

## **3.0 Tree Maintenance Guidelines**

### **Introduction**

Trees are a major element of city parks and Department staff should continue to learn more about tree care in order to prolong the health of all trees. All DRP Divisions should perceive the cost of tree maintenance as an investment in its capital assets. It is the intention of the following sections to provide guidelines to maintenance practices that result in the best environment for park trees.

### **3.10 Care of trees listed in the *DRP Tree Preservation Policy***

Pruning performed on park trees adheres to the latest standards and recommendations made available by industry professionals and the International Society of Arboriculture (ISA). In the following sections watering, fertilizing, and general maintenance practices will be discussed. Work performed to trees protected by the *L.A. City Ordinance*, as well as *Heritage Trees* and *Special Habitat Value Trees*, must always adhere to these recommendations.

For trees protected by the *L.A. City Ordinance*, a permit must be obtained from the Board of Public Works to perform any alteration to the tree or pruning of any branches larger than 2 inches in diameter. Permitted pruning shall be done in compliance with the Oak Tree Pruning Standards set forth by the Western Chapter of the International Society of Arboriculture.

Trees recognized as DRP *Heritage Trees* and *Special Habitat Value Trees* can be pruned with the approval of the DRP Forestry staff. Pruning shall be done in accordance with the Oak Tree Pruning Standards set forth by the Western Chapter of the International Society of Arboriculture. Any work within the tree's dripline also requires approval from DRP Forestry staff.

Park trees recognized as *Common Park Trees* are to be protected by applying the most current ANSI (American National Standards Institute) and ISA recommendations for tree pruning, as well as maintenance practices as described in the following sections.

### **3.15 Request for Tree Work Guidelines**

To date, the Department has not established a pruning cycle, and tree care performed by the Forestry Division is by demand only. Field staff shall call the Forestry office at (213) 485-4826 any time tree pruning or inspection is required. Trees by nature shed bark and drop leaves, fruits, seeds, and small branches. In many instances, the Forestry crew will not be able to solve tree litter problems by pruning. It is important for field staff to evaluate tree pruning needs before calling in the work order. Misleading information and calling regular tree pruning needs as emergency requests results in inefficient use of the Forestry crews. Below is a guideline of regular job order requests and emergency requests for tree work.

### 3.15.1 Regular Work Order Requests:

Regular work order requests are for all tree maintenance that does not fall under the Tree Emergencies category. These types of requests include pruning of trees not posing an immediate hazard to human life or property or for large-scale projects (for example, trees blocking light fixtures, signs, or impeding walkway/road clearance), and require a work order submitted to the Forestry Division. The Lead Sr. Gardener, Park Maintenance Supervisor, or Sr. Park Maintenance Supervisor must call in all work order requests. Work orders will be reviewed and prioritized by the respective Principal Park Maintenance Supervisors.

### 3.15.2 Tree emergencies:

The following is a list of possible tree emergencies in priority order:

#### **High Priority:**

1. Trees or limbs that have fallen and caused accidents or personal injury
2. Trees or limbs that have fallen and caused damage to vehicles or structures
3. Trees or limbs which are in immediate danger of falling or breaking
4. Broken hanging limbs adjacent to structures, roads, or in picnic or play areas, play areas
5. Trees or limbs that blocking streets or roads

#### **Medium to Low Priority:**

1. Trees or limbs that have fallen and are not an immediate hazard
2. Trees or limbs that have fallen and are not blocking roads or streets
3. Hanging tree limbs that may not be in immediate danger of falling
4. Dead or severely declining trees without a target present

### **3.20 DRP Pruning Standards**

Pruning means the removal of leaves or dead parts of plants, especially branches, to achieve the following:

- maintain or direct plant form
- enhance health and appearance
- influence flowering, fruiting, and vigor
- regulate growth
- control plant size
- invigorate declining plants

Trees and other woody plants respond biologically to pruning (wounding) in specific and predictable ways. Careful study of these responses has led to pruning practices that can best develop, preserve, and enhance the structural integrity, beauty and functional value of trees.

### 3.20.1 Industry Standards

The *ANSI A300-2001-Pruning* presents performance standards for the care and maintenance of trees, shrubs, and other woody plants (Appendix C).

*Best Management Practices – Tree Pruning* is the companion publication to the ANSI A300-2001 (Appendix D)

### 3.20.2 Types of Pruning

The DRP uses seven types of pruning: structural, crown cleaning, thinning, raising, reducing, restorative, and pruning of palms and conifers.

Climbing spikes shall not be used to climb park trees or palms for the purpose of pruning. Climbing spikes may be used to rescue an injured worker or remove dead, dying, or hazardous trees.

The DRP Forestry staff evaluates trees from the ground before determining the type of pruning by referring to the *Tree Operations Manual*.

Considerations are based on tree species and can include the following:

- Species growth characteristics
- Time of year
- Tree form (ex: excurrent or decurrent)
- Tree condition (health)
- Tree structure—presence of weaknesses or defects

Staff determines from the ground what limbs need to be removed to achieve or enhance a tree's structural integrity, appearance, or desired size.

#### ➤ **Pruning for Structure**

Structural pruning is the removal of live branches and stems to influence structural integrity. It usually follows four procedures: 1) Canopy cleaning by removing dead, broken, diseased and dying branches, 2) development or re-establishment of a dominant leader, 3) establishment of the lowest permanent scaffold limb and 4) establishment of scaffold limbs by removing competing stems or branches.

#### ➤ **Pruning to Clean**

Cleaning is the selective removal of dead, diseased, detached, rubbing and broken branches. This type of pruning is done to reduce the risk of branch failure and the transmission of decay, insects and diseases.

#### ➤ **Pruning to Thin**

Thinning is the selective removal of small live branches to reduce crown density. Branches are ¼ to 1-inch in diameter. 10-15 percent of live foliage can be removed at one time. If more pruning is desired, it should not exceed 25 percent in a single year. Excessive removal of small branches on the lower two-thirds of a branch or stem is called lion tailing and may have an adverse effect on the tree – it is not an accepted practice.

➤ **Pruning to Raise**

Raising is the selective removal of branches to provide vertical clearance. Caution must be taken to not remove too many lower branches. This can cause slow development of trunk taper, cause cracks or decay in the trunk, or transfer too much weight to the top of the tree.

➤ **Pruning to Reduce (Drop Crotch)**

Reduction is the selective removal of branches and stems to decrease the height and/or spread of a tree. This type of pruning is done to minimize the risk of failure, to reduce height or spread, for utility clearance, to clear vegetation from buildings or other structures, or to improve tree appearance. Crown reduction shall be accomplished with reduction cuts rather than heading cuts.

➤ **Pruning to Restore**

Restoration is the selective removal of branches, sprouts, and stubs from trees that have been topped, severely headed, vandalized, lion-tailed, broken during a storm, or otherwise damaged. Full restoration usually requires several pruning events over a number of years.

➤ **Pruning Palms**

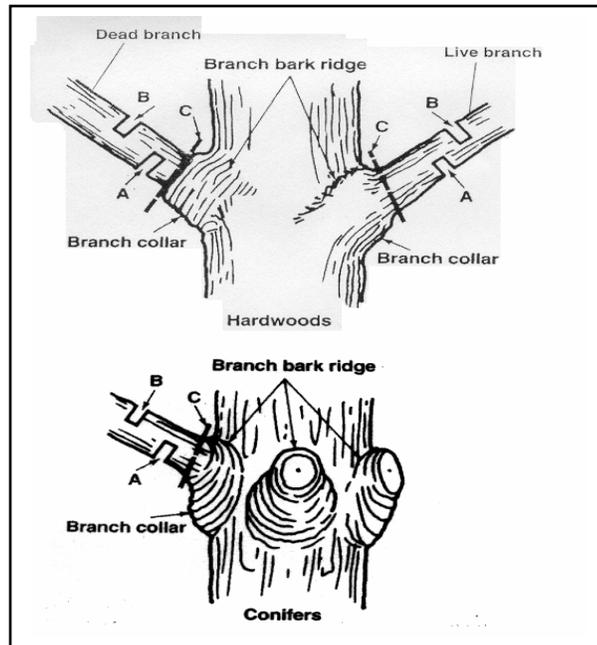
Palm pruning primarily removes dead and chlorotic fronds. Green fronds growing at an angle of more than 45 degrees from horizontal shall be retained. DRP Forestry staff minimizes the risk of disease transmission by pruning green fronds of *Washingtonia* and *Phoenix* species with handsaws disinfected in 1 % bleach solution after each tree is pruned.

➤ **Pruning Conifers**

Conifers are primarily pruned to control the density of branching, the shape of young trees, and the size of older ones. They are intolerant of topping or heading. Conifers typically have an excurrent growth habit, which is usually maintained throughout the lifespan of the tree. The DRP strives to prune conifers outside of hot summer months when the infestation of the bark beetles is more likely to occur. Thinning, by the selective removal of small branches, is the most appropriate method when pruning conifers.

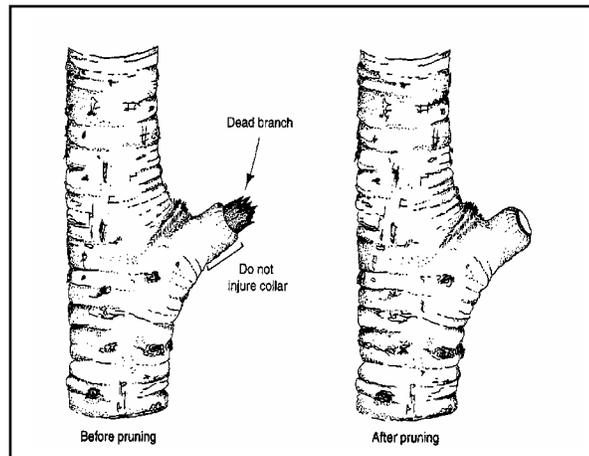
### 3.20.3 Pruning Cuts

A proper pruning cut causes very little injury to the adjoining stem. When the pruning cut is properly made a ring of woundwood forms above and below the wound during the first growing season after the cut. Pruning cuts are not covered with wound dressings or sealants. DRP Forestry staff sometimes applies a light coating of a nonphytotoxic material for aesthetical purpose. The DRP typically uses two types of cuts: 'Branch Removal Cut' (thinning cut) and 'Reduction Cut' (drop-crotch cut). Flush cuts, those made "flush" with the parent stem, removes chemical barriers that counter decay and is no longer an accepted practice.



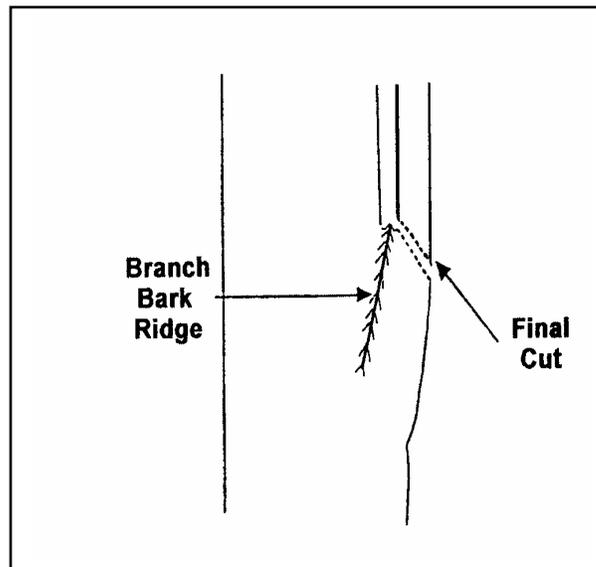
University of Illinois at Urbana-Champaign, *Plant Health Care for Woody Ornamentals*

*The first cut (A) undercuts the limb. The second cut (B) removes the limb. The final cut (C) should be just outside the branch collar to remove the resulting stub. A pruning cut that removes a branch at its point of origin shall be made close to the trunk or parent limb, without cutting into the branch bark ridge or collar, or leaving a stub. Branches too large to support with one hand shall be precut to avoid splitting of the wood or tearing of the bark.*



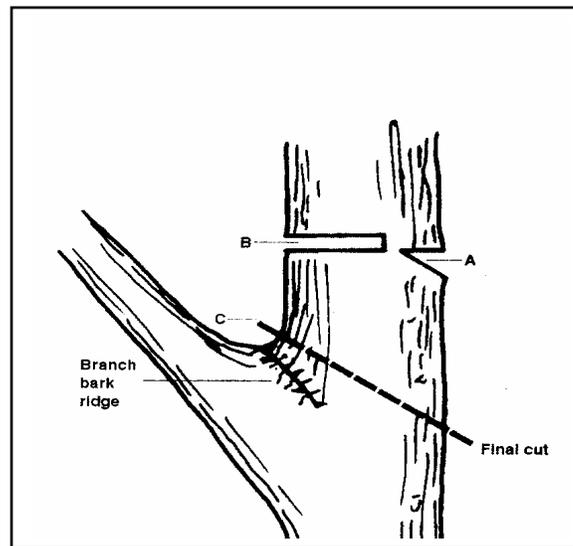
Gilman, E.F. 2002. *An Illustrated Guide to Pruning*

*When removing a dead branch, do not cut into the swollen collar growing around the dead branch, even if it is large. Removing the collar from around the dead branch will injure the trunk since this is composed of trunk wood.*



ANSI A300

*A final cut that removes a branch with a narrow angle of attachment should be made from the outside of the branch to prevent damage to the parent limb.*



University of Illinois at Urbana-Champaign, *Plant Health Care for Woody Ornamentals*

*A reduction cut shortens a stem back to a lateral branch. The exact location of the final cut will vary from branch to branch.*

### 3.20.4 Timing of Pruning

Hazardous trees of any species may be pruned any time of the year. Removal of dying, diseased, broken, rubbing, or dead limbs can also be accomplished at any time with little negative effect on the tree. Light pruning (removing less than 10 percent of the foliage) can be performed safely on most species at any time providing the trees are in good health.

Plant development can be slowed and plant size maintained if pruning takes place soon after growth is complete for the season. Such pruning should not be so severe or so early as to encourage new shoot growth. If maximum dwarfing is desired, most plants should be pruned in the period from early to midsummer. This will reduce leaf area for the longest period.

Most deciduous plants can be pruned during the dormant period between leaf fall to the end of winter with similar growth results. Avoid pruning broadleaf trees in early to late spring. Evergreens will be set back the least if they are pruned in the late winter. This also minimizes bark beetle attack on conifers.

Pruning when trees are dormant can minimize the risk of pest problems associated with wounding (attracting insects to fresh wounds), and can allow trees to take advantage of the full growing season to close and compartmentalize wounds. Avoid pruning trees, and especially stressed trees during or soon after the initial growth flush in spring. This is when the cambium is active and bark is particularly vulnerable to being torn loose.

Corrective pruning may be easier during the growing season. Branches that hang too low from the weight of leaves or fruit can be thinned and dead and weak limbs can be more easily spotted for removal.

It is a recommended practice to evaluate each tree before pruning. If necessary, alternate the schedule according to condition. For example, if oak tree dieback (caused by *Diplodia quercina*) is found, pruning should be performed between November and January. If oak twig blight (caused by *Cryptocline cinerescens* or *Discula quercina*) is identified, reschedule pruning during dry weather in the summer or fall. To prevent trees from the attack of boring insects, pruning should be performed during the least favorable time for these insects to relocate, commonly in cooler winter months.

During bird nesting season, DRP Forestry staff does not schedule large pruning projects for park trees. Forestry staff also takes special precautions to watch for signs of bird activity on the ground and scouts trees for occupied nests before beginning pruning projects. On occasions when the birds are present and the tree does not appear to be at risk, the pruning project is delayed for a few months.

### 3.20.5 Pruning Stressed Trees

Pruning is cutting into a tree's life tissue. Therefore, it is important to apply pruning practices that do not compound stress. This is especially true if pruning is performed on trees that are already stressed from various other factors. When a tree is stressed, its defense system is weakened. When defense systems are weakened and a pathogen is present, infection usually takes place that may result in tree decline.

- If the tree has been recently damaged by injury or disturbance, remove all broken branches. If necessary, restore the crown to preserve structural integrity.
- If the tree is stressed from receiving inadequate care, prune moderately to clean the crown, thin and reduce end weight, or restore the entire crown.

Care must be taken to prune stressed trees during the best time of the season for the species and when common pests are not present.

### 3.20.6 Pruning Young Trees

The average life expectancy for trees growing in harsh urban conditions is less than 20 years. Pruning trees early can improve tree vitality and preserve structural integrity. They may be pruned at planting time to remove branches damaged during handling and transplanting, and to establish the tree's permanent framework. Lower branches are typically retained as "temporary branches" – they serve to strengthen and protect the trunk. The following should be pruned:

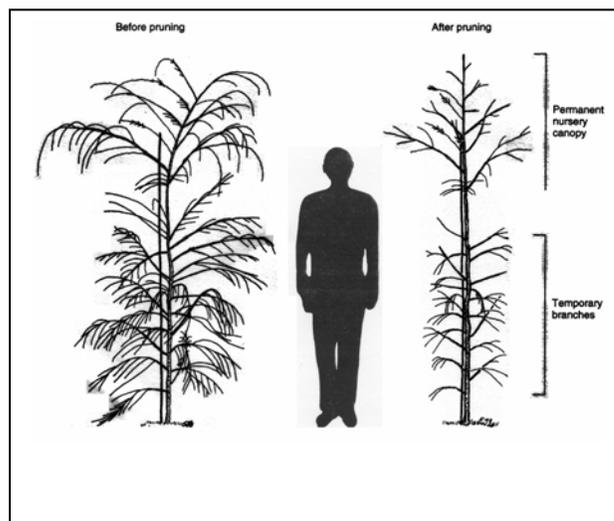
- Broken, dead, and diseased branches
- Sucker growth arising from the base or watersprouts growing vertically from a branch
- Crossing and rubbing branches

Staking may be necessary to temporarily support, anchor, or protect young trees.

Subtle pruning cuts have a dramatic effect on the future structure of a tree. The goal is to develop trees with one dominant leader, strong and balanced scaffold branches, good trunk taper, and to correct weaknesses such as included bark or codominant stems

It is important for the field maintenance staff to:

- Monitor and adjust rubbing tree stakes and ties that are too tight. In a park setting, most properly developing trees should have stakes removed after three to five years.
- Maintain temporary branches for the first three to five years after the tree has been planted. To allow mowing and prevent breaking, shorten temporary branches to 12-18 inches as shown below.



Gilman, E.F. 2002. *An Illustrated Guide to Pruning*

***Temporary branches on the lower part of the trunk are to remain for 3-5 years after planting. These branches will nourish the trunk, build caliper, and prevent over extension of the leader. Be sure to shorten any temporary branches growing into the permanent canopy.***

Temporary branches are crucial in the development of young trees. They allow for flow of photosynthates, nutrients and water between the trunk and temporary branches and leaves. Temporary branches aid in the development of a robust tapered trunk, and can result in a tree that withstands greater stress from wind, stands erect, and is better equipped to support a crown mass at maturity. These branches should be shortened to about 12-18 inches and remain for at least 3-5 years after planting. When they are permanently removed they should be pruned according to established guidelines. Do not “flush cut” or leave stubs, which are invitations to disease.

### **3.30 Prohibited Acts**

Any damaging acts or alterations to protected trees are prohibited. We discuss a few of the most common harmful practices below.

#### **3.30.1 Excessive pruning**

The most common offense in urban areas is excessive pruning. People often see different tree pruning styles and assume that these practices are good for trees. Forestry staff is cautious to trim only as much as necessary to achieve these results: a healthy and beautiful tree, increased public awareness, and the greatest ecological benefit.

#### **3.30.2 Topping and Heading.**

Topping is the indiscriminate cutting back of tree branches to stubs or lateral branches that are not large enough to assume the terminal role.

**“Topping is perhaps the most harmful tree pruning practice known. Yet despite more that 25 years of literature and seminars explaining its harmful effects, topping remains a common practice”** ISA, *Why Topping Hurts Trees*.

Other names for topping include “heading”, “tipping”, “hat-racking”, and “rounding over”. A common misconception is that a tall tree poses a hazard and its height should be reduced to make it safer. Topping may reduce the hazard in the short term, but is not a viable method for height reduction.

**Topping stresses trees** -- Topping often removes 50-100% of the leaf-bearing crown of a tree. Since the leaves are the “food factories” of a tree, topping can temporarily “starve” a tree. The severity of the pruning triggers a kind of survival mechanism. The tree activates latent buds, forcing rapid growth of multiple shoots below each cut. The tree needs to form a new crop of leaves as soon as possible, and if it doesn’t have the stored energy to do this, it is seriously weakened and may die.

A stressed tree is more vulnerable to insect and disease infestations. Large, open pruning wounds expose the sapwood and heartwood to attack. The tree may lack sufficient energy to chemically “defend” the wounds against invasion. Some insects are actually attracted by chemical signals to stressed trees.

**Topping causes decay** -- Cuts made along a limb between lateral branches create stubs. The tree may not be able to close these wounds and the exposed tissues are subject to decay. Normally a tree will compartmentalize these decaying tissues, but few trees can defend against multiple, severe wounds caused by topping.

**Topping can lead to sunburn** -- When leaves are removed the remaining branches and trunk are suddenly exposed to high levels of light and heat. The result may be sunburn of the tissues beneath the bark. This can lead to cankers, wood decay, bark splitting and death of some branches.

**Topping may create hazards** -- Stubs left from topping usually decay. Shoots that are produced below the cut are often weakly attached and may be at risk of failure. Unlike normal branches that develop normally, the outermost layer of the parent branches only connects these new shoots. The new shoots grow quickly and may become heavy and prone to breakage.

**Topping makes trees ugly** -- The natural branching structure of a tree is a biological wonder. Topping removes the ends of the branches, often leaving ugly stubs. Topping destroys the natural form of a tree.

### 3.30.3 Other prohibited actions

- “Lions tailing”. This practice removes all or most secondary and tertiary branches from the interior portion of the crown, leaving most live foliage at the perimeter of the canopy.
- Excessive root pruning that damages more than 25% of the root zone.
- Excessive tree raising.
- Compacting soil within the dripline because of unnecessary driving or parking.
- Recreation activities that will damage trees.

### **3.40 Maintaining Tree and Turf Association**

Trees and turf are mutually exclusive in nature. It is rare to see many trees growing in grasslands and conversely, grass is not common on the forest floor. Each plant group has its own demands and strategies to inhibit the growth of the other, leading to competition for water, nutrients, sunlight, and rooting space. Turf requires morning sunlight for optimum growth, health, and stand density. Golf course design considers tree location and species selection with respect to placement of turf areas. The DRP uses many design alternatives at their golf courses—for example, aligning maintenance requirements by using indigenous plants, or using mulch to minimize compaction and enhance tree health. More information is provided in Appendix P in Training Leaflet 3 – *Trees and Turf Associations*.

#### **3.40.1 Mulching as Turf Alternative**

Mulching the root areas of trees is perhaps the simplest but most beneficial practice we can perform to enhance tree health and minimize competition with turf. The application of mulch can:

- aid in soil moisture retention
- moderate soil temperature
- eliminate weed and turf competition and reduce allelopathic interference
- condition the soil and improve microbial activity
- reduce irrigation requirements

By design, mulch keeps mowing equipment from damaging tree trunks and eliminates the need for herbicide applications. It is also aesthetically pleasing.

Mulch should be applied between 4 and 6 inches deep and kept a minimum of 6 inches away from tree trunks. Mulching a large area will visually and physically tie groupings of trees together.

#### **3.40.2 Mowing and other Equipment**

Mowing equipment, spray rigs, aeration equipment, and skip loaders can all cause irreversible mechanical injury to trees. Severe damage can occur and tree trunks can eventually become girdled and die when trees are hit repeatedly with equipment such as string trimmers. Sometimes referred to as “mower blight”, trunk wounds also serve as entry points for diseases, borers, or other insects.

The DRP commonly uses mulch around trees as a deterrent against this kind of damage. Tree guards are also used to protect the trunks of young trees. They should be routinely examined and either readjusted or removed as trees mature.

#### **3.40.3 Fertilizing Standards and Mycorrhizae Treatments**

Trees require certain essential elements to function and grow. Although turf in City parks is fertilized regularly, trees typically do not require supplemental fertilizer for optimum growth. With the exception of nitrogen, most soils supply adequate amounts of nutrients. Excess and unnecessary fertilizer applications can predispose trees to disease and insect infestation, pollute ground water, and create salt buildup in the soil. If a tree appears to have a nutrient deficiency, a laboratory soil or foliar analysis should be performed before fertilizer is applied.

**Mycorrhizae** are root structures that are created when young lateral roots are invaded by specific fungi that form symbiotic associations to the advantage of each<sup>1</sup>. Plants benefit from mycorrhizae by enhanced nutrient uptake and *may* improve water absorption and drought resistance.

The DRP has had success applying mycorrhizae adjacent to trees growing in infertile urban soils. Analysis of tree roots for the presence of native mycorrhizal fungi should be performed before application of inoculants.

### **3.50 Watering Practices**

Water needs of trees vary by species, tree age, soil type, and environmental conditions. The relationship between soils, plants, and water is a complex subject and is only briefly discussed in this section.

Supplemental irrigation for mature trees should be deep and infrequent. Deep watering can increase drought tolerance and encourage deep roots less likely to damage hardscape. Excess irrigation can promote root-rotting fungi and lead to tree decline, whereas frequent shallow watering encourages surface roots that provide poor anchorage.

Watering frequency depends on temperature, humidity, wind, soil type, and drainage. The DRP uses a soil probe to determine soil moisture and establishes its irrigation schedules accordingly. The Department endeavors to water in the early morning when there is little wind, irrigation is less likely to interfere with park activities, and foliage is allowed to dry during the day, an important consideration for trees that are susceptible to fungal-related foliar diseases.

Proper irrigation is key to the survival of newly planted trees. If rainfall is not sufficient for tree establishment, supplemental water is necessary. The best indicator is to probe the soil to determine the moisture content of root ball.

The DRP avoids using overhead irrigation that wets tree canopies or tree bases, especially of those trees that are susceptible to foliar diseases or diseases caused by crown- or root-rotting fungi.

Native trees adapt to environmental conditions of the region and after establishment rarely require supplemental irrigation. Planting native and drought tolerant trees in turf-dominated City parks requires careful irrigation management.

More information on watering practices can be found in Appendix P – Leaflet 4 - *Watering Practices* and Leaflet 7 – *Maintaining Young Trees*.

### **3.60 Soil Condition**

Soil compaction is the largest single factor responsible for the decline of mature trees. Ninety percent of the damage to the upper 18 inches of soil occurs during the first pass by heavy equipment and cannot be reversed. DRP staff makes every effort and encourages the KOOL Program (Keep Off Our Lawns) to avoid soil compaction by not parking or driving within the dripline of trees.

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<sup>1</sup> *Arboriculture*, p. 107.

The following aeration methods and drainage systems are recommended to improve soil porosity in compacted soils:

### 3.60.1 Drainage

Adequate drainage must be provided when planting new trees. If trees are planted in impermeable soil with low water infiltration rates (less than 2 inches per hour), the DRP may employ one of the following drainage systems:

- French drains, at a minimum depth of three feet
- Drain tiles or lines installed beneath trees
- Drain holes augered at the bottom of the planting pit at a specified diameter and depth, and filled with medium-sized sand or fine gravel.

### 3.60.2 Aeration

Aeration of soil supporting turfgrass is performed with caution and avoided within the tree's drip line. Hollow-tine aeration can lead to the elimination of tree roots in the upper few inches of soil and usually results in improved turf root growth. Soil that is disturbed or compacted within the dripline is loosened or aerated to promote root growth and enhance tree vitality. One of the following aeration methods should be specified to correct compacted soil conditions:

- Vertical mulching. Auger holes 2-4 inches diameter, 2-3 feet deep on 4-foot centers and backfill with porous material such as perlite, vermiculite, volcanic rock, peat moss or mixture thereof.
- Radial Trenching. Using an air excavator, excavate a soil trench 3-6 inches wide and a minimum of 12 inches deep from approximately three feet from the trunk radiating out to the edge of the dripline. The trenches shall radiate out from one foot at the closest point.
- Soil Fracturing. Using pneumatic soil probe (e. g., Gro-gun) to deliver a sudden burst of air that cracks loosens or expands the soil to improve the root-growing environment.
- Subsurface injections under moderate hydraulic pressure, using a three-foot probe and applied on 3-foot centers within the dripline.

## 3.70 Insect and Disease Control

Appropriate species selection and providing for a tree's basic growth requirements are critical components of pest management. Proper planting techniques, irrigation, pruning and aftercare all contribute to a plant's tolerance of and defense to pests.

Many factors contribute to plant stress and pest susceptibility. Drought conditions and smog, for example, are stressors. In the 1980's, thousands of blue gum *Eucalyptus* trees died when drought increased their susceptibility to longhorn borers. Years of repeated defoliations caused by the redgum lerp psyllid has resulted in the death of thousands of *Eucalyptus* trees and the removal of 5,000 specimens from City parks.

**A vigorous plant is best equipped to stave off pest infestation.**

DRP implements Integrated Pest Management (IPM), a strategy that is designed to prevent and suppress pest problems with minimum adverse effects on human health, the environment, and non-target organisms. The Vegetation Management Unit of the Forestry Division is responsible for pest identification and actions taken or recommended to control, and if needed, eradicate pests before damage to a tree is irreversible. It is important for DRP staff to notify the Unit at (213) 485-4826 with your observations and/or concerns. Accurate timing is critical for success.

### **3.80 Training Material (Appendix P)**

The DRP believes that providing training and sufficient information to enhance the knowledge of those involved in maintenance, construction, or recreation activities around trees is the best solution to unintentional tree damage. Training also provides additional information that helps field staff make their own decisions.

Training material is available in various formats:

- leaflets that may be distributed during Tailgate meetings
- informational brochures
- PowerPoint training presentation (available in outline form)

The information included in the training material focuses on the most common situations and problems occurring in our parks and explains how trees respond to these situations. The material offers recommendations, alternatives, and practices to avoid or apply when working around trees. If additional training material not provided in Appendix P is required, please contact the Forestry office. Appendix P includes the following:

- ***Oak Tree Ordinance***
- ***Tree Wounds***
- ***Tree and Turf Associations***
- ***Watering Practices***
- ***Mulch and Its Benefits***
- ***Tree Staking***
- ***Maintaining Young Trees***
- ***Tree Care Presentation (PowerPoint)***
- ***Video Guide –Tunneling and Trenching***
- Brochures of ***The Green in Your City series***

### **3.90 Tree Inventory**

The successful management of any resource begins with an inventory of the resource, and the urban forest is no exception. Inventories are essential for planning, scheduling, and monitoring maintenance tasks, and in assisting in management decisions, particularly when developing a monetary budget.

The DRP is exploring means to inventory an estimated 800,000 park trees. Currently, the Forestry staff is investigating a variety of inventory systems to provide the level of information needed to make sound decisions. Since park trees grow randomly in open space, it is difficult to refer to and identify tree locations. When using fixed reference points is not possible, a global positioning system (GPS) and geographic information

systems (GIS) are best for collecting and representing data. GPS employs a handheld unit that locates a point (e.g., a tree) on the ground via a satellite system. This information can then be readily transferred to GIS. These systems of collecting data provide “layers” of information that is important to other park functions, and can reduce field data collection time by 30 percent.

A tree inventory provides descriptions of tree location, species, size, condition, and management needs. The inventory information is used to develop integrated pest management strategies by identifying species to avoid, analysis of specific problems, location of trouble spots, and pest monitoring: this data can transform the DRP’s approach to park tree management from reactive to proactive. The information also can be used to enhance the ecological value of park trees and provide direction regarding the planting of trees that are attractive and beneficial to wildlife and the connection of wildlife corridors.

An inventory is essential in locating planting sites, identifying management needs, and locating hazardous trees in need of pruning or removal. The inventory also can be used in public relations as a news release that describes public tree resources, both in terms of the number and value of trees.

Once completed, the inventory will be updated on a continuous basis by connecting to an existing computerized Forestry Work Order System and by collecting data regarding newly planted trees. In summary, the tree inventory for park trees carried out on continuous basis will establish a baseline of where the tree population has been, where it is now, and where it is going in the future.

This information was written at a time (April 2003) when funds for the tree inventory have not yet been identified. When the tree inventory program is in progress, this section will be re-written and will provide more specific information on the system used in our Department.