City of Brentwood

Department of Parks and Recreation

Tree Policies and Guidelines Manual

Adopted: March 6, 2017
Latest Revision: October 2, 2017

Table of Contents

Appendices:

Statement of Commitment

The City of Brentwood is a community which recognizes its trees as one of its most valuable resources. It is for this reason that the City has dedicated itself to the preservation, proper maintenance and continued enhancement of our community forest.

The over 3,000 street and park trees throughout Brentwood are a community asset valued at more than 3 million dollars. The community forest provides environmental benefits, adds to property values, and contributes to an enhanced quality of life for all of Brentwood's residents.

Trees improve the environment in which we live by moderating the climate, providing oxygen, conserving water, reducing erosion and harboring wildlife within our urban setting. There are many benefits to having a healthy, well-maintained urban forest. The benefits include:

- Reducing the "heat island" effect which results from having extensive amounts of unshaded hardscape
- Conserving energy by reducing cooling costs
- Significantly increasing property values
- Intercepting rainfall thus reducing the need for stormwater controls
- Slowing down harsh winds
- Muffling street and traffic noise
- Providing shade and overall beauty to our community.

Unfortunately, our trees suffer from the rigors of urban life, including air pollution, vandalism, compacted soils, limited growing spaces, and the extremes of the St. Louis climate. In order to overcome such rigorous growing conditions for our City trees and procure the benefits of these, our most valuable assets, staff must be proactive in the care they provide.

Tree Policy Manual

This Tree Policy Manual defines and illustrates the policies and procedures that shall be utilized by City Staff in the management and care of all trees located on City property or within the City's public right-of-way. The following pages document the City of Brentwood's official guidelines for the planting, pruning, removal, preservation and protection of all City-owned trees. These policies shall be based upon the highest nationally accepted standards set for tree care.

In adopting these policies and procedures, the city recognizes Louise Charbonneau, a long time and politically active resident, who often advocated on behalf of improving and sustaining Brentwood's Urban Forest.

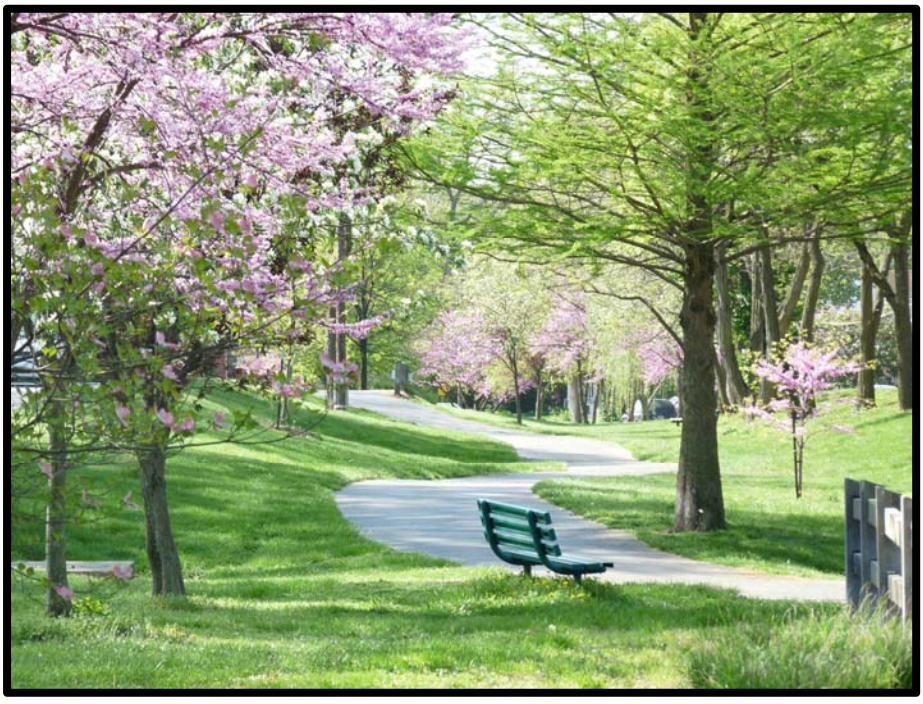
Parks & Recreation Department

The Parks & Recreation Department is responsible for the daily management and emergency services in the urban forest. The philosophy of the Brentwood Parks & Recreation Department is to maintain balance between the benefits of healthy trees to the community and the potential risks associated with an urban tree canopy. As stewards, the Parks and Recreation Department shall strive to achieve a sustainable and healthy urban tree canopy to maximize the benefits to residents and visitors of Brentwood.

The department provides planting and maintenance services, and oversees all contracted work on City trees. The Department maintains records and updates the City's tree inventory, and is the primary resource for residents who contact the City with concerns and questions about trees. The Department also provides:

- Residential educational materials on proper care
- Events held to bring attention to and educate the public on the importance of the urban forest
- An annual Arbor Day celebration in honor of our urban forest

The department will employ International Society of Arboriculture (ISA) Certified Arborists to maintain the City's urban tree canopy. These arborists will follow the American National Standards Institute (ANSI) A300 standards, the generally accepted industry standards for tree care practices. These standards were developed by the Tree Care Industry Association (TCIA) by the Accredited Standards Committee whose mission it is to develop consensus standards based on current research and sound practice for writing specifications to manage trees, shrubs and other woody plants.



Guiding Principles

The City shall adhere to the following principles in all tree-related policies and processes:

- Recognize that trees of our urban forest are more than aesthetic enhancements.
- Trees are the backbone of our urban ecosystem and an essential part of our community's infrastructure.
- Promote the health and growth of our urban forest by following scientifically established best practices for tree selection, planting, watering and pruning.
- Promote a robust urban forest through policies and practices that reduce its vulnerability to known diseases or pest infestations, and future threats, including the anticipated effects of climate change.
- Engage in a continuous process of long-range planning for the growth and maintenance of our urban forest
- Promote public appreciation of our urban forest through educational outreach programs.
- Proceed in a manner that is inclusive and transparent.

Public Right-of-Way

The City retains an established public right-of-way on each public street. These right-of-ways are City-controlled areas for the purpose of public improvements, including streets, sidewalks, curbs and gutters, driveway approaches, streetlights, street signs and street trees.

Public right-of-ways may vary per street and will usually extend beyond street width. Generally, the width of these parkways or right-of-ways are around ten (10) feet from the face of the curb, but this dimension may range from anywhere between one (1) foot and thirty (30) feet.

Any tree located within this public right-of-way is recognized as a City-owned tree and is subject to the policies described herein.

General Preservation and Planned Management

One of the most important aspects of preserving Brentwood's community forest is the ability to retain a manageable population in terms of species diversity, density and appropriateness. The City shall achieve this through proper planning and gradual reforestation efforts, rather than through drastic deforestation and replacement measures, whenever possible. No healthy, living tree shall be removed for the sole purpose of altering an area's existing tree species composition.

Species Diversification and Density:
A diversified population of tree species helps to guard against the negative impacts of monocultures. Monocultures, large populations of a single tree species, may be ravaged during insect or disease epidemics. On the other hand, too diversified a population may create an unmanageable inventory of trees. Thus, as a means of controlling species vicissitude, the City will strive to adhere to the Santamour (1990) guidelines for tree plantings within a city, which specifies that municipalities should plant:

- No more than 30% of a sing Family
- No more than 20% of a single Genus
- No more than 10% of a single species

Brentwood's Approved Tree List:
Brentwood tree population management plan shall be based primarily upon the City's approved tree list. The current list of approved trees can be found in the appendix of this document. The size of tree to be planted will depend on the width of the planting strip, available vertical growing height and site specific traits related to tree growth. The Parks & Recreation Department will give preference to the selection of tree species native to St. Louis and the surrounding region due to their inherent characteristics and adaptability to the region's environmental conditions.

Appropriate tree species shall be selected for designation based upon the following criteria:

- **Native or Traditional Tree Palettes:** Species that are native to this region, already exist or have traditionally existed in the region are preferred.
- **Species Hardiness:** Based upon the trees adaptability to the region in terms of its resistance to frost or freezing temperatures.
- **Drought Tolerance:** Species that are more tolerant of long, dry periods and lack of water are preferred.
- **Durability and Wind Resistance:** Species that are not brittle in nature and will tolerate high winds.
- **Pest and Disease Resistance:** Species known for having a lack of significant pest or disease problems are preferred.
- **Soil Conditions:** Species that will tolerate the region's typical soil types as well as the urban soil condition are preferred.
- **General Aesthetics and Shading Potential:** Trees that provide some aesthetic benefits, such as showy flowers or attractive fall color, or trees that provide a good amount of shade are preferred.
- **Subsurface Growth Habits:** Species that do not have invasive surface roots are preferred.
- **Availability:** Trees that are readily available are preferred.

Inventory Administration:
The Parks & Recreation Department shall keep an inventory of all City-owned trees, including detailed site characteristics and work histories for each tree. This record shall be updated on a continual basis by the City's staff and/or On-Call Contractor.

The inventory of City trees identifies location, species (both scientific and common names), diameter (DBH), height, parkway size, overhead utilities, estimated asset value, recommend maintenance and work history.

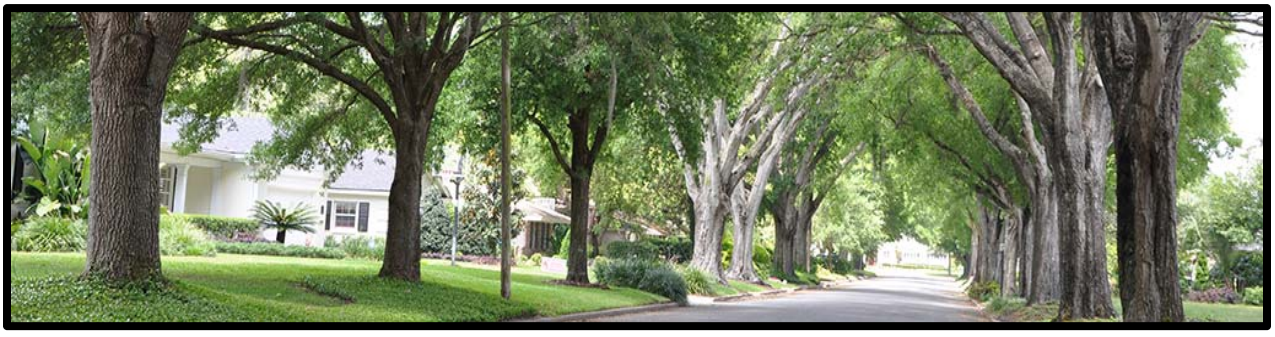
Tree Planting Guidelines

The Parks & Recreation Department shall be responsible for overseeing the planting and maintenance of all City trees. The following guidelines and procedures have been developed to promote the health and safety of City trees from the time they are planted through maturity.

Tree Replacement Policy:
3,182 planting sites were identified in the 2014 Tree Management Plan. Staff is still in the process of reviewing each of these sites to determine if each site is indeed a viable planting site. At the time of publication of this manual, the City had 2,658 planted trees and 524 vacant planting sites. It is the objective of the Parks & Recreation Department to have a tree planted in every planting site identified in the 2014 Tree Management Plan.

The City shall replace any City tree which has been removed with the provision that the remaining vacant site is viable for planting. The City shall strive to replace any City tree by the next planting cycle, unless some unforeseen circumstance delays the replanting. For example, a resident request a specific species of tree that will not be available during the current planting cycle. The City will wait until the next planting cycle to replant this particular tree.

Season to Plant:
Unless otherwise approved by the Parks & Recreation Department, most tree plantings shall take place between mid-fall and early spring to take advantage of the dormant period for most trees and the cooler, wetter seasons of the year.



Viable Planting Sites:
It shall be the objective of the City to plant all viable vacant sites located on City property or within the public right-of-ways and to replace any City tree which has been removed with the provision that the remaining vacant site is viable for planting. Viability shall be based on the following criteria:

- **Spacing:** There is adequate spacing present overhead, underground and radially to allow for the healthy, unimpeded growth of the tree to its mature size. Specific examples of spacing conditions that may make a site unsuitable for planting may include:
  - Inadequate canopy room between existing trees.
  - Proximity of a planting site to existing water, gas, sewer lines, or existing buildings or structures.
  - Potential for conflict with overhead utility/service lines.
  - Inadequate with of the tree lawn for accommodating the tree's root establishment.
- **Traffic Clearance:** There is an adequate line of sight visibility between normal vehicular or pedestrian traffic and necessary signage and street lights.
- **Maintenance Resources:** There is adequate and consistent water source available or the ability to safely provide water.

Planting Stock Standards:
The City shall make every effort to ensure that it plants only vigorous, healthy trees which can easily be trained into an attractive natural form, with strong roots and good crown development. The specifications for acceptable planting stock shall be:

- All trees shall be true to type or botanical names as ordered or shown on planting plans.
- All trees shall have a single, fairly straight trunk with a good taper and branch distribution vertically, laterally and radially.
- All trees shall be healthy, have a form typical for the species or cultivar, be well rooted and shall be properly trained.
- The root ball of all trees shall be moist throughout and the entire crown shall show no sign of moisture stress.
- All trees shall comply with Federal and State laws requiring inspection for plant diseases and pest infestations
- No tree shall be accepted that has been severely topped, headed back, pollarded or lion-tailed.
- The tree selection process will favor trees that do not exhibit co-dominant stems or excessive weak branch attachments that cannot be trained without jeopardizing the natural form of the species or health/establishment of the individual tree.
- No tree shall be accepted that is root bound, shows evidence of girdling or kinking roots or has "knees" (roots) protruding above the soil.

Medium and Large trees shall conform to American Standards for Nursery Stock unless otherwise specified by official City designee. The desired specifications for acceptable medium and large tree plantings shall be:

- The tree shall be no less than eight feet in height.
- The branches should be less than two-thirds the trunk diameter and be a minimum of 1½ inch in diameter.
- The branches should be at least six inches above ground.
- The root ball should be at least 20 inches in diameter.

Small trees shall conform to American Standards for Nursery Stock unless otherwise specified by official City designee. The desired specifications for acceptable small tree plantings shall be:

- The tree shall be no less than five feet in height.
- The branches should be less than two-thirds the trunk diameter.
- There should be at least eight branches on the upper half of the tree.
- The root ball should be at least 16 inches in diameter.

The City shall reserve the right to refuse any tree that does not meet these standards and may require any person who has planted such sub-standard trees, on city property or within City right-of-ways, to have these trees removed and replaced at that person's own expense.

Planting Location and Spacing:

The Parks & Recreation Department has developed the following guidelines to ensure proper growth and health of newly planted trees.

- A tree will not be planted in a tree lawn that is less than three feet (36 inches) in width.
- Spacing of trees shall be determined by the ISA Certified Arborist according to the local site conditions, the species used and growth characteristics of the tree to be planted. The following general specifications will be used:
  - Large trees – At least forty (40) feet from center of tree to center of tree
  - Medium trees – At least thirty (30) feet from center of tree to center of tree
  - Small trees – At least twenty (20) feet from center of tree to center of tree

  When planting a new tree next to an existing tree of a different size, the minimum spacing should be calculated by averaging the spacing requirement for the two size classes. For example, a new small tree planted next to an existing medium tree, should be planted at a distance of 25 feet.
- A tree shall be placed at a minimum distance from the following objects:
  - Intersection – Twenty-five (25) feet
  - Building or permanent structure – Fifteen (15) feet
  - Utility poles or street light – Fifteen (15) feet for large and medium trees; Ten (10) feet for small trees
  - Crosswalk – Six (6) feet
  - Driveway or Alley – Six (6) feet
  - Gas lines, water lines or sewer lines – Six (6) feet
  - Fire Hydrants – Five (5) feet

Tree Pit Standards:
The tree pit is one of the most important factors in establishing a healthy tree. A diagram illustrating a proper tree pit can be found in the appendix. The specifications for acceptable tree pits shall be:

- Tree pits shall be two to three times the width of the tree.
- Tree pits should be saucer or bowl shaped.
- The sides of the tree pits should slope gradually.
- The soil should remain undisturbed beneath the root ball.
- The center of the tree pit hole should be firm to stabilize the tree.

When planting the tree, staff will:

- Ensure that the root flare is visible at or slightly above grade after planting the tree.
- Make every effort to orient the tree so it faces the same direction that it was grown at the nursery, at the time of planting.
- Plant the tree slightly higher than it was originally gown to allow for settlement.
- In poorly drained soil, elevate the root ball in relation to the surrounding grade.
- Leave the extra soil over the structural roots, until the tree is planted in the ground.
- Use the same soil that was removed from the hole as the backfill around the root ball.

Mulching and Weed Suppression:
A tree in a natural forest will deposit mulch in the form of leaves or needles, several inches deep at its base. Naturally occurring mulch provides nutrients while allowing air and water to permeate the soil.

In urban environments, however, residents and property owners may have reasonable concerns about preventing the growth of weeds around the base of trees, and avoiding the accumulation of leaves and debris that may clutter walkways.

Mulching the planting area with two to four inches of wood chips or chunk bark is recommended. The depth should not exceed four inches. Mulch should not touch the base of the tree or cover the root flare. Volcano mulching, the practice of thick mulch layers piled high against the tree's truck, is damaging to the tree's health and is strongly discouraged. A diagram illustrating proper mulching techniques found in the appendix.

Weed barriers, if used, should be made of permeable fabric. Property owners should avoid applying any landscaping material to the base of trees that will compress the soil below it or make it impermeable to air or water. This includes:

- Bricks
- Cement
- Rocks or boulders
- Plastic weed barriers

General Maintenance – Newly Planted Tree

All newly planted trees shall be placed on a schedule to receive young tree maintenance immediately after completion of a planting program. Properly maintained young trees will develop into structurally strong trees well-suited for their surrounding environment. These trees should require little corrective pruning as they mature. Young trees that reach a large mature size should have a sturdy, tapered trunk with well-spaced branches.

Young Tree Maintenance Program:
Each City tree shall be scheduled for young tree maintenance at least once per year for the first three years after being planted, as part of a Young Tree Maintenance Program. This program shall entail:

- Watering – promptly after planting, the soil surrounding the tree should be thoroughly saturated. Excessive heat and drought requires special attention given to newly planted trees.
- Stabilization – when stability is a problem, newly planted trees shall be staked according to the methods recommended by the ISA.
- Inspection – periodic inspection of newly planted trees for pests and diseases should be done to ensure the continued health of the tree.
- Pruning – the pruning of newly planted trees is not recommended, except for the removal of dead or broken branches.

Watering Schedule:
Newly installed trees are dependent upon supplemental irrigation until established, typically for two years. Periods of extreme heat or draught may require more water than recommended in these specifications.

Watering Newly Planted Trees:
Watering requirements for newly-planted trees will vary based on species, location and soil conditions. Although professional advice should be sought whenever possible, the following recommendations generally apply:

- During the first two years after a tree is planted in the ground it shall be watered thoroughly to their root depth as frequently as needed. The minimum watering standards shall be as follows:
  - One to three months in the ground: four times per month or as necessary
  - Four to six months in the ground: two times per month or as necessary
  - Seven to twelve months in the ground: one time per month or as necessary
- Newly planted trees should be watered slowly for several hours during each watering cycle in order to allow the tree's roots to adequately absorb the available water. Water may be provided in a variety of ways:
  - Applying a garden hose on a slow drip for several hours
  - Creating a "tree-well" around the base of the tree and filling it with water that can slowly be absorbed into the ground
  - Using a drib irrigation system that is set to deliver water for several hours
  - Filling a plastic bladder or "tree Bag" with water and allowing it to slowly release water into the ground

General Maintenance – Mature Trees

All mature trees shall be placed on a four year assessment rotation scheduled by Wards. The trees will be assessed in the following years:

- Ward I – 2018, 2022, 2026, 2030
- Ward II – 2019, 2023, 2027, 2031
- Ward III – 2020, 2024, 2028, 2032
- Ward IV – 2021, 2025, 2029, 2033

After the assessment is completed a maintenance recommendation will be made and incorporated into the City's work plan. This work plan will be developed based on any immediate tree needs.

Pruning:
All City trees shall be evaluated for pruning needs on a regular basis and pruned as necessary using professionally accepted standards, as established by the ISA, TCIA and ANSI Section Z133.1 All City trees shall be pruned in a manner that will encourage good development while preserving their health, structure and natural appearance. A diagram illustrating proper pruning specifications can be found in the appendix.

Pruning Techniques:
"Thinning" cuts in mature trees shall be the standard pruning technique for City trees. A thinning cut is the removal of a branch at its point of origin, or the shortening of a branch to a lateral that is large enough to assume the terminal role.

When removing a live branch, pruning cuts should be made just outside the branch bark ridge collar. This location of cut is in contrast to a "flush cut" which is made inside the branch bark ridge and collar. Flush cuts should be avoided because they result in a larger wound and expose trunk tissues to the possibility of decay. If no collar is visible, the angle of the cut should approximate the angle formed by the branch bark ridge and trunk. A diagram illustrating a branch collar can be found in the appendix.

When removing a dead branch, the final cut should be made just outside the branch bark ridge and collar of live callus or wound wood tissue. If the collar has grown out along the branch stub, only the dead stub should be removed; the live collar should remain intact.

If it is necessary to reduce the length of the branch, the final cut should be made just beyond (without violating) the branch bark ridge of the branch being cut to. The remaining branch should be no less than one third (1/3) the diameter of the branch being removed, and with enough foliage to assume the terminal role. A diagram illustrating the one third rule description can be found in the appendix.

Pruning cuts should be clean and smooth, leaving the bark at the edge of the cut firmly attached to the wood. A three-cut process, sometimes referred to as "jump-cutting" should be used to remove larger limbs in order to avoid stripping or tearing of the bark, and to minimize unnecessary wounding.

As trees mature, their need for structural pruning should decrease. Pruning should then focus on maintain tree structure, form, health and natural appearance. This is accomplished through one of the following five methods:

- **Crown Cleaning** – the removal of dead, dying, broken, diseased, crossing, weakly attached and low-vigor branches from a tree's crown; as well as the elimination of water sprouts, sucker growth and foreign materials from the entire tree. Crown cleaning shall be completed on an as-needed basis.
- **Crown Thinning** – the selective removal of branches to increase light penetration and air movement through the crown. Thinning opens the foliage of the tree, reduces weight on heavy limbs, distributes ensuing invigoration throughout the tree and helps retain the tree's natural form.
- **Crown Reduction –** the selective removal of branches to decrease the height and/or spread of the canopy. Crown reduction minimizes the risk of failure, balances the canopy and improves tree aesthetics.
- **Crown Raising** – the removal of lower branches in order to provide vertical clearance.
- **Crown Restoration** – the improvement to the structure and appearance of trees that have sprouted vigorously after being broken, topped or severely pruned using heading cuts. One to three sprouts, on main branch stubs, should be selected to form a natural appearing crown. The more vigorous sprouts may need to be thinned or cut to a lateral to control length, growth or ensure adequate attachment for the size of the sprout. Crown restoration may require several pruning applications over a number of years. Crown restoration shall be completed as necessary, based upon the specific condition and circumstances surrounding the tree.

When thinning the crown of mature trees, no more than twenty-five percent (25%) of the tree's live growth should be removed, with the preference of 10 – 15% being removed. In slower growing or particularly sensitive species, no more than ten percent (10%) of live growth should be removed. Trees shall always be thinned to their natural form and should retain well-spaced inner lateral branches with foliage. Trees and branches so pruned will have stress more evenly distributed along the branch and throughout the tree. Oak trees shall not be pruned from April 1 through December 31 to prevent the spread of Oak Wilt.

Crown Topping:
Crown topping is the practice of severe pruning of a tree, disregarding nodes and crotches, to drastically reduce the height of a tree. Topping adversely affects the natural growth structure of a tree and has the potential to create a hazardous tree. Under no circumstance should a tree be pruned in this manner.

Street, Sidewalk and Visibility Clearance:
Street and sidewalk clearance standards shall be achieved through crown raising. Only those branches that must be removed to achieve the established height clearance standard shall be pruned. All such pruning cuts shall be thinned back to the nearest lateral found above the set minimum height standard. Where possible, young or developing trees should be maintained in such a manner that at least one half (1/2) of the foliage should be on branches that originate in the lower two thirds (2/3) of the tree. Similarly, branches should have even distribution of foliage along their lengths. This will ensure a well formed, tapered structure and will uniformly distribute stress within the tree.

All City trees shall be maintained to the following height clearance specifications:

- **Sidewalks and park paths:** Limbs shall be raised to a minim of seven (7) feet from grade to wood. In locations where no sidewalks exist, limbs may be retained below this minimum elevation as long as they conform to the natural shape of the species. In location where City street trees are set back from, or do not interfere with sidewalk traffic, limbs may also be retained below this minimum height specification.
- **Residential and collector streets:** Limbs shall be raised gradually from eight (8) feet at curb to fourteen (14) feet over traffic lanes from grade to wood giving the appearance of an arch rather than an angle. Select trees may require a higher maximum over traffic lanes or existing lanes for existing mature canopy-forming limbs.
- **Arterial streets:** Limbs shall be raised to fourteen (14) feet from grade to wood. Select streets may require a higher maximum over traffic lanes for existing mature canopy-forming limbs.

Visibility clearance for streetlights or signage shall be achieved through "windowing" through the foliage of a tree, rather than severely raising or reducing its crown. Only those branches that need to be removed to attain the visibility clearance desired shall be pruned. All such pruning cuts shall be thinned back to the nearest lateral found away from the structure that is to be cleared.

Root Pruning:
The root system of a tree is one of its most important physiological components. Roots are the main source of water and mineral absorption for the tree, they provide anchorage and stability and they act as one of the principal storage areas for food. The proper pruning of a tree's roots is as important as the proper pruning of a tree's crown.

Whenever possible, the City shall avoid removing any of a tree's root system. In instances where there exists a need to install subsurface structures or utilities, every effort shall be made be made to avoid encroachment within the drip line of a tree. If it becomes necessary to excavate within a tree's drip line, every effort shall be made to tunnel under or through the tree's root system with a minimal amount of pruning, rather than to trench across the tree's roots.

When root removal becomes necessary for the installation or repair of hardscape, such as sidewalks, driveway approaches or curbs and gutters, two methods shall be employed by the City to address invasive or encroaching roots. The following root pruning methods are:

- **Selective Root Pruning:** The removal of specific offending roots which are directly interfering with a work area. When pruning out selective roots, great care shall be given to retain as much root surface as possible, including sufficient buttress root dispersal around the radius of the tree. No more than one third (1/3) of a tree's root system shall be removed. Roots shall be cut back at least four (4) inches away from new hardscape to the nearest node. Pruning cuts shall be made clean and smooth with no crushing or tearing of the remaining root.
- **Root Shaving:** The removal of a small portion of a nonessential buttress root or general root with a diameter of four (4) inches or greater. Roots will be shaved down to allow for at least two inches of clearance between the root and the new hardscape. No more than one third (1/3) of a root's diameter shall be shaved off. Shaving cuts shall be made clean and smooth with no crushing or tearing of the remaining root.

The soil shall be backfilled immediately following pruning or shaving activity to minimize dying of the roots. Any root pruning or shaving on roots greater than two inches in diameter shall be approved by the City's certified arborist.

Chemical Spraying:
Chemical spraying shall only be done for specific insects or diseases with the proper materials and equipment, in the necessary strength and applied at the proper time to ensure control. Precautions shall be taken to inform and protect the public before spray applications of pesticides and other potentially hazardous chemicals begin. Local conditions such as wind and temperature shall be considered before spraying.

Spraying shall only be performed by Certified Pesticide Applicators in accordance with accepted arboricultural standards and all State and Federal regulations. The Applicator shall read and understand the label information of the chemicals being used.

Fertilization:
The City does not, as a practice, fertilize trees. If warranted, the fertilization of City trees shall be in accordance with accepted arboricultural standards and conform to ANSI A300 standards.

Cabling & Bracing:
The City does not, as a practice, cable and brace trees. If warranted, the cabling/bracing of City trees, methods and materials shall conform and ANSI A300 standards. Bracing shall not be used as a substitute for cabling, but rather in conjunction with cables.

Pest and Disease Management

The best way to prevent pest problems is to use best management practices for planting, pruning and care of trees. Trees have a built-in system to withstand a certain amount of pest and disease infestations. However, when they become detrimental to the tree, control procedures may be used. The City of Brentwood follows generally accepted Integrated Pest Management (IPM) techniques.

IPM is a process used to solve pest problems while minimizing risks to people and the environment. The City adheres to the following techniques:

- **Biological Control:** The use of natural enemies (predators, parasites, pathogens and competitors) to control pests and their damage.
- **Cultural Controls:** The practices that reduce pest establishment, reproduction, dispersal and survival.
- **Mechanical and Physical Controls**: The use of activities that kill a pest directly or make the environment unsuitable for it. Physical controls include the removal of diseased or pest infected limbs and trees, mulches for weed management, steam sterilization of the soil for disease management or barriers such as screens to keep birds or insects out.
- **Chemical Controls**: The use of pesticides. In IPM, pesticides are used only when needed and in combination with other approaches for more effective, long-term control.

Disease Prevention

Certain precautions must be taken when performing maintenance on any diseased tree to ensure the disease will not continue to be transmitted after the work has been completed. When working with a diseased tree, staff will sterilize tools after each cut before reusing the tool.

Tree Health and Risk Assessment

The Parks & Recreation Department will perform regular tree health and risk assessments to spot potential weaknesses before they become major problems. The assessments will be performed by ISA Certified Arborists who will utilize the ISA Basic Tree Risk Assessment Form. The form is a tool for arborist to record and categorize information while performing a basic tree risk assessment. This tool builds on the tree risk assessment methodology outlined in ISA's Best Management Practices: Tree Risk Assessment.

If needed, the City may seek another opinion from their On-Call Supportive Urban Forest Tree Care Contractor or a reputable tree service company to provide an additional assessment on a tree.

Tree Removal

It is the City's policy to protect and preserve healthy trees that provide valuable benefits to our environment and to the quality of life in the City of Brentwood whenever possible. The Parks & Recreation Department, or contractor working with the department, will be responsible for the removals of all trees.

Tree Removal:
The ISA Certified Arborist will make the determination for the removal of a tree if any of the following conditions exist:

- **Hazardous Trees:** The Parks & Recreation Department shall identify hazardous trees based on the severity of the following signs of decline:
  - Large dead branches in the tree
  - Cavities or rotten wood along the trunk or in major branches
  - Mushrooms present at the base of the tree or on trunk
  - Cracks or splits in the trunk or where branches are attached
  - Cracked or flaking bark on trunk or branches
  - Strong lean at the trunk
  - Many major branches arise from one point on the trunk
  - Damaged, broken or injured roots
  - Tree has been topped or otherwise heavily pruned
- **Dead Trees:** Trees that are dead or have been determined by an ISA Certified Arborist to be in a state of severe decline shall be removed.
- **Diseased/Infected Trees:** Trees that are diseased and lost their productive capacity, and are not likely to recover despite the application of available remedies. Trees that acquire an infectious disease or are infested with an insect that is declared to be a serious pest threat to other nearby trees shall be removed, if removal is determined to be the pest control solution. Examples of this include trees infested with the Emerald Ash Borer.
- **Emergency Removals:** Healthy trees may be removed if the City of Brentwood decides an emergency condition exists and tree removal is determined to be the only option available.
- **Public Safety:** Healthy trees may be removed if the City of Brentwood decides that a public safety concern exists, and the tree removal is determined to be the only option available.
- **Hardscape Damage:** If hardscape repairs cannot be completed without severe root pruning, which would jeopardize the health and stability of the tree, the tree may be removed.

Tree Removal Standards:
All work performed in the removal of a tree shall be in accordance with ISA and ANSI standards.

Stump Removal:
All stumps shall be removed to a depth of at least eight inches and the remaining holes shall be filled with soil and either replanted with a new tree or planted with sod or seed.

Site Cleanup

Work areas should be left in a condition equal to or better than which existed prior to the commencement of forestry operations. Upon completion of work performed, all branches, twigs, leaves, chips and larger portions of the tree shall be promptly removed and properly disposed by those performing the work.

Tree Maintenance Notification

The City will notify residents that tree maintenance is being performed on a tree in City's right of way adjacent to resident's home in the following ways:

- A notification letter will be delivered to residents notifying them that tree maintenance is scheduled to be performed. The letter will mailed at least two weeks before any work will be done.
- A neon ribbon will be hung indicating which tree will be worked on.
- A door-hanger or flyer will be placed on the front door of the resident's home up to 48 hours prior to work commencing.
- A notice will be placed directly on the tree.

Construction Protection

Construction damage associated with new development taking place around existing City owned trees can be detrimental to those trees in a number of ways. The following construction specifications shall be observed to preserve and protect existing City owned trees located on a site that is planned for development.

General Site Evaluation:
As part of the review for a location planned for development, the Planning and Development Department shall consult the Parks & Recreation Department on the appropriate measures to take regarding trees existing on the project site. Both staffs will work together to develop an appropriate mitigation plan. In addition, the Parks & Recreation staff shall develop a plan to protect all trees that are to remain as well as examine the following as each of these activities pertain to trees on the project site:

- Site access
- Traffic route considerations
- Excavation limitations
- Appropriate locations for the piling of soil and debris
- Storage of equipment and vehicles

Protective Fencing:
Temporary, protective fencing shall be installed around any existing tree that is to be preserved on a project site. The fencing must be made of a material that has high visibility and be posted at regular intervals around the tree. The fencing shall be placed at a minimum in order to protect the Critical Root Zone. The Critical Root Zone shall be measured of one foot per DBH per tree. This area contains most of the roots essential to the tree's continued health and vigor. If construction encroaches too far into the Critical Root Zone, the structural integrity of the tree may be jeopardized, creating a hazardous tree. No activity shall take place within this fenced area. Protective fencing shall be placed beyond the minimum Critical Root Zone if deemed necessary. A diagram illustrating the Critical Root Zone can be found in the appendix.

Construction Mulching:
If the Parks & Recreation staff determines that traffic encroachment within the drip line of a preserved tree is unavoidable, then a six to twelve inch layer of temporary mulch shall be placed over the affected area to disperse the weight of the traffic and equipment. Additional weight dispersal and mobility may require the placement of large plywood sheets over the mulched area. Construction mulching and plywood must be removed carefully, so as not to damage the tree, as soon as the required activity within the drip line of the tree has been completed.

Excavation Requirements:
Whenever possible, services such as water lines and utilities shall be routed around the drip lines of trees that are being preserved on a site. If Parks & Recreation staff determines that excavation within the drip line of a preserved tree is unavoidable, then every effort shall be made to tunnel under or through the tree's root system with a minimal amount of pruning, rather than to trench across the tree's roots.

All root pruning shall be in accordance with the maintenance guidelines established for such activity in this manual.

Grade Changes:
A change of grade around a tree, even well outside of a tree's root zone, can have serious impact on the tree due to reduced aeration or poor drainage. Parks & Recreation staff shall recommend that development specifications include requirements for mitigating such impacts to trees that are to be preserved on a project site based upon the type of grade changes that are to be implemented, tree species, drainage patterns, soil conditions and future irrigation and maintenance plans.

Staff shall employ the following mitigation measures whenever feasible:

- **Raised Grades:**
  - If a grade around an existing tree is to be raised with a backfill less than six inches in depth, then staff should consider vertical mulching as a mitigation measure.
  - If a grade around and existing tree is to be raised more than six inches, then staff should consider specifying the construction of tree well as a mitigation measure.
- **Lowered Grades:**
  - If a grade around an existing tree is to be lowered along the side of its root zone, then staff should consider specifying the construction of a terraced dry wall as a mitigation measure
  - If a grade around an existing tree is to be lowered along all sides of its root zone, the staff should consider specifying the construction of a tree island as a mitigating measure.

BRENTWOOD
CITY OF WARMTH

TREE CITY USA®

Appendix A

Brentwood Parks & Recreation
Approved Tree Planting Species List

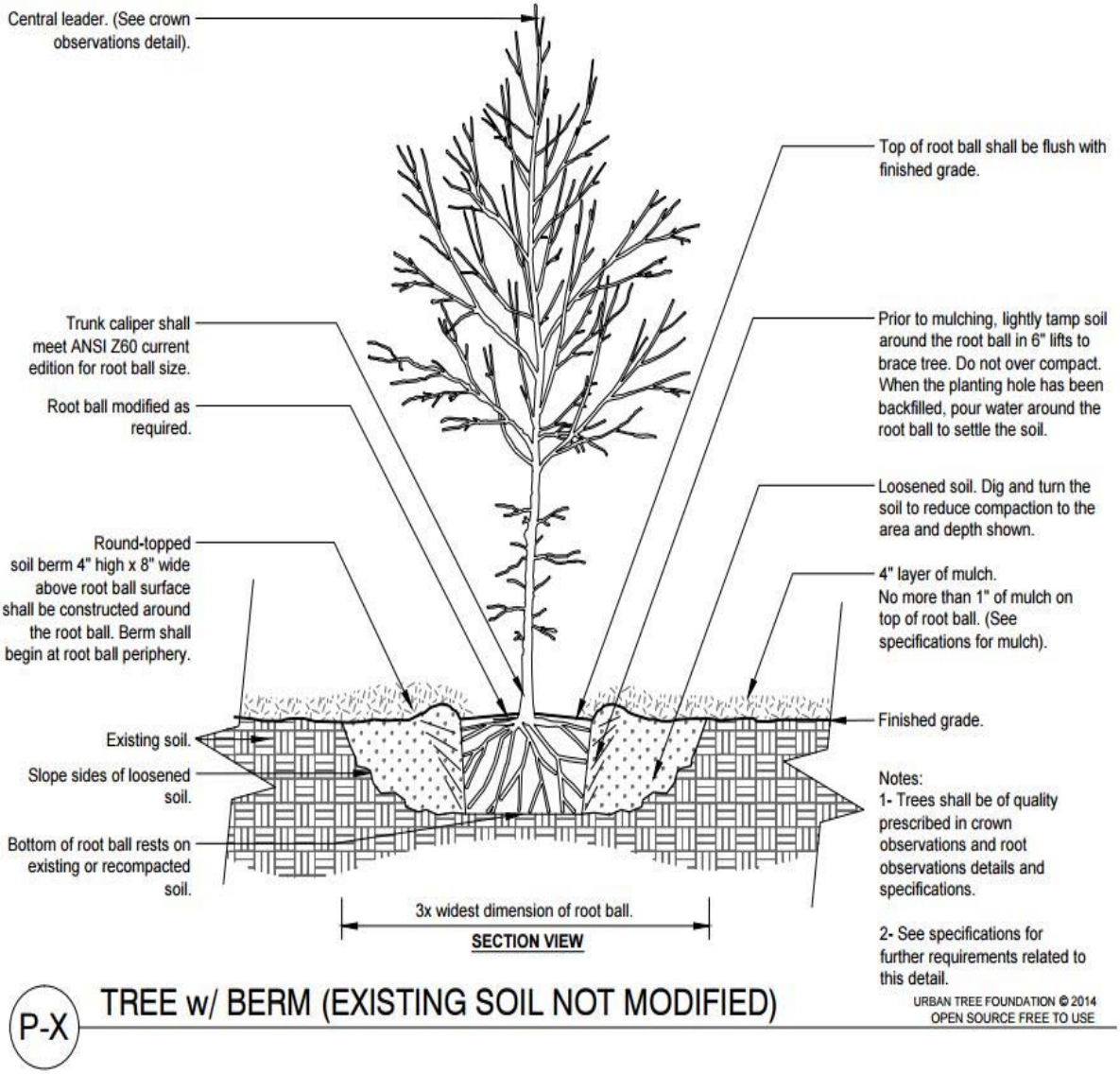
Small Trees – under 40 feet tall Spacing between trees - 20 feet	
Common Name	**Scientific Name**
Maple, Trident	*Acer beurgeranum*
Maple, Paperbark	*Acer griseum*
Maple, Japanese	*Acer palmatum*
Maple, Shantung	*Acer truncatum*
Buckeye, Ohio	*Aesculus glabra*
Buckeye, Red	*Aesculus pavia*
Serviceberry, Downy	*Amelanchier arborea*
Serviceberry, Allegheny	*Amelanchier laevis*
Hornbeam, American	*Carpinus caroliniana*
Redbud, Eastern	*Cercis canadensis*
Fringetree, White	*Chionanthus virginicus*
Dogwood, Pagoda	*Cornus alternifolia*
Dogwood, Flowering	*Cornus florida*
Dogwood, Kousa	*Cornus kousa*
Hazelnut, American	*Corylus americana*
Smoketree, American	*Cotinus obovatus*
Hawthorn, Cockspur	*Crataegus crus-galli*
Hawthorn, Washington	*Crataegus phaenopyrum*
Hawthorn	*Crataegus spp.*
Hawthorn, Green	*Crataegus viridis*
Carolina Silverbell	*Halesia carolina*
Witch Hazel, Ozark	*Hamamelis vernalis*
Witch Hazel, Common	*Hamamelis virginiana*
Magnolia, Saucer	*Magnolia soulangiana*
Magnolia, Star	*Magnolia stellata*
Magnolia, Sweetbay	*Magnolia virginiana*
Crabapple, Flowering	*Malus spp.* “Prairie Fire” or “Sugar Tyme”
Hophornbeam, American	*Ostrya virginiana*
Parrotia, Persian	*Parrotia persica*
Plum, Wild	*Prunus americana*
Hoptree	*Ptelea trifoliata*
Willow, Corkscrew	*Salix matsudana*
Japanese Tree Lilac	*Syringa reticulata*
Arborvitae, American	*Thuja occidentalis*
Viburnum, Blackhaw	*Viburnum prunifolium*
Viburnum, Rusty Blackhaw	*Viburnum rufidulum*

Medium Trees – 40 to 60 feet tall Spacing between trees - 30 feet	
Common Name	**Scientific Name**
Maple, State Street	*Acer miyabei*
Maple, Freeman	*Acer x freemanii*
Horsechestnut	*Aesculus hippocastanum*
Alder, European	*Alnus glutinosa*
Birch, River	*Betula nigra*
Hornbeam, European	*Carpinus betulus*
Hornbeam, Upright	*Carpinus betulus* "Fastigiata"
Katsura	*Cercidiphyllum japonicum*
Yellowwood	*Cladrastis kentuckea (lutea)*
Filbert, Turkish	*Corylus colurna*
Rubbertree, Hardy	*Eucommia ulmoides*
Honeylocust, Thornless	*Gleditsia triacanthos var. inermis*
Holly, American	*Ilex opaca*
Juniper, Chinese	*Juniperus chinensis*
Redcedar, Eastern	*Juniperus virginiana*
Blackgum	*Nyssa sylvatica*
Spruce, Colorado	*Picea pungens*
Pine, Shortleaf	*Pinus echinata*
Pine, Austrian	*Pinus nigra*
Oak, Sawtooth	*Quercus acutissima*
Oak, Chinkapin	*Quercus muehlenbergii*
Oak, Shumard	*Quercus shumardii*
Oak, Post	*Quercus stellata*
Oak, Black	*Quercus velutina*
Willow, Weeping	*Salix babylonica*
Sassafrass	*Sassafrass albidum*
Pagodatree, Japanese	*Sophora japonica*
Elm, Lacebark	*Ulmus parvifolia*
Elm, Slippery	*Ulmus rubra*

Large Trees – over 60 feet tall Spacing between trees - 40 feet	
Common Name	**Scientific Name**
Maple, Red	*Acer rubrum*
Maple, Sugar	*Acer saccharum*
Catalpa, Northern	*Catalpa speciosa*
Hickory, Bitternut	*Carya cordiformis*
Pecan	*Carya illinoensis*
Hickory, Shagbark	*Carya ovata*
Sugarberry	*Celtis laevigata*
Hackberry	*Celtis occidentalis*
Beech, American	*Fagus grandifolia*
Ginko (male only)	*Ginko biloba*
Coffeetree, Kentucky	*Gymnocladus dioicus*
Walnut, Black	*Juglans nigra*
Tuliptree	*Liriodendron tulipfera*
Magnolia, Cucumbertree	*Magnolia acuminate*
Redwood, Dawn	*Metasequoia glyptostroboides*
Pine, Eastern White	*Pinus strobus*
Sycamore	*Platanus occidentalis*
Plane Tree, London	*Platanus x acerifolia*
Cottonwood, Eastern	*Populus deltoides*
Cherry, Black	*Prunus serotina*
Oak, White	*Quercus alba*
Oak, Swamp White	*Quercus bicolor*
Oak, Scarlet	*Quercus coccinea*
Oak, Shingle	*Quercus imbricaria*
Oak, Overcup	*Quercus lyrata*
Oak, Bur	*Quercus macrocarpa*
Oak, Pin	*Quercus palustris*
Oak, Willow	*Quercus phellos*
Oak, Northern Red	*Quercus rubra*
Cypress, Pond	*Taxodium ascendens*
Cypress, Bald	*Taxodium distichum*
Linden, American	*Tilia americana*
Linden, Littleleaf	*Tilia cordata*
Linden, Silver	*Tilia tomentosa*
Elm, American	*Ulmus americana*
Zelkova, Japanese	*Zelkova serrata*

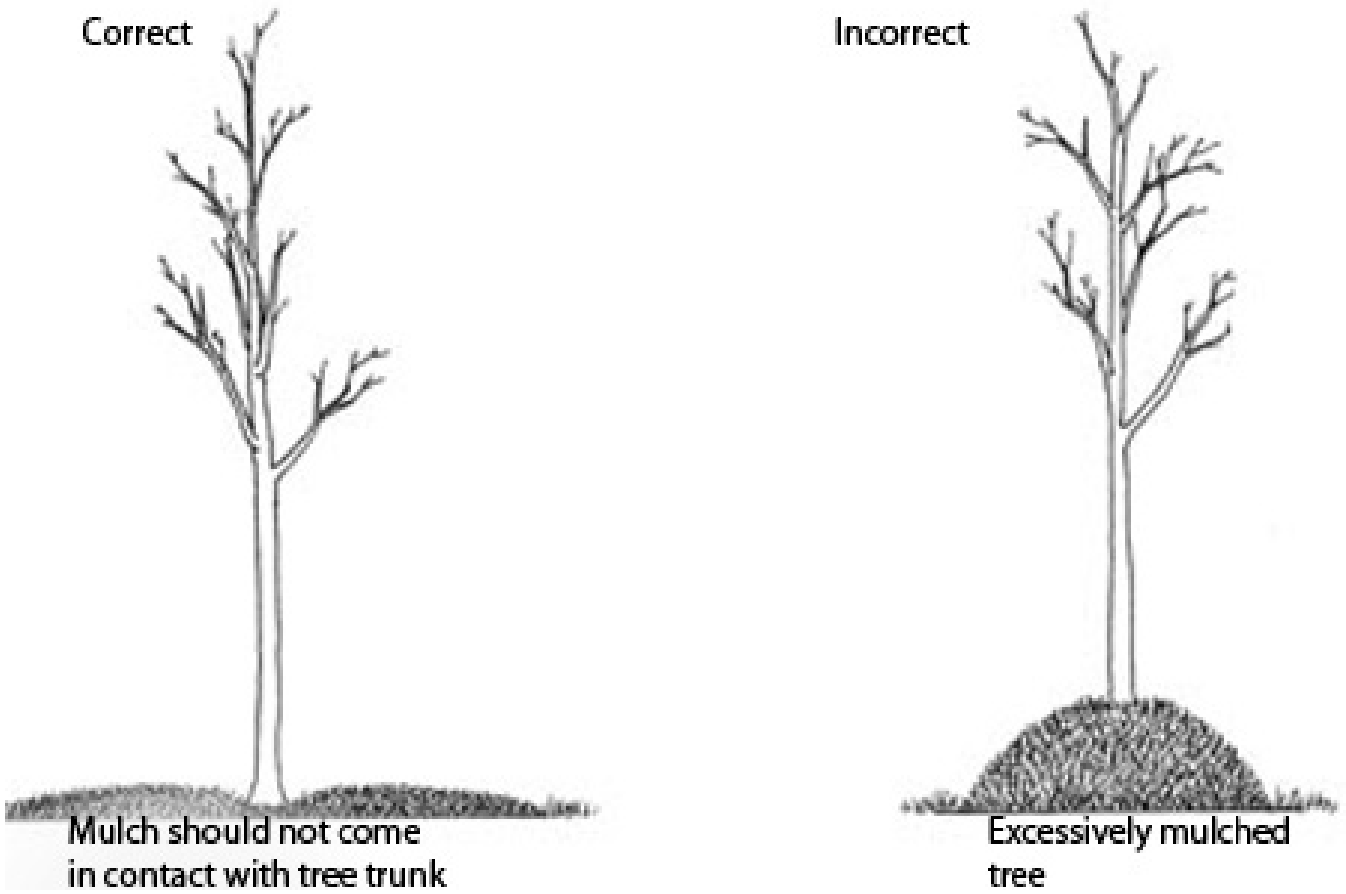
Appendix B

Tree Pit Standards



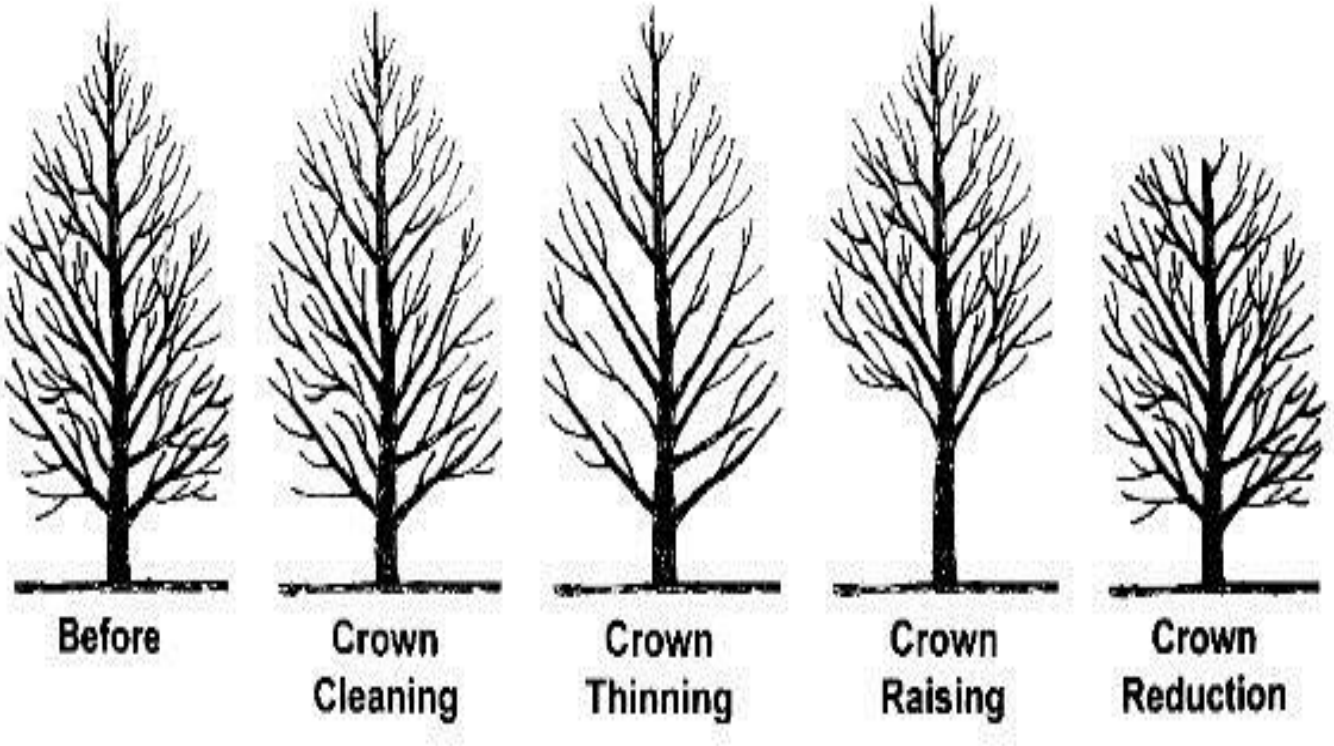
Appendix C

Proper Mulching Techniques



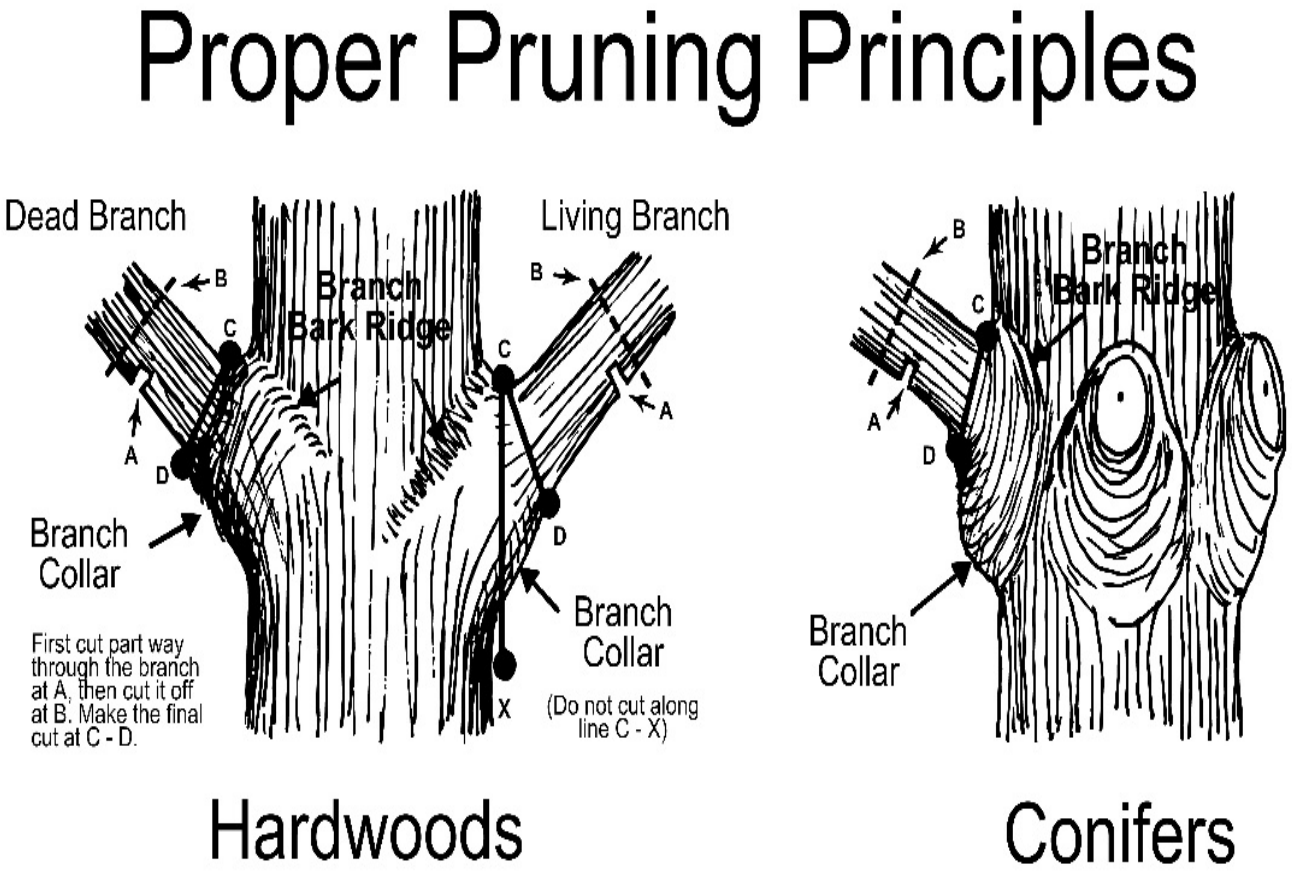
Appendix D

Proper Pruning Specifications



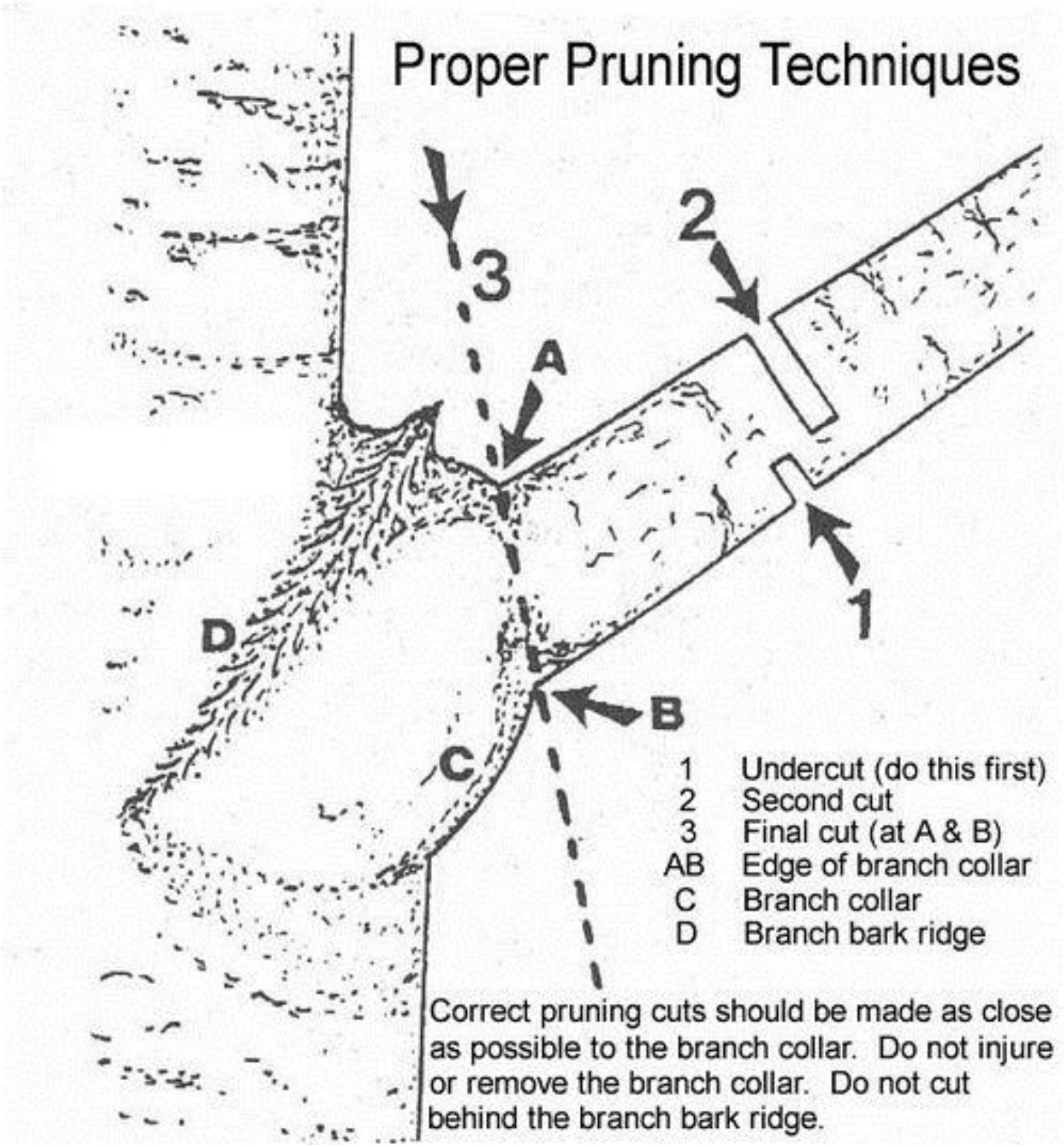
Appendix E

Pruning Specifications – Branch Collar



Appendix F

Pruning Specifications – One Third Rule Description



Appendix G

Pruning Specifications – Critical Root Zone