking to live here and are a positive addition to property values of homes in this neighborhood. To this end, the neighborhood association has undertaken education efforts concerning oak wilt to better protect the trees in the neighborhood. We also appreciate the City's efforts to protect our heritage trees. It is our understanding that the Zoning and Platting Commission will discuss and possibly act upon rescinding a variance and amending action related to the damage/impact of a Heritage Tree. We ask that you take into consideration the benefit that these trees bring to our neighborhood and to our property values, and ensure that they are protected. Our hope is that this never happens again and we appreciate any action you can take to help achieve that.

To: Keith Mars

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PUBLIC HEARING INFORMATION

Although applicants and/or their agent(s) are expected to attend a public hearing, you are not required to attend. However, if you do attend, you have the opportunity to speak FOR or AGAINST the proposed development or change. You may also contact a neighborhood or environmental organization that has expressed an interest in an application affecting your neighborhood.

During a public hearing, the board or commission may postpone or continue an application's hearing to a later date, or recommend approval or denial of the application. If the board or commission announces a specific date and time for a postponement or continuation that is not later than 60 days from the announcement, no further notice is required.

A board or commission's decision may be appealed by a person with standing to appeal, or an interested party that is identified as a person who can appeal the decision. The body holding a public hearing on an appeal will determine whether a person has standing to appeal the decision.

A zoning ordinance amendment may include a conditional overlay which would include conditions approved by the Land Use Commission or the City Council. If final approval is by a City Council's action, there is no appeal of the Land Use Commission's action.

An interested party is defined as a person who is the applicant or record owner of the subject property, or who communicates an interest to a board or commission by:

- delivering a written statement to the board or commission before or during the public hearing that generally identifies the issues of concern *(it may be delivered to the contact listed on a notice)*; or
- appearing and speaking for the record at the public hearing;

and:

- occupies a primary residence that is within 500 feet of the subject property or proposed development;
- is the record owner of property within 500 feet of the subject property or proposed development; or
- is an officer of an environmental or neighborhood organization that has an interest in or whose declared boundaries are within 500 feet of the subject property or proposed development.

A notice of appeal must be filed with the director of the responsible department no later than 14 days after the decision. An appeal form may be available from the responsible department.

For additional information on the City of Austin's land development process, visit our web site: **www.ci.austin.tx.us/development.**

Written comments must be submitted to the board or commission (or the contact person listed on the notice) before or at a public hearing. Your comments should include the name of the board or commission, or Council; the scheduled date of the public hearing; the Case Number; and the contact person listed on the notice.

Contact: Keith Mars, 512-974-2755
Public Hearing: Zoning and Platting Commission, November 2, 2010

Kristin Bradfield
Your Name (please print)

☐ I am in favor
☒ I object

4712 Highland Terrace
Your address(es) affected by this application

Kristin Bradfield — 11/1/10
Signature — *Date*

Daytime Telephone: 512-420-8150

Comments: Many trees have been removed from property during house demo etc. All trees are big and old and part of the charm of our street. I disagree with cutting any down. Our remodel worked around the trees - we don't think any should be removed

If you use this form to comment, it may be returned to:
City of Austin
Planning and Development Review – 4th floor
Keith Mars
P. O. Box 1088
Austin, TX 78767-8810

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SECTION 3 - TREE AND NATURAL AREA PRESERVATION

Quick Links to Major Sections:

3.1.0 GENERAL

The information in this section is intended to define the technical design criteria needed to achieve the tree and natural area preservation goals identified in Chapter 25-8, Subchapter B, Article 1 of the Land Development Code (LDC). These rules apply to all land located in the city limits and to the City's extraterritorial jurisdiction areas as identified in Section 3.3.1.

A list of submittal requirements necessary to show compliance with the provisions of the LDC and these rules can be found in the Administrative Criteria Manual.

The site plan approval process is outlined in Chapter 25-5 of the LDC. Procedures for inspection and enforcement information are also found in Chapter 25-1.

Appeals concerning the enforcement of these rules shall be brought to the Director of the Department of Environmental Protection.

3.2.0 RESERVED

3.3.0 TREE SURVEYS

Quick Links to Tree Surveys Sections:

3.3.1 Survey Requirements by Jurisdiction

A. Full and Limited Purpose Annexation Areas.

The following types of projects require a survey of all trees eight (8) inches in diameter and larger:

- Site specific projects which are commercial, multifamily residential or public facilities;
- Subdivisions and linear development projects within a water supply watershed which are subject to the Comprehensive Watersheds Ordinance (see specific requirements in Section 3.3.3 below).
- The following types of projects require a survey of all trees 19 inches in diameter and larger:
- Subdivisions and linear development projects not subject to the Comprehensive Watersheds Ordinance;
- Single-family duplex residential projects.

B. Extraterritorial Jurisdiction Areas.

In Water Supply Rural or Water Supply Suburban Watersheds, all projects subject to the Comprehensive Watersheds Ordinance require a survey of all trees eight (8) inches in diameter and larger or acceptable alternatives (see specific requirements in Section 3.3.3 below).

Capital Improvement Program projects in any portion of the two (2) or five (5) mile extraterritorial jurisdiction areas must comply with tree survey requirements as if they were inside the city limits (see Section 3.3.1 A above).

C. Hill Country Roadway Corridor Areas.

In addition to the standard eight (8) inch tree survey, all Hill Country roadway projects require a survey of certain species of trees down to six (6) inches in diameter for individual trees and down to two (2) inches in diameter for tree clusters (see specific requirements in Section 3.3.4 below).

3.3.2 General Tree Survey Standards

A. Required Field Data.

Tree data submitted for site plan or permit approval must be obtained from a ground survey. The data which must be obtained in the field are tree locations, diameters and types. Crown area is discussed later in the Environmental Criteria Manual and need not be considered as part of required field data.

1. Location.

Tree surveys must be as accurate as possible, but need not be certified. Levels of inaccuracy which will result in a failure to comply with the City tree preservation design criteria and construction specifications may necessitate new surveys and plan adjustments either prior to permit approval or project release.

Trees with branches extending onto a site or project easement must be surveyed. Trunk locations of off-site trees may be estimated to avoid trespass problems.

Methods for locating trees may vary depending on the size of the project and number of trees. For small areas with few trees, taping the distance to the center of the trunk from two (2) known points is a viable option. For large, tree covered sites, using a total station survey system from a platform elevated above the tree line may be the most practical method.

2. Diameter.

Diameters of existing trees are measured at 4-½ feet above grade (diameter at breast height). If the tree is on a slope, measure from the high side of the slope. Measure above or below unusual swells in the trunk (see Figure 3-1 in Appendix V of the Environmental Criteria Manual).

To determine the diameter of a multi-trunk tree, measure all the trunks; add the total diameter of the largest trunk to ½ the diameter of each additional trunk. 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.

For Ash Juniper (cedar) trees (Juniperus ashei), only single-trunk trees with diameters eight (8) inches and greater or multi-trunk specimens with at least one such sized trunk need be surveyed. The intent of this provision is to encourage the preservation of those mature cedars which provide valuable habitat for various species, while lessening the overall cost of the survey.

Diameter measurements should be accurate to the nearest ½ inch. This data is used in the determination of tree significance and replacement value (if necessary).

Trees may be measured with a caliper, cruise stick, standard tape measure or diameter tape, all of which are available at forestry suppliers. Calipers are accurate, but difficult to handle. Cruise sticks are less accurate, but efficient for quick measurements. Standard tape measures are accurate, but require transposing from circumference to diameter. Diameter tapes are accurate and have the advantage of giving readings in diameter inches. End hooks and automatic recoiling on some models provide maximum efficiency.

3. Type.

Tree types should be accurate to the species level (e.g. Post Oak, Spanish Oak, Cedar Elm, etc.).

Tree types may be listed by common names or botanical names (e.g. Post Oak or Quercus stellata).

Good field references for the Austin area are:

- **Native and Naturalized Woody Plants of Austin and the Hill Country** by Brother Daniel Lynch
- **Trees of Central Texas** by Robert A. Vines

B. Recommended Additional Field Data.

Additional information which would greatly aid project designers and reviewers in their efforts would include crown configuration, crown clearance, condition, spot elevation and tree number.

1. Crown Configuration.

If a tree has a crown which is skewed in one (1) 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.

The critical root zone discussed in Section 3.3.2 D below supplants the "crown size" required by the LDC.

2. Crown Clearance.

This information is often critical in determining whether a given structure or vehicular use area can practically be placed within the drip line 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.

5. Tree Numbers.

Tagging trees in the field with numbers corresponding to the trees shown on plans is extremely useful. Such numbered tags reduce time spent by project designers, plan reviewers, and contractors in determining the location of any given tree. Numbered aluminum tags are available from most survey and forestry suppliers.

C. Limits of Surveys.

If there is an area which is known at the time of the survey to be on the project site or easement but outside the buildable area, a limits of construction line may be established. Trees beyond this line need not be surveyed provided the following conditions are met:

- The limits of construction must be fenced throughout all phases of construction.
- A general description of the numbers, types and sizes of trees in the area beyond the limits of construction must be provided as a plan note (see Figure 3-2 in Appendix V of the Environmental Criteria Manual).

D. Plan Graphics.

The standard tree graphics discussed below are important to provide consistent information in the most useful format for efficient plan review.

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 Figure 3-2 in Appendix V of the Environmental Criteria Manual). For example, an oak tree with a trunk diameter measuring 15 inches would be represented to scale on plans with a 15 foot circle.

2. Critical Root Zone.

Trees are to be represented on plans by a concentric circle centered on the trunk location, with a diameter equal in feet to twice the number of inches of the tree's trunk diameter (see Figure 3-2 in Appendix V of the Environmental Criteria Manual).

The area within this circle is referred to as the critical root zone (CRZ). The CRZ is used by plan reviewers to determine compliance with design standards and construction specifications.

A circle is graphically efficient to produce and represents the most likely configuration of a tree's root pattern even when the crown is skewed or one-sided. The ratio of circle diameter to trunk diameter is based on typical drip line distances noted on open grown

trees with full crowns. The drip line standard for critical root zone area is being used as a practical matter despite the fact that a tree's roots often extend two (2) to three (3) times beyond the drip line.

Trees proposed to be retained are to be represented by a solid circle.

Trees proposed to be removed are to be represented by a dashed circle.

Trees proposed to be planted are to be graphically differentiated from existing trees.

3. Diameters and Types.

Tree diameters and types must also be shown on the plan. This information should be shown adjacent to each trunk location. Displayed in this manner the tree survey data is more efficiently used by project designers and plan reviewers.

For very large sites with many trees, this data may be shown in legend form referenced by a tree number adjacent to each trunk location subject to the following restrictions:

- Legends are to be shown on the plan sheets on which the corresponding trees appear.
- Legends may be submitted in book format for review purposes, but the legend must also be shown on plan sheets to assure legal standing for the tree survey.

Legends can be useful because they allow for the presentation of other data such as crown configurations, heights, conditions, etc.; however, they are difficult for designers and plan reviewers to use efficiently.

3.3.3 Tree Survey Standards for Environmental Assessments (for Water Supply Watersheds) LDC Chapter 25-8, Subchapter B, Article 1

A. Ground Survey.

All subdivisions and site plans (as defined by 25-1-21 of the LDC) for projects located in water supply watersheds require a survey of trees eight (8) inches in diameter and larger using the standards in Section 3.3.2 above.

B. Aerial Photography Alternative.

An aerial photography interpretation may supplant the ground survey for preliminary analyses of large scale projects such as subdivisions, utility corridors and golf courses.

C. Photography Standards.

The aerial photography must be flown at an appropriate time of year such that all significant tree types are visible. This would typically be from April through November for deciduous trees. Some hill country sites dominated by Live Oaks and Junipers may be flown during the winter months.

Interpretation done without computer enhancement must be from photographs flown at a minimum scale of approximately one (1) inch = 400 feet.

To provide maximum location accuracy potential, interpretations must be done from stereo nine (9) inch X nine (9) inch photographs.

An acceptable alternative to stereo photography is the use of mono photographs which have been rectified and flown with clearly marked ground control points.

Another alternative is computer generated imagery from single photos flown at a minimum scale of approximately one (1) inch = 2000 feet. This imagery must be rectified and digitized using known ground control points. Other alternatives will be considered which give equal or greater accuracy potential.

D. Photo Interpretation.

The aerial photography must be interpreted to delineate as accurately as possible all ground cover types, describing each type by general species composition and range of tree diameters. Also, the interpretation must show the approximate locations and types of any trees with crown diameters equal to or greater than 40 feet and other significant vegetation deserving special consideration (see Figure 3-3 in Appendix V of the Environmental Criteria Manual). This level of detail will normally require supplemental field work. The capability of identifying large trees in a tree covered area is sometimes enhanced through the use of stereo photographs.

This interpretation must be drawn on a plan showing topography and the locations of basic development features (e.g., roadways, utility easements, lot lines, etc.) (see Figure 3-3 in Appendix V of the Environmental Criteria Manual). This plan may supplant the aerial photography mylar overlay required for the vegetative description portion of the engineer's report. When submitting for review, the applicant must provide the aerial photography along with the plan.

3.3.4 Tree Survey Standards for Hill Country Roadway Corridors

A. Basic Survey.

All site plans for projects located in Hill Country Roadway corridors require a survey of all trees eight (8) inches in diameter and larger using the standards in Section 3.3.2 above (LDC Chapter 25-8 Subchapter B, Article 1).

B. Additional Survey Requirements.

In addition to the standard requirements, smaller individual trees or tree clusters of specified native species must also be surveyed. These species include those listed in the code along with other small native tree species which have been added to the list. (The code language "... for small native trees such as ..." allows for the addition of small native tree species not listed directly in the ordinance.) Species which are to be surveyed under this requirement are included in the chart in Appendix F.

For all the listed native species, the tree survey must include:

- All individual trees with trunk diameters greater than six (6) inches; and,
- All tree clusters with three (3) or more trunks (two (2) to six (6) inches in diameter) located within ten (10) feet of each other.

The method of surveying these small tree clusters is illustrated in Figure 3-4 in Appendix V of the Environmental Criteria Manual.

3.4.0 TREE PHYSIOLOGY

The following is a collection of facts regarding tree physiology which provide the basis for the subsequent design standards for preservation and the City of Austin Standard Specifications and City of Austin Standards (see Figure 3-5 in Appendix V of the Environmental Criteria Manual).

3.4.1 Roots

Roots provide three (3) primary functions: 1) support, 2) intake of nutrients and water and 3) storage of food reserves. Cutting a large root has the triple effect of reducing the tree's anchorage, destroying the nutrient intake potential beyond that point and reducing food reserves by a substantial amount.

Tree roots must respire in order to survive. Conditions which restrict the availability of oxygen effectively suffocate affected roots. Such conditions will also result in the accumulation of carbon dioxide and other toxic gases in the soil which adversely affect associated soil microfauna as well as the roots. Typical conditions which inhibit this essential gas exchange are compaction of the soil, addition of new soil (fill) and ponding of water.

Trees establish a balance between root and crown areas such that destroying a portion of one may lead to the destruction of a portion of the other.

Roots of adjacent trees are typically intermingled through the sharing of rootstock by several stems, grafting of roots by like species of trees or a general sharing of the same space. It is important to make a clean cut when severing roots rather than tearing them. A ripping action (as with a dozer) affects roots of one (1) or more trees far beyond the point of contact. Roots left jagged are also unable to produce the callous growth necessary to close the wound; thus decay becomes more extensive. In addition, cleanly cut roots can generate new roots more readily than torn roots.

The soil pH is an important factor in the functioning of the root system. Trees in the Austin area are already growing in highly alkaline soils. Leaching of lime from concrete can increase alkalinity to potentially lethal levels.

Approximately 99 percent of a tree's roots occur within the first three (3) feet of soil and most of the fine feeder roots which collect the moisture and nutrients are located in the first four (4) inches of soil.

Typically, a tree's root system extends as much as two (2) to three (3) times the distance to the drip line.

3.4.2 Trunk

A tree's trunk serves as a conduit for nutrients and water going to the leaves and food materials going to the roots. In addition, it is a major food reserve storage area.

The sapwood contains the cells which serve as the upward transport system for nutrients and water. In most trees, the sapwood is found within the last few inches of the outer trunk wood.

The phloem, located in a very thin layer of cells just inside the bark, serves as the downward transport system for food materials, enzymes, hormones and other materials produced by the leaves.

The cambium is the tissue layer located between the phloem and sapwood that creates the cells for both transport systems.

The proximity of all these important structures to the outer extremities of the trunk and branches make their protection against injury so critical.

Contrary to popular belief, tree wound dressing is not a corollary to antiseptics used on animal wounds which prevent infection and promote healing. The only sure cure is prevention where trees are concerned. Trees never "heal" wounds, but rather, seal off or compartmentalize the affected area provided all conditions are right for such activity. There are arboricultural techniques which can increase the chances of a tree successfully compartmentalizing some wounds, but simply applying tree wound dressing is not chief among them. (Note: Because tree wound dressing masks odors emitted by the wounds which attract insect vectors, it is a vital procedure in the protection of oak trees against the oak wilt fungus. Tree wound dressing should be applied to oaks immediately after wounding.)

The root collar is the interface of the tree trunk and root system evidenced by a flaring of the trunk near the ground surface. The proximity of this structure to the root system promotes the misconception that the root flare can be covered with fill such as top soil dressing. This portion of the trunk is not adapted to the same conditions as the underground roots. In addition to reducing aeration, fill material which tends to keep the root flare and trunk area moist, can facilitate invasion by soil borne fungi and insects. When this happens, the tree trunk can be girdled by decay agents, resulting in death. Some species of trees are more susceptible to this than others; however, covering the root flare should be avoided as a general rule.

3.4.3 Crown

The tree's branches and leaves make up the crown. Branches serve the same transport and food storage function as the trunk in addition to giving rise to the leaves. Leaves manufacture the food and other substances required to sustain the whole tree.

Removal of more than 30 percent of a tree's crown can severely impact the tree's ability to provide sufficient food quantities for continued growth or protection against debilitation by disease.

3.5.0 DESIGN CRITERIA

It is the responsibility of the Department of Environmental Protection to review development plans for compliance with the tree and natural area preservation requirements of the Land Development Code. The City arborist must make the initial determination whether trees have been adequately considered in the design process. This requires:

- The identification of significant trees;
- An assessment of conformance with minimum design criteria for tree preservation;
- An analysis of design constraints and alternatives; and
- The negotiation of mitigative measures when necessary.

A discussion of each of these aspects of plan review follows.

3.5.1 Significant Tree Identification

The Land Development Code addresses tree preservation in terms of saving "protected" trees (Tree Ordinance), designing around "significant" trees and vegetation (Comprehensive Watersheds Ordinance)

or preserving the "natural landscape character" (Landscape Ordinance) of an area. In any case, there must be some determination as to what constitutes a significant tree or group of trees. Not all "protected" trees are significant due to such factors as their species or condition. Conversely, some smaller trees may have significance due to their rarity, screening potential or other factors.

A. Tree Evaluation Method.

Whenever there is a question about which trees in a project area should be preserved, the tree evaluation method discussed below can be useful.

A designer can walk the project area with these criteria in mind and perform a rough analysis of the tree situation. Some groups of trees as well as individual trees can be identified as potential design constraints early in the process. In situations where it is necessary to choose between two (2) or more significant trees, a more detailed analysis can be performed by competent professionals in order to assign numerical values to each. These relative values can enhance the decision-making process.

In addition to the benefits described above, this tree evaluation method can be used as a "finding of fact." This can be submitted to the Planning Commission in the rare situation where no agreement can be reached over the removal of significant "protected" trees, or over the issue of whether the natural character of the site has been adequately preserved.

The method for evaluating trees for the purposes of this document is based on ten (10) factors: condition, type, size, aesthetics, energy conservation/heat abatement, safety, adjacent trees, water quality protection/soil conservation, wildlife habitat and historic significance. Each factor is graded on a scale from 1 to 4 (1 being low). Some of the factors are weighted to reflect greater importance in different situations. Weights which will be applied are as follows:

Sites	Aesthetics	(2 x Score)
Waterway Alterations	Wildlife Habitat	(2 x Score)
Utility Lines	Wildlife Habitat	(2 x Score)

The sum of scores for all ten (10) factors determines the relative value of a tree or group of trees. Given the assigned weights, the range of possible scores is 11 to 44. To give some guidance to project designers and permit applicants, scores are categorized as follows:

11 to 22 - Low Value

23 to 32 - Medium Value

33 to 44 - High Value

A discussion of each factor follows:

1. Condition. In assessing a tree's condition, the arborist considers trunk condition, growth rate, tree structure, insect and disease problems, crown development and life expectancy. A score is assigned as follows:

1 = Poor
2 = Fair
3 = Good
4 = Excellent

2. Type.

The species of trees native to, naturalized in, adaptable to or frequently planted in the Austin area have been divided into four (4) classes based on overall quality. The chart in Appendix F indicates how each species fits in this general classification. A score is assigned as follows:

1 = Class IV
2 = Class III
3 = Class II
4 = Class I

3.Size.

Tree sizes are divided into four (4) categories. A score is assigned for each size category as follows:

1 = Less than 8 inches
2 = 8 to 13.9 diameter inches
3 = 14 to 18.9 diameter inches
4 = 19 diameter inches and larger

4. Aesthetics.

Trees located on the perimeters of a project area can serve to buffer or screen the project from roadways and adjacent tracts and therefore have a high aesthetic value. Trees may also score high in this category regardless of there location if they are in good condition and have exemplary form. Such trees should be preserved as aesthetic enhancements to the project. A score is assigned as follows:

1 = Poor
2 = Fair
3 = Good
4 = Excellent

5. Energy Conservation/Heat Abatement.

If a tree is shading a building, parking or pedestrian use area in its existing situation, it receives a high score under this category. The energy conservation/heat abatement potential is also considered even if there are no existing benefits. For example, large trees west of a buildable area will score high. A score is assigned as follows:

1 = Poor
2 = Fair
3 = Good
4 = Excellent

6. Safety.

If a tree is in a hazardous situation due to external factors related to man-made features (not inherent to the condition of the tree) such as its proximity to power lines, its location relative to a road intersection, etc., it receives a low score. Scores reflect the feasibility of mitigating the safety problems, and are assigned as follows:

1 = Hazardous; Low Mitigation Potential
2 = Hazardous; Medium Mitigation Potential
3 = Hazardous; High Mitigation Potential
4 = Not Hazardous

7. Adjacent Trees.

The proximity of other trees has a bearing on a tree's value. Everything else being equal, a lone tree has greater value than one (1) tree of many. The fate of other trees in the vicinity also affects this rating factor. A score is assigned as follows:

1 = Many trees; High Retention Potential of Adjacent Trees
2 = Many trees; Low Retention Potential of Adjacent Trees
3 = Few Adjacent Trees
4 = Lone Tree

8. Water Quality Protection/Soil Conservation.

Trees help reduce stormwater runoff and enhance ground water recharge by breaking the impact of raindrops and improving soil structure. A tree's effectiveness in this capacity is correlated with the size of the crown and root zone area. Large trees with full crowns and unrestricted root zones score highest in this category. A score is assigned as follows:

1 = Poor
2 = Fair
3 = Good
4 = Excellent

9. Wildlife Habitat

This factor is rated on the basis of the intrinsic value of the type of tree as a provider of food and forage and general wildlife cover characteristics, or on the basis of field observations of a particular tree, whichever is greater. The chart in Appendix F provides the intrinsic values for the major genera of trees in the Austin area.

Regarding field observations, an individual tree may rate higher than the assigned intrinsic value of the genus due to such things as the presence of food bearing parasites or epiphytes (e.g., mistletoe or grapes) or due to the potential for or actual presence of wildlife nesting cavities. A score is assigned as follows:

1 = Poor
2 = Fair
3 = Good
4 = Excellent

10. Historical Significance.

The highest rating in this category is reserved for trees which fit one of the following criteria:

- The tree is on a registry of significant trees.
- The tree has been documented as historically significant.
- The tree is rare in the Austin area.

- Due to its location and size, the tree serves as a significant landmark on the landscape.

Since historical significance is largely a function of age, the arborist's estimate of the age of the tree also has a bearing on this value. Scores are assigned as follows:

1 = Less than 40 Years Old
2 = 40 to 80 Years Old
3 = Greater than 80 Years Old
4 = Registered, Rare or Landmark Tree

3.5.2 Tree Preservation Design Criteria

A. Critical Root Zone Impacts.

As noted in Section 3.4.0, a tree's root system ranges well beyond the drip line. The critical root zone (CRZ) has been established (see Section 3.3.2 D 2) to set a practical limit beyond which any loss of roots would not have a significant impact on a tree's survival.

Design constraints often dictate that trees slated for preservation have some encroachment on their critical root zone. Weighing this fact with what appears to be an acceptable degree of risk to most trees, the following minimum design criteria (maximum allowable impacts) have been established (see Figure 3-6 in Appendix V of the Environmental Criteria Manual):

- A minimum of 50 percent of the critical root zone must be preserved at natural grade, with natural ground cover.
- No cut or fill greater than four (4) inches will be located closer to the tree trunk than ½ the CRZ radius distance.

This standard requires that construction impacts associated with various design features be considered. For example, the installation of a curb typically requires excavation of two (2) feet behind the back of curb. In such a case, the line of impact on the CRZ will be two (2) feet behind the curb line shown on the plan (see Figure 3-7 in Appendix V of the Environmental Criteria Manual).

In order to assure that the remaining root zones are adequately preserved, tree protection fencing is required for all trees within the limits of construction. Project designers are required to show the specific locations of tree protection fencing on the grading and tree protection plan. Fencing should be indicated to protect the entire Critical root zone (CRZ) area or as much of the CRZ as is practical. Fencing is required to be chain-link mesh at a minimum height of five feet. A two inch layer of mulch within the entire available root zone area is required for **All** trees which have any disturbance indicated within any portion of the critical root zone.

B. Crown Impacts.

The following is the minimum design criterion (maximum allowable impact) for tree crowns:

- A maximum of 30 percent of the viable portion of a tree's crown may be removed.

Construction methods must also be considered when implementing this design standard. For example, a building wall may only require the removal of 30 percent of the crown, but the scaffolding necessary to construct the building may require the removal of another 20 percent of the crown (see Figure 3-9 in Appendix V of the Environmental Criteria Manual).

C. Deviations from Minimum Design Criteria.

These criteria represent minimum standards for determining whether or not a tree is "preserved". Greater impacts may be allowed, provided that all design alternatives have been proven unfeasible and that some acceptable form of mitigation such as a remedial care program is negotiated (see Section 3.5.4 C). Conversely, some cases may require that a larger area of root zone be preserved to increase the survival potential of particularly significant trees.

These design criteria are enforced in the field as well as on the plan. Plan adjustments made during construction must be reviewed by the City arborist.

3.5.3 Design Constraints and Alternatives

In addition to the preservation of significant trees, other factors which affect plan design in Austin include such things as restrictions on building on steep slopes, in floodplains and near critical environmental features; cut and fill limitations; access and egress restrictions; parking requirements; landscape area requirements; building height limitations; and impervious cover limitations. Tree preservation is intrinsically less definitive than most of these restrictions, and requires that those constraints, as well as other issues such as public health and safety and reasonable and lawful use of the property, be considered in an evaluation of whether a project meets tree preservation requirements of the Land Development Code.

In order to best provide for the preservation of significant trees, the project designer should carefully consider different design alternatives in the initial planning of the project. Meeting with the City arborist in a preliminary consultation prior to submitting plans for review is advised when there appear to be conflicts between design constraints. Early resolution of such conflicts during the design phase is usually advantageous.

In the review of a proposed project, the first indicator of how well trees have been incorporated in the design process is, how will the proposal impact the medium to high valued "protected" trees (19 inch diameter and larger). These trees are considered on an individual basis and a proposal to remove any of them is carefully scrutinized. Removals which are not adequately justified may require major plan alterations.

Another indicator is, how will the proposal impact smaller, significant trees (less than 19 inch diameter). These trees are typically considered in mass as they relate to the overall preservation of the natural character of the site. Individual trees are examined to see whether minimum design criteria have been met, but recommendations for major plan alterations are reserved for cases where large numbers of these trees are to be adversely impacted without adequate justification (i.e., the plan exhibits gross negligence on the part of the designer regarding tree preservation).

An example of a major plan change might be to notch a proposed building in a manner which would result in a loss of the building's square footage. A less restrictive change might be to alter the configuration of the building, but maintain the same square footage.

The following sections include text and illustrations describing some design alternatives which can be used to preserve significant trees.

A. Parking and Vehicular Use Areas.

Figure 3-7 in Appendix V of the Environmental Criteria Manual illustrates a parking peninsula which meets the minimum design criteria for critical root zone preservation. A few examples of ways to achieve the standards or otherwise preserve significant trees are as follows:

- Use compact car parking space allotments in a manner which allows an expansion of peninsula or median sizes.
- Use minimum allowable dimensions of parking spaces.
- Reduce the number of parking spaces to the minimum required.
- Use angled parking to minimize parking aisle widths and expand peninsulas and medians.
- Consolidate nearby landscaped peninsulas and apply for alternative compliance to the 50 foot spacing requirement.
- Realign or alter sizes of drives to avoid trees.
- Shift parking medians.
- Reduce building sizes or change uses to reduce the number of required parking spaces.

1. Permeable Paving

Another design alternative which may be considered in some situations is the use of permeable paving. This alternative is less preferable than leaving 50 percent of the root zone natural. The qualities that make a good paving surface are in direct conflict with the qualities necessary to save tree roots. Permeable paving is permitted, however, provided the installation meets City of Austin Standards and City of Austin Standard Specifications and the following design criteria (see Figure 3-8 in Appendix V of the Environmental Criteria Manual):

- Finished grade of the permeable paving surface must be a minimum of six (6) inches and a maximum of 18 inches above existing grade to provide room for base and paving material without cutting.
- A minimum distance of three (3) feet must be maintained between curb and tree to minimize potential for trunk scarring by vehicles.
- Minimum of 25 percent of the CRZ must remain at natural grade with a natural ground cover.
- The combined area of permeable paving and natural cover around a tree must be at least 75 percent of the CRZ.
- Permeable paving is only permitted in parking spaces and low traffic drives. It is not permitted in areas that are likely to be staging areas for fire ladder trucks.

These design criteria, as well as the construction specifications must be observed in the field. Deviations may be considered code violations.

B. Buildings.

Figure 3-9 in Appendix V of the Environmental Criteria Manual demonstrates compliance with minimum design criteria. Other examples of alternatives to preserve significant trees are as follows:

- Provide a pier and beam foundation.
- Provide finished floor elevations which minimize required cut or fill.
- Notch buildings around significant trees.
- Design building to fit under crowns of adjacent trees.

To comply with the design criterion requiring retention of 70 percent of a tree's crown, consideration must be given to the following:

- Providing adequate work space during construction;

- Providing a safe distance between limbs and walls (especially glass), eves, roofs, etc.; and,
- Applying proper pruning techniques (see City of Austin Standard Specifications).

C. Sidewalks and Pedestrian Use Areas.

Sidewalks often appear innocuous on plans, but can be very detrimental to trees due to grading requirements. Some design alternatives which should be considered are:

- Move sidewalk as far from tree trunks as possible.
- Provide a finished grade above existing grade for sidewalks required in close proximity to a tree trunk.
- Route drainage under sidewalks where elevated grade is required.
- Reduce width of sidewalk (minimum of four (4) feet when adjacent to a street curb or three (3) feet otherwise).

D. Grading.

Tree preservation and grading requirements are two (2) design constraints which are most often in conflict. A grade change of a few inches can be detrimental to a tree, yet most sites require extensive cut and fill in order to manage drainage flow. Some design alternatives which can be used to preserve significant trees are as follows:

- Use berms or retaining walls instead of cutting to provide detention.
- Design detention ponds around significant trees, adding depth to minimize width where possible.
- Provide tree well and/or aeration systems for trees in fill areas (see City of Austin Standard Specifications and City of Austin Standards).
- Provide retaining walls to mitigate cuts and fills (see Figure 3-10 in Appendix V of the Environmental Criteria Manual).

E. Utilities.

Underground water and wastewater lines, storm sewers, irrigation lines and both underground and overhead electric and telephone lines have considerable impact on trees.

Some typical design alternatives which should be considered are as follows:

- Establish the utility easement where it will have the least impact on trees, if possible.
- Stack underground utility lines to reduce the number of trenches required.
- Bore or tunnel under trees to minimize root impacts (see Figure 3-11 in Appendix V of the Environmental Criteria Manual).
- Prescribe methods to mitigate impacts on trees during construction not addressed in standard specifications and details (e.g., lifting lines over significant trees during stringing of power poles).

F. Waterway Alterations.

Waterway alterations cover a number of types of development activities. Some of the most detrimental to trees are channelization projects. Some alternatives which should be considered for these are:

- Use vertical or stepped gabions to reduce the required width of the channel (see Figure 3-12 in Appendix V of the Environmental Criteria Manual).
- Use concrete retaining walls to preserve root systems of trees adjacent to the channel (see Figure 3-12 in Appendix V of the Environmental Criteria Manual).

3.5.4 Mitigative Measures

The emphasis on preserving existing trees in the Land Development Code is due in part to the adverse growing conditions in the Austin area. Indigenous trees are more adapted to local conditions and are more likely to survive the climatic fluctuations. Many of the trees in the Austin area grow very slowly, thus making preservation more critical in order to avoid long term impacts.

When a proposed development project design necessitates the removal of significant trees (i.e., the total destruction of trees or a departure from the minimum design criteria), the City arborist shall make recommendations regarding an appropriate mitigation program. A typical program would include one or more of the following mitigative measures:

- Planting replacement trees;
- Saving blocks of natural areas;
- Providing a maintenance program for trees to be retained; See C.O.A. Remedial Tree Care Notes - Appendix P-6.
- Requiring special construction techniques; and,

- Transplanting existing trees.
- Alternative mitigative proposals for enhancement of the urban forest

Proposals which will enhance any aspect of city's urban forest may be pursued in consultation with the City Arborist. Proposals should be submitted in writing. In unusual situations and upon approval of the City, funds may be provided for off-site tree planting as a partial compensation for trees removed due to development. Utilizing a standard formula of one caliper inch of replacement value equivalent to $ 75.00; funds may be placed into a dedicated Urban Forestry Replenishment Fund. (NOTE: The option of funding off-site planting is not intended to facilitate the excessive removal of trees.)

These mitigative measures are not meant to supplant good planning. In view of the emphasis on tree preservation discussed above, mitigation for tree removals will be considered only after all design alternatives which could save more existing trees have been evaluated. A discussion of each measure follows.

A. Replacement Trees.

The most common measure used to mitigate tree removals is the planting of replacement trees. The following factors affect tree replacement:

- The available planting area;
- The anticipated rate of survival of trees planted;
- The quantity of trees to be planted; and
- The types of trees proposed.

1. Available Planting Area.

Replacement trees should be planted on the site or easement from which existing trees are to be removed. If this is not feasible, a person may initiate a proposal to plant trees off-site. This may be acceptable if the planting site is in reasonable proximity to the project area.

2. Survival Potential.

Before agreeing to any replacement option, the City arborist will assess the probability that trees planted will survive. This typically requires that some type of irrigation capability be implemented for a minimum two (2) year period. Irrigation may not be required if it can be adequately demonstrated that, given the size and type of trees planted, the planting site and the time of year the trees are planted, the mortality rate is likely to be low.

3. Quantities of Replacement Trees.

Replacement tree values will be expressed in terms of caliper inches. For example, if it is agreed that full caliper replacement is necessary for a 20 inch diameter existing tree to be removed, then 20 caliper inches of replacement trees must be shown on a plan.

The City arborist will typically set a minimum size for replacement trees between one (1) and four (4) caliper inches depending on the situation. Trees greater than four (4) caliper inches may be permitted if the feasibility is adequately documented.

In the example above, if the site in question could only support a few trees, and there was good irrigation available, then five (5) trees with a minimum caliper of four (4) inches would be acceptable. If there was ample planting space and minimal irrigation potential, then 20, one (1) inch caliper trees would be more acceptable.

In determining the total caliper inches of replacement trees acceptable as compensation for trees removed, the City arborist will use the evaluation results. For the highest valued trees (33 and greater), replacement may be up to 100 percent of the diameter(s) of the tree(s) in question. Lesser-valued trees may only be replaced at a maximum rate of 50 percent of the relevant trees' diameters.

4. Types of Replacement Trees.

In order to enhance the general quality of the urban forest in Austin, certain restrictions will be placed on the types of trees which will be allowed to serve as replacement for trees removed. Unless site conditions prohibit it, 75 percent of the total caliper inches of replacement trees required must be represented by large, Class I tree species (see Appendix F). The remaining 25 percent of total caliper inches may be represented by a mixture of small Class I tree species and any Class II species. All trees selected must be suitable for the environment of the immediate planting site (see Appendix F).

A minimum of five (5) different species of trees must be planted if more than 100 caliper inches of trees are required. This requirement is meant to prevent large mono cultures from being planted on sites, which increases chances of disease epidemics.

The planting of Spanish Oak (Quercus shumardii), Texas Red Oak (Quercus texana) and similar thin bark red oaks is discouraged in proximity to known oak wilt centers. These trees are potential sources of inoculum for the Oak Wilt fungus Ceratocystis fagacearum. Fungal spore mats formed on these types of trees are attractive to insect vectors, which results in long range dissemination of the fungus. Information regarding locations of Oak Wilt centers may be obtained from the office of the City Forester, Parks and Recreation Department.

5. Hill Country Roadway Corridor Replacement Tree Provisions. In accordance with code requirements, replacement trees for Hill Country Roadway projects must come from the list of native trees found in Appendix F. Typically, to meet the intent of the code, required caliper inch replacement values are from 70 to 100 percent of the total diameters of trees removed.

6. Enforcement Criteria.

The location, size and type of all replacement trees must be shown on approved plans in a manner which will allow verification of their installation at the time of inspection for Certificate of Occupancy or project release.

Optimum planting times do not always correspond to project completion. For that reason, replacement tree plantings may take place after the project is released by the Department of Environmental Protection; provided, that before project release, a person posts fiscal security in an amount equal to the going rate for installed trees with a one (1) year guarantee, plus 15 percent to cover administrative costs.

In areas where no irrigation system is available, irrigation may be supplied by water truck. In such cases, prior to project release, a person must submit:

- A signed water truck service contract for review and approval by the City arborist; and,
- Fiscal security in an amount equal to the going rate for the approved service plus 15 percent to cover administrative costs.

B. Natural Area Preservation.

Another form of mitigation for trees removed which may be considered is the preservation of areas containing significant trees and other vegetation which might normally be destroyed during the construction process. Examples are areas within the normal limits of construction such as parking medians, landscape areas adjacent to proposed buildings, etc. which contain trees and vegetation that are not required to be surveyed and are not normally subject to protective measures.

In order to qualify as a mitigative measure, these areas must be delineated on the plan in the same manner as any limit of construction (see Section 3.3.2 C). The area must also be protected in accordance with City of Austin Standard Specifications and City of Austin Standards for tree protection.

C. Tree Maintenance.

This mitigative measure is most appropriate in cases where the minimum design criteria established in Section 3.5.2 cannot be met for individual trees. Deviations from those criteria

increase the chances of a tree's death or greatly reduced longevity. A remedial care program can increase the survival potential to an acceptable level in many cases.

A good maintenance program is beneficial for any trees subjected to construction pressures even when all design criteria and protective measures have been met. For this reason, a tree maintenance program for all remaining trees on a site may serve as mitigation for trees destroyed in lieu of replacement trees in some cases.

The City arborist must review the remedial care program to ensure that it will accomplish what is necessary to maintain the viability of any affected trees.

To ensure compliance, the program must be documented by a plan note at the time of plan approval. In addition, prior to release of the project, a person must submit:

- A signed service contract for review and approval by the City arborist; and,
- Fiscal security in an amount equal to the going rate for the approved service plus 15 percent to cover administrative costs.

These measures are necessary because the remedial care program must typically extend over a minimum 18 month period after completion of the project.

D. Special Construction Techniques.

In conjunction with remedial care, mitigation for trees removed may include special construction techniques not normally required in standard specifications. Some of these techniques include the following:

- Prior to excavation within tree drip lines or the removal of trees adjacent to other trees that are to remain, make a clean cut between the disturbed and undisturbed root zones with a rock saw or similar equipment to minimize root damage.
- In critical root zone areas that cannot be protected during construction with fencing and where heavy vehicular traffic is anticipated, cover those areas with four (4) inches of organic mulch or gravel to minimize soil compaction.
- Perform all grading within critical root zone areas by hand or with small equipment to minimize root damage.
- Water all trees most heavily impacted by construction activities deeply once a week during periods of hot, dry weather. Spray tree crowns with water periodically to reduce dust accumulation on the leaves.
- 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 soil.

E. Transplanting.

Another form of mitigation may be to transplant existing trees. Trees as large as 26 inches in diameter, growing in chalky limestone, have been successfully moved in the Austin area. Due to the inherent difficulties of this type of operation, a comprehensive feasibility report must accompany any such request.

The feasibility report must contain such things as:

- Digging method;
- Relocation sites;
- Method of transport;

- Time of year transplanting will take place;
- Storage methods (if any); and,
- Maintenance programs before and after transplanting.

3.6.0 SPECIAL OVERLAY ZONE CRITERIA

3.6.1 Waterfront Overlay Combining District Bonus Provisions for Tree Preservation

A bonus of additional gross floor area shall be allowed for every square foot of the critical root zone (CRZ) of a large, existing Class I tree (see Appendix F) which is left undisturbed. The bonus is also applicable if the tree can be transplanted (see Section 3.5.4 E). The additional gross floor area granted as a bonus under this provision is calculated by multiplying the total area of undisturbed CRZ by the height limitation(s) applicable to the property and dividing the result by 12. The City arborist and the Waterfront Planning Advisory Board must review any such bonus application.