

PRUNING STANDARDS FOR TREES
CITY AND COUNTY OF SAN FRANCISCO
JUNE 27, 2006

Pruning can either help or hurt trees. When appropriate practices are used, pruning can provide significant benefits. When inappropriate practices are used, significant harm can follow. For the long-term health and structural stability of trees in San Francisco, it is critical that pruning practices conform to professional standards established by the tree care industry.

This document identifies basic standards for tree pruning in the City and County of San Francisco. These standards apply to all those working on public trees¹, including City of San Francisco employees and managers, private contractors, property owners, and residents.

Foundation for the Standards

The City of San Francisco recognizes the most current editions of the following benchmark standards for tree pruning (see References):

1. American National Standards Institute (ANSI) A300 Pruning Standards
2. ANSI Z133.1 Safety Standards
3. ISA Best Management Practices: Tree Pruning

City arborists, managers, related personnel and contractors should obtain copies of the above publications and apply the standards and guidelines when engaged in pruning operations in San Francisco. Copies of these documents can be obtained from the International Society of Arboriculture (see Resources). Occupational health and safety standards in the workplace shall be observed at all times.

For street trees, Article 16 of the San Francisco Public Works Code establishes responsibilities regarding planting, maintenance (including pruning), and removal. Tree damage caused by inappropriate pruning is addressed as follows: “Any person who removes, damages, or destroys a tree in violation of Article 16 shall pay a sum of money equal to the diminishment of the tree’s value” (Section 811b).

A. Pruning Needs, Objectives, and Plans

In San Francisco, there is a great diversity of trees, including conifer, broadleaf evergreen, and deciduous species. For each species, there exists substantial variation in

¹ “Public trees” shall mean all trees located on public property and in the public right-of-way.

age, size, condition, and structure of individual trees. This species diversity and tree variability creates challenges with regard to tree care practices, and in particular for pruning. Pruning needs can vary substantially depending on these factors: some trees will need little or no pruning, while others will need substantial pruning. In addition, some trees need to be pruned to improve structure, while others may need branches removed to manage pest problems or provide clearance from overhead utility lines.

To ensure that pruning is appropriate for the species and tree/site conditions, it is important to have a clear understanding of the specific needs of the tree and the objectives for pruning. Pruning objectives include the following:

- Improve structural strength and reduce failure potential (including dead branch removal)
- Prevent or mitigate a pest problem
- Improve aesthetic characteristics
- Provide clearance for pedestrians, vehicles, and structures
- Improve safety and security for residents and visitors
- Repair structural damage from wind loading
- Reduce maintenance costs (i.e., when applied to young trees)
- Influence flowering and fruiting of some species

***Standard 1:** For commercial contractors, a written plan of work shall be prepared that clearly identifies the tree species, location, need for pruning, pruning objectives, pruning specifications, and the scope of pruning. A checklist format can be used. Where multiple reasons for pruning exist, they should be prioritized from highest to lowest. A separate plan is needed for each tree. For groups of trees of the same species with similar pruning needs, one plan will suffice.*

For all city departments and agencies, work plans shall be developed either for individual trees or for groups of trees, such as trees along streets, in parks, or on the grounds of public buildings. Plans shall include species, location, need for pruning, pruning objectives, pruning specifications, and the scope of pruning. Pruning plans shall be specific for the species to be pruned.

Work plans shall be available at work sites during pruning operations.

B. Pruning Practices

1. PRUNING CUTS

Pruning is a wounding process that causes some level of injury to trees. It is important to make pruning cuts that minimize injury or the potential for injury. For instance, cuts should be made on branches in a manner that ensures rapid and complete wound closure, thus reducing the potential for decay. Information on appropriate branch removal practices and the size and location of cuts is found in *ANSI A300 Part 1 (Pruning)* and *Best Management Practices: Tree Pruning* (see References).

Note that flush cuts increase the potential for decay and reduce the formation of callus tissue above and below the wound (woundwood). In some cases, flush cuts can stimulate vigorous but incomplete callus development. Conversely, leaving branch stubs prevents wound closure and increases the potential for decay. These types of pruning cuts should be avoided.

Standard 2: All pruning cuts shall conform to ANSI A300 standards (Part 1: Pruning). Do not make flush cuts or leave branch stubs.

2. AMOUNT OF PRUNING

Removal of live branches and associated leaf area can have a negative impact on the health of trees. When relatively large amounts of leaf area are removed, the capacity of a tree to produce energy for growth and pest resistance is diminished. Pruning should be limited to that amount needed to accomplish the pruning objective. In some cases, it may be best to complete pruning over a two- or three-year period rather than do all that is needed in one year.

In addition, excessive pruning or overthinning stimulates watersprout development in many species. Watersprouts are usually weakly attached and prone to breaking at the point of attachment. Crown density can increase substantially due to watersprout production, resulting in a loss of tree form and reduction in light penetration. Also, excessive pruning can lead to sunburn injury to bark tissue of branches and the trunk.

Standard 3: Not more than 25% of the crown shall be removed within an annual growing season. The percentage of foliage removed shall be adjusted according to age, health, and species considerations. Stressed trees are less tolerant of pruning and leaf area removal should be minimal. In cases where more than 25% of the crown needs to be removed, such as to reduce the potential for structural failure, a qualified arborist² shall make an assessment of the amount of pruning needed to abate the hazard. When possible, such pruning should be scheduled over a two- or three-year period. Pruning should be minimal on species prone to watersprout development. For such species, pruning during the summer months may reduce the potential for watersprout development (see Standard 4). For species susceptible to sunburn injury, pruning shall not expose bark tissue of the trunk and scaffold branches to sunlight levels that lead to injury.

3. WHEN TO PRUNE

² “Qualified arborist” shall mean arboriculture professionals with any one of the following certifications or credentials: ISA Certified Arborist, ISA Board Certified Master Arborist, ASCA Registered Consulting Arborist, and individuals holding a college degree (4-year) in Arboriculture, Urban Forestry, or closely-related discipline, with 3 years of documented field experience in urban tree care.

In San Francisco, the time of year to prune can vary depending on pruning needs, objectives, and species. Generally, trees can be pruned throughout the year, but the following times need to be avoided: 1) when leaves are forming or falling, and 2) when pest problems may result from pruning (e.g., insect infestation or disease infection). In addition, care should be taken to avoid pruning tree parts when birds (or other wildlife species) are actively nesting.

Standard 4. *Generally, pruning can be done throughout the year. For some trees, however, certain periods or seasons need to be avoided. For species susceptible to particular insect or disease problems, avoid pruning at times of the year when the problem will be exacerbated (e.g., do not prune pines during the spring and summer months in order to minimize the potential for bark beetle infestations). For trees with a notable flowering trait, avoid pruning prior to or during flowering periods (unless flowers cause allergic reactions). Pruning to remove dead, diseased, or broken branches can be done at any time of year. Pruning during the summer months can be used as a strategy to reduce watersprout development in certain species.*

For deciduous species, do not prune during bud swell, bud break, or leaf expansion in the spring. Do not prune from the time leaves begin to turn color in the fall through the leaf drop period. Do not prune during times of the year that may initiate or exacerbate a pest problem (e.g., do not prune elms during the summer months to avoid Dutch elm disease infection and transmission).

Broadleaf-evergreen species (such as Eucalyptus spp., Ficus spp., Acacia spp., and Myoporum spp.) can be pruned throughout the year. Avoid pruning during periods that stimulate substantial watersprout development. For species prone to foliar diseases, avoid pruning at times when disease-susceptible new growth can be stimulated by pruning.

For conifers, pruning during the winter months (November through February) is generally recommended. Do not prune during periods of needle formation and enlargement (except for specialty-pruned conifers that are pruned during growth periods to create a bona fide horticultural form). For species susceptible to bark beetle infestations (e.g., Pinus spp.), do not prune when beetles are active (typically March through October in San Francisco).

4. WOUND TREATMENTS

Over the years, wound dressings and paints have been used to treat or cover pruning wounds. Dressings are no longer recommended, however, because there is no scientific evidence to indicate that these treatments reduce decay or accelerate wound closure. In addition, some dressings may cause tree injury. Until scientific studies find clear benefits to using these materials, pruning wound treatments are viewed as being unnecessary.

Standard 5. *Pruning wound treatments (dressings and paints) shall not be used.*

5. PRUNING AND CLIMBING EQUIPMENT (pruners, saws, and spikes)

To promote callus development and wound closure, it is important to make clean pruning cuts. Bark surrounding the cut should not be torn, shredded, stripped away, or otherwise separated from the wood. This can be accomplished by using pruning equipment that is sharp and sized appropriately for the job. Clean, well-maintained equipment (blades, chains, bars, and air/fuel filters) produces cleaner cuts with less effort, improves worker safety, and reduces the potential for the spread of pathogens.

In addition, injury to bark tissue can occur from the use of climbing spikes (gaffs, climbing spurs) and tie ropes. Resulting wounds can lead to localized bark death and wood decay, and can serve as entry courts for insects and pathogens. Wounds from ropes can be reduced by the use of friction savers at the tie point.

Standard 6. *Pruning equipment shall be sharp and sized appropriately for the pruning cut. Avoid the use of any pruning and climbing equipment that may cause damage to bark tissue. Spikes (climbing spurs) shall not be used for climbing trees unless the tree is being removed, or when limbs are more than throwline-distance apart and there is no other means of climbing the tree. Pruning tools shall be treated with a disinfectant (such as Lysol) when pruning trees infected with a pathogen that may be transmitted (on tools) from one tree to another of the same species, such as elms (*Ulmus spp.*). Disinfectants should be used before and after pruning individual trees.*

C. Pruning Mature Trees

1. PRUNING TYPES

As noted in section A, trees are pruned to achieve various objectives. To meet the objective(s) identified for a mature tree, several different types of pruning can be employed: cleaning, thinning, raising, reduction, and restoration. Each of these pruning types is described in the following publications: *ANSI A300 Standards* and *Best Management Practices: Tree Pruning* (see References). It is important to be familiar with each type to develop a plan of work for pruning a mature tree.

Since these pruning types are used to achieve specific objectives, it is also important to select the appropriate type to match the objective. For example, if the height or spread of a tree needs to be reduced to improve structural strength, then crown reduction pruning should be selected. Or, if the density of the crown needs to be reduced for pest management purposes, then branch removal pruning (thinning) should be selected.

The City of San Francisco requires tree clearances for the following situations: pedestrians on sidewalks, foliage obstructing streetlights and signals, and vehicles on

roadways. Street trees should be pruned to maintain a 14-foot vertical clearance over curbing, and 8-foot clearance over sidewalks. To avoid excessive pruning to achieve these clearance requirements, pruning should be initiated when the tree is young, and continued through maturity. Pruning over several seasons to achieve these results is preferable to single-season pruning. In certain cases, such as to abate safety hazards, pruning may be needed that exceeds standards for canopy removal in a season (see *Standard 3*). In such cases, pruning shall be conducted under the supervision of a qualified arborist.

Standard 7: *In San Francisco, all those engaged in tree pruning operations shall be familiar with each of the pruning types. Selection of the pruning type(s) shall be based on pruning objectives (see Standard 1). Refer to publications cited in section C1 for descriptions of pruning types. Clearance pruning that does not comply with Standards 3 and 4 shall be conducted only under the supervision of a qualified arborist (see footnote 1).*

2. TOPPING AND HEADING CUTS

Topping is the reduction of a tree's size using heading cuts that shorten limbs or branches back to a predetermined crown limit. Topping is not an acceptable pruning practice (see *ANSI A300 Standards*).

Heading is defined as cutting a currently growing or one-year-old shoot back to a bud, or cutting an older branch or stem back to a stub in order to meet a defined structural objective, or cutting an older branch or stem back to a lateral branch (see *ANSI A300 Standards*).

When pruning mature trees, heading cuts should be avoided for the following reasons:

- Vigorous shoots can be stimulated to grow just below the heading cut. Typically, these shoots are weakly attached, poorly tapered, and have a high failure potential.
- Wood decay can develop in the cut branch or stem. Often, decay extends well into the branch or stem and reduces its structural strength. This increases failure potential.
- The tree's natural form can be lost in many cases, particularly when relatively large diameter cuts are made.

In very limited cases, heading cuts may be appropriate for mature trees, such as:

- To reduce tree height or branch end weights. Note: This approach should be employed **only** in cases where there is a high risk of structural failure and thinning cuts (reduction cuts) cannot be used. Also, follow-up pruning to minimize risk associated with weakly-attached shoots will be needed.
- To achieve a specialty tree form using the pruning technique called "pollarding". Pollarding uses heading cuts to shorten branches to a predetermined length when the tree is young. Thereafter, it requires the removal of all of the current season's

growth that forms near the cut branch ends. Eventually, tissues at the end of the branch develop to form enlarged and rounded structures, referred to as “knuckles”. Pollarding is typically reserved for certain deciduous species, such as London plane (*Platanus x acerifolia*) and elm (*Ulmus spp.*). Generally, pollarding is not recommended because it requires a high level of maintenance (annual pruning) and tree benefits are reduced by the annual reduction of canopy size. Pollarding is not appropriate for conifers and broadleaf evergreen species.

Standard 8: *Heading cuts shall not be used when pruning mature trees, except in very limited cases. Whenever possible, use reduction cuts to reduce height and branch removal cuts (thinning cuts) to reduce branch end weights. When reduction and branch removal cuts are not possible (such as when interior lateral branches are not present) and tree hazard potential is high, then heading cuts may be needed, but their use should be minimized. The practice of pollarding shall be limited in application to London plane tree (*Platanus x acerifolia*) and elm (*Ulmus spp.*), and only when initiated on young trees (i.e., not after they reach a juvenile or mature stage).*

3. STRESSED TREES

Old, unhealthy, and stressed trees require special pruning consideration. Such trees do not tolerate the loss of leaf area as well as more vigorous trees: they take longer to recover from pruning, and their capacity to respond to pests and other injuries can be impaired. Removal of live branches and associated leaf area should be minimized or avoided. Generally, pruning should be limited to the removal of dead branches and significant structural defects.

Standard 9: *For old, unhealthy, and stressed trees, pruning should be limited to the removal of dead branches and structural defects. Removal of live branches should be avoided or minimized.*

4. UTILITY PRUNING

Pruning trees to maintain clearance from high voltage distribution lines is a requirement for the local utility (Pacific Gas and Electric, PG&E). This is a highly specialized area of pruning that requires extensive training in safe work practices and appropriate pruning techniques. Guidelines providing detailed information regarding appropriate pruning practices for utility line clearance (such as lateral or directional pruning) are given in the Utility Pruning section of the *ANSI A300 Pruning Standards* (see References).

Standard 10: *Utility pruning requires extensive training in safe work practices and specialized pruning techniques. Prior to pruning trees for line clearance, all workers shall have documented training that meets utility and tree industry standards. Pruning practices shall follow guidelines described in ANSI A300 Pruning Standards (see*

References). A plan of work that incorporates these practices shall be developed prior to pruning.

D. Pruning Young and Juvenile Trees

Multiple benefits can be achieved by pruning trees during their formative years. These include:

- The establishment of strong structure with a commensurate reduction in failure potential as the tree matures.
- Reduction of long-term maintenance costs.
- Enhancement of tree longevity and extension of long-term environmental and social benefits.

Young trees need to have a strong, well-established central leader, strong branch attachments, adequate spacing/distribution of scaffold branches, and temporary branches retained both between scaffolds and below the lowest scaffold. Although these structural characteristics should be established as soon as possible, training of young trees is an on-going process for most species.

***Standard 11:** Trees should be structurally pruned when they are young. Follow guidelines in: *Training Young Trees for Structure and Form* (see *References*). Young trees will need follow-up pruning, preferably three times in the first five years, and then periodically as they develop through the juvenile phase into maturity.*

E. Palm Pruning

Several species of palms are planted in San Francisco's urban forest. Being monocots, these trees have a different anatomy and form than conifer, broadleaf evergreen, or deciduous species. As a result, they require special care, particularly in regard to pruning. Generally, only dead fronds (palm leaves) should be removed. The removal of live fronds should be limited to those that are broken or severely chlorotic. Fronds should be removed carefully to avoid damage to living tissue. To avoid transmitting disease-causing organisms on pruning tools, it is important to disinfect tools before and after pruning individual trees. Although this applies to many palm species, it is particularly important for Canary Island date palm (*Phoenix canariensis*) to avoid the spread of Fusarium wilt (*Fusarium oxysporum* f. sp. *canariensis*).

***Standard 12:** Palm pruning should be limited to the removal of dead, broken, and strongly chlorotic fronds. Live, healthy fronds should not be removed. Fronds should be severed close to the petiole base without damaging living trunk tissue. Palm fruit, flowers, and loose petiole bases should be removed if deemed to be a safety risk. A disinfectant (such as Clorox or rubbing alcohol) shall be used on pruning tools before and after pruning individual trees. Climbing spikes or spurs shall not be used to climb palms for pruning.*

F. Root Pruning

In urban settings, trees may require root pruning, typically to address conflicts with infrastructure elements (sidewalks and curbs). Since this practice results in the loss of roots, both tree health and structural stability are affected. As a result, it is critical to be fully aware of practices used to minimize root-pruning impacts. Keep in mind that certain trees should not be root pruned, such as trees in poor condition or trees that are leaning. In addition, some species do not respond well to root pruning, such as pepper tree (*Schinus spp.*), tulip tree (*Liriodendron tulipifera*), camphor (*Cinnamomum camphora*), Chinese evergreen elm (*Ulmus parvifolia*), and callery pear (*Pyrus calleryana*).

To minimize root-pruning impacts, a tree assessment should be conducted prior to pruning. Both tree and site conditions need to be evaluated to determine the potential for injury and structural stability loss. Following the assessment, a plan should be developed that identifies the maximum allowable size of roots to be cut, allowable proximity to the trunk for cuts, time of year when root cutting is allowable, and the most suitable method for making cuts. Both the assessment and plan should be completed by a qualified arborist. For more information on root pruning, review the following publication: *Reducing Infrastructure Damage by Tree Roots: A Compendium of Strategies* (see References).

Standard 13. Root pruning should be considered only when other options for correcting a conflict between roots and infrastructure are deemed not practical. For trees requiring root pruning, a tree assessment shall be conducted and a root-pruning plan shall be developed by a qualified arborist (see footnote 1). Avoid root pruning during times of the year when wind loads on trees are greatest, such as during the winter months. Crown pruning prior to or following root pruning shall be done only in cases where the potential for structural failure may increase substantially because of root pruning.

References

ANSI A300 (Part 1)-2001 Pruning: Tree Care Operations - Tree, Shrub and Other Woody Plant Maintenance - Standard Practices (revision and redesignation of ANSI A300-1995, includes supplements). American National Standards Institute, Washington, DC.

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Resources

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