CITY OF VANCOUVER
WASHINGTON

Street Tree Manual

Arboriculture Specifications and Standards of Practice

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Chapter 1 – Purpose and Scope of the Street Tree Manual

The Street Tree Manual ("Manual") contains specific regulatory provisions, promulgated by the City Forester pursuant to Vancouver Municipal Code ("VMC") § 12.04.030. VMC § 12.04.030 allows the City Forester to quickly implement best management practices, as reflected in the professional tree care industry, for the planting, maintenance, and removal of street trees.

The Manual supplements VMC Chapter 12.04, Street Trees. Therefore, individuals must be familiar with the requirements from both VMC Chapter 12.04 and the Manual. VMC Chapter 12.04 governs any conflict between VMC Chapter 12.04 and the Manual.

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Chapter 2 - Definitions.

"ANSI A300 standards" Industry developed standards of practice for tree care; acronym for American National Standards Institute

"ANSI Z133.1" safety standards for tree care operations

"Arboriculture" refers to that part of horticulture which deals with the study and care of trees and other woody plants.

"Backfill" soil put back into the hole when planting a tree

"Balled and burlapped (B & B)" having the root system and soil wrapped in burlap for moving and planting a tree or other plant

"Bare root" tree or other plant taken from the nursery with exposed root system, without soil

"Bottoming" excessive removal of the lower branches

"Bracing" installation of metal rods through weak sections or portions of a tree for added support

"Branch bark ridge" top area of a tree's crotch where the growth and development of the two adjoining limbs push the bark into a ridge

"Branch collar" area where a branch joins another branch or trunk created by overlapping wood tissues

"Cabling" installation of hardware in a tree to help support weak branches or crotches

"Caliper" trunk diameter measured at six inches from the ground; if caliper is greater than 4 inches the measurement is taken at 12 inches from the ground.

"Central leader" the main stem of a tree

"City" means the incorporated City of Vancouver, Clark County, Washington.

"City Forester" means the City's Urban Forester, or designee.

"Codominant branches/stems" forked branches of nearly the same size in diameter and lacking a normal branch union (or containing a branch union with included bark).

"Crown" the aboveground portions of a tree.

"Crown cleaning" removal of watersprouts and dead, dying, diseased, crossing and high-risk branches from a tree.

"Crown raising" removal of the lower branches of a tree in order to provide clearance for buildings, vehicles and pedestrians.

"Crown reduction" pruning to reduce the height and/or spread of a tree by cutting to a lateral branch or limb at least one-half the diameter of the cut being made.

"Crown restoration" a method of restoring the natural growth habit of a tree that has been topped or damaged in any other way.

"Crown thinning" selective removal of laterals from branches and limbs to provide light and air movement through the crown or to lighten the weight of the remaining branches.

"Cultural" sunlight; water; fertilizer; air; pest infestations; or other factors resulting in poor tree growth.

"Deadwooding" removal of dead and dying limbs from a tree.

"Decay" decomposition of woody tissues by fungi or bacteria.

"Dieback" condition in which the ends of the branches are dying.

"Director" means the City's Director of Public Works, or designee.

"Drip line" means that area on the ground below the tree in which the boundary is designated by the edge of the tree's branches.

"Drop-crotch pruning" see crown reduction

"Easement" means a grant of one or more property rights by the property owner, for a specific purpose, to the public, a corporation, or another person or entity.

"Emergency" means damage to utility systems, or to public or private property or an immediate threat to the welfare of persons, due to storm or other acts of God or other accident which requires immediate attention to alleviate the condition or commence or complete repairs.

"Heading back" topping; cutting of limbs back to buds, stubs or lateral branches not large enough to assume apical dominance.

"Hazard tree" means any tree or tree part that with a combination of structural defect and/or disease which makes it subject to a high probability of failure, and a proximity to persons or property, as assessed by the City Forester. Hazard tree evaluation standards

are established by the International Society of Arboriculture and are used by the City to determine this designation.

"Included bark" bark that becomes embedded in a crotch between branch and trunk or between codominant stems and causes a weak structure.

"Internode" the region of the stem between two successive nodes.

"Inappropriate Species" are the types and species of trees that are in the Street Tree Ordinance as prohibited trees or are determined as such by the City Forester.

"Knowingly" means that a person knows or acts knowingly or with knowledge when he or she is aware of a fact, circumstance or result which is described by this Chapter as being a violation, whether or not the person is aware that the fact, circumstance or result is a violation of this Chapter.

"Leader" the primary terminal shoot or trunk of a tree.

"Lion tailing" the poor pruning practice in which the limbs are thinned from the inside of the crown to a clump of terminal foliage.

"Major pruning" means the pruning or cutting out of branches three inches in diameter or greater; root pruning; or cutting out of branches and limbs constituting greater than fifteen percent of the tree's foliage bearing area, and in which the natural form of the tree is retained.

"Mature Tree" when a tree has achieved 75% of its full canopy growth or trees that are over 15 years of age.

"Minor pruning" means pruning or cutting out of water sprouts, suckers, twigs, or branches less than three inches in diameter, or which constitutes less than fifteen percent of the tree's foliage bearing area and retains the natural form of the tree. Removal of dead wood**,** broken branches and stubs are also considered minor pruning.

"National arborist organization" means nationally recognized arborist associations including International Society of Arboriculture and American National Standards Institute.

"Node" the slightly enlarged portion of a stem where leaves and buds arise.

"Nuisance vegetation" means trees, plants, shrubs or vegetation which is in the right-of-way or private property and situated so that they interfere with the free and safe use of any street or sidewalk and is declared a public nuisance. Any vegetation which interferes with vision at any intersection so as to violate Section 20.93.240 of this Code is also nuisance vegetation and a public nuisance.

“Occupational Safety and Health Act (OSHA)” the United States legislative act dealing with health and safety in the work place.

“Permit holder” means that person who is issued a street tree work permit under this Chapter.

“Person” includes any individual, firm, association, corporation, agency, or organization of any kind.

“Planting” means necessary steps taken during installation of trees and shrubs within the public right of way to ensure survival.

“Planting strip” means that area from the back of curb and the front of sidewalk or the area in the raised median, used for grass or approved landscaping plants.

“Private tree” means a tree in which the trunk wholly resides on a property owner’s real property adjacent to the right-of-way.

“Property owner” means a person or agent thereof, who owns or controls real property adjacent and within a right-of-way.

“Pruning” cutting away unwanted parts of a plant.

“Public place” means property owned in fee by the City of Vancouver.

“Public utility” means any organization that has a franchise to utilize the public rights-of-way.

“Raising (Elevating)” the removal of lower limbs from a tree to provide clearance.

“Reduction” pruning to decrease height and /or spread of a branch or crown.

“Removal” means the act of taking out or reducing a part or an entire tree or shrub so that the tree or shrub will not regain its mature size or function.

“Restoration” pruning to improve the structure, form and appearance of trees that have been severely headed, vandalized, topped or damaged.

“Right-of-way” means property designated for general public access, typically including but not limited to planting strip, street tree, sidewalk, curb, and street.

“Scaffold branches” the permanent or structural branches of a tree.

“Sidewalk” means a facility made of concrete or other approved material for the conveyance of pedestrians usually adjacent to a street, or between streets.

"Species" a group of organisms composed of individuals of the same genus.

"Staking" supporting a newly planted tree or leaning tree with stakes.

"Stress" factors that negatively affects the growth and health of a tree.

"Structural defects" flaws, decay or other faults in the trunk, branches, or root collar or a tree that may lead to failure of the tree.

"Structural pruning" pruning to establish a strong scaffold branch system.

"Street" means a public way designed primarily for vehicular traffic. It includes the terms "road", "highway", "avenue", "boulevard", "thoroughfare", or other traffic way and usually includes improvements, including curbs, sidewalks and street pavement within the right-of-way.

"Street tree" means any woody vegetation, generally single-stemmed, and is recognized by the City as a tree, and in which the trunk is wholly or partially located within the right-of-way or any easement granted for the purpose of public tree management. A "street tree" may also be the portions of a private tree residing in the right-of-way.

"Street Tree Manual" means the Tree Specifications and Standards of Practice for the City of Vancouver which contains regulations and standards for the planting, pruning, removal and maintenance of trees on public right of way and a program for developing and improving the public tree resources of the community.

"Subordinate" pruning to reduce the size and growth of a branch in relation to other branches or leaders.

"Sucker" shoot arising from the roots.

"Supervise" means a person who has obtained certification from the International Society for Arboriculture and who ensures that his or her employees engage in work that is in reasonable compliance with standards contained in the Street Tree Manual.

"Thinning cut" removes a branch at its point of attachment.

"Topping" cutting back a tree to buds, stubs or laterals not large enough to assume the role of leader.

"Undercut" a cut on the underside of a limb to be removed to prevent tearing as the limb falls.

"Urban Forestry" has as its objective the cultivation and management of trees and related plants for their present and potential contribution to the physiological, sociological and economic well being of urban society. Inherent in this function is a

comprehensive program designed to educate the urban populace on the role of trees and related plants in the urban environment. In its broadest sense, urban forestry is one essential component of a multi-managerial system that includes watersheds within the City, wildlife habitats, outdoor recreation opportunities, landscape design, recycling of municipal vegetative wastes and tree care in general.

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Chapter 3 – Street Tree Work Permit and Street Tree Worker License.

Permits. Any individual who seek to obtain a street tree work permit for planting, pruning or removal of any street tree or a street tree worker license may obtain an application at the following address:

Online: www.cityofvancouver.us/urbanforestry
Request by email: urbanforestry@ci.vancouver.wa.us
Request by phone: (360) 619-1128
Request in person: Citizen Service Center, 1313 Main St

Chapter 4 - Tree Selection

A beautiful, well-maintained tree adds environmental, economic and social value to the community. Trees are critical to the urban infrastructure. They provide shade, energy conservation, road conservation, prevent erosion, mitigate damage from stormwater, clean the air and water, help block wind, and they provide habitat for urban wildlife.

Planting the right tree in the right place is an investment in the future. Choosing the right tree and the best place to plant will help provide beautiful, healthy trees that require less maintenance. The temptation to plant a fast growing tree is great. However, fast-growing trees often develop problems prior to maturity because much of their energy is used in growth with little left over for defense of pests and diseases. Trees with slow to moderate growth rates are usually healthier, survive longer, and they are able to tolerate attacks from pests and diseases. Good tree selection should also accommodate site use and safety needs.

A. Appropriate Species (by planter width size). APPENDIX A

1. Street Tree Selection List

2. Factors to consider when selecting the right tree for the right place include:

   a. Mature height, width and shape of the tree

   b. Visibility and clearance near driveways, intersections, traffic signs and signals

   c. Future conflicts with overhead (**Trees with height of more than 25' at maturity shall not be planted under, or adjacent to overhead utility lines**) and underground utility lines (at least 5 feet from underground utility lines)

   d. Soil space for roots to avoid conflicts with sidewalks, driveways, streets, curbs, sewer and septic systems

   e. Soil type, soil conditions and other site constraints

   f. Cultural requirements of the tree-hardiness, light, soil and water requirements

   g. Susceptibility to disease or insect pests

B. Replacement Tree Size. Planting Strip for:

1. 4' planting strip- 1.5" or larger caliper.

2. 6-8' planting strip- 2" or larger caliper.

C. Replacement Tree Quality.
Replacement trees shall meet the quality and size standards of this chapter. Replacement trees shall be American Standard for Nursery Stock Grade No. 1 or better.

D. Prohibited Species

(Common Name)	(Scientific Name)
Cottonwoods, Aspen, or Poplars	Populus sp.
Willows	Salix sp.
Silver Maple	Acer saccharinum
Tree of Heaven	Ailanthus altissima
Boxelder	Acer negundo
Black Locust	Robinia pseudoacacia

Chapter 5- Planting Standards

A. Objective. Street trees shall be planted to provide for the eventual mature size of the trees.

B. Equipment. All equipment to be used and all work to be performed must be in full compliance with the most current revision of the American National Standards Institute Standard Z-133.1 and A300 or as amended.

C. Planting locations. Trees shall not be planted closer than:

1. Twenty-five (25) feet from the curb line of an intersection; lower tree branches should be shortened or removed to provide physical and visual clearance.

2. Five (5) feet from alley margins and driveways.

3. Five (5) feet from fire hydrants, underground utilities, water meters, and utility boxes or poles.

4. Ten (10) feet from directional traffic signs.

5. Two (2) feet from property lines.

6. Twenty (20) feet from stop or yield signs.

7. Twenty (20) feet from street lights. If a columnar variety is selected, the distance can be reduced, but species selection shall be determined by the City Forester.

8. Twenty-five (25) feet from adjacent trees depending on species.

9. 3 feet behind curb or sidewalk if no planter strip exists (attached sidewalks or just curb).

10. Trees with height of more than twenty-five (25) feet at maturity shall not be planted under, or adjacent to overhead utility lines

D. New Street Trees. New street trees shall not be less than 1.50 inches in diameter, measured at six inches above the ground. The City Forester shall authorize variances in size. Plant material shall conform with and meet American Standard for Nursery Stock, ANSI Z60.1-1996 or as amended and the Standardized Plant Names adopted by the American Joint Committee on Horticulture Nomenclature. Plant material may be balled and burlapped, containerized or bare root.

E. Handling standards. Street trees should be handled and planted according to the specifications contained in this subsection.

[2. Applicable specifications and standards. *Principles and Practices of Planting Trees and Shrubs.* 1997. International Society of Arboriculture, P.O. Box 3129, Champaign, IL 61826-3129.
American Standard for Nursery Stock. 1996. American Association of Nurseryman, Inc. 1250 I Street. N.C. Suite 500, Washington, D.C. 20005.

Standardized Plant Names. 1942. American Joint Committee on Horticulture Nomenclature, Horace McFarland Company, Harrisburg, PA]

1. Transportation, storage and handling of plant material. Individuals should take all precautions customary in good trade practice in preparing plants for moving, including, but not limited to the following:

    a. Dig, pack, transport, and handle plants with care to ensure protection against injury.

    b. Protect all plants from drying out.

    c. Plants, once removed from the holding medium, must be planted immediately.

    d. Plants shall not be bound with wire or rope at any time so as to damage the bark or break branches.

    e. Plants should be lifted and handled with suitable support of the soil ball to avoid damage.

    f. Cover plants transported on open vehicles with a protective covering to prevent wind burn.

2. Concrete cuts. Concrete cuts for tree planting shall be at least 4' x 6' or 6' x 9' or larger depending on the space constraints and the mature size of the tree, to allow for air and water into the root area.

3. Adjacent surfaces. Space between the tree and the hard surface may be covered by a nonpermanent hard surface such as bricks on sand, paved blocks and cobblestones; and mulch.

4. Accessories and soil amendments.

    a. Bark mulch. Bark mulch, such as hemlock or fir bark, shredded medium grind size, free from noxious weed seed, debris, and all foreign material, may be applied at a three (3") inch depth in a four (4") foot diameter circle or to curb around tree. Mulch must stay two (2") to six (6") inches away from the trunk of the tree.

    b. Water. Water should be free of substances harmful to plant growth. Water polymers may be used to extend water holding capacity in dry sites.

    c. Organic matter. Native soil may be amended by spreading two (2") to four (4") inches of organic matter (bark, sawdust, compost) over the area to be planted. The organic matter should then be worked into the soil to a depth of

six (6”) or more inches. The deeper the organic matter is incorporated, the deeper will be root development especially in poor and compacted soils.

F. Planting Operations. Streets trees should be planted according to the following specifications (Fig. 1. New tree planting):

1. Work Area. During planting, areas being landscaped should be kept clean. Water, mud, dirt, trash, papers, cans, and other materials are to be kept off turf, walks, driveways and streets so as not to impede normal traffic, use of area and to prevent water from reaching storm drains. Cleaning should be performed during installation of the street trees and upon completion of the work. All excess materials, soil, debris and equipment should be removed from the site upon completion of work. Damage, if any, to adjacent areas must be repaired.

2. Excavation. Excavate the planting hole three (3) to five (5) times wider than the diameter of the root ball. If the soil is compacted, the hole should be five (5) times the width of the root ball. The hole must be wider at the top than at the bottom, with shallow, sloped walls. The planting hole should not be deeper than the root ball, and the bottom of the hole should be undisturbed soil so that the soil will give solid support to the bottom of the root ball. The top of the root collar should be level with the existing finish grade at the planting site. Plants should not be planted deeper than they were at their former location.

3. Plant Protection. Plants should be protected at all times during planting operations to prevent roots from drying out. No planting is to be done during freezing weather or other highly unfavorable planting conditions. The root system should be kept moist until planting. This is accomplished by soaking the roots in water for one (1) to two (2) hours, but for NO MORE THAN SIX (6) hours; by wrapping them in moist burlap; or by temporarily planting (heeling in) to planting depth in moist sawdust, bark or soil. Hold plants in the shade prior to planting.

4. Setting the plants in the hole. Before planting a bare root street tree, prune back any badly bruised, broken, girdling or jagged roots to sound wood with a clean cut. Dig the planting hole deep enough so the plant, when set in the hole, will be at the level it was in the nursery, or preferably, one (1”) to two (2”) inches higher a mound of soil at the center of the planting hole is used to achieve this. The hole large enough to accommodate the root system. The diameter of the hole should allow spreading the roots without crowding or bending them. If branches were tied in at the nursery they must be released prior to final orientation in the planting hole to achieve the best landscape affect.

5. Special setting instructions for balled and burlapped trees: If a street tree is balled and burlapped prior to planting, one should comply with the following instructions:

a. Setting the plants in the hole. A balled and burlapped plant should be positioned so that its weight keeps the tree in a perpendicular position before backfill is added. Plants should be transferred directly from the storage site to the planting hole. If branches were tied in at the nursery they must be released prior to final orientation in the planting hole to achieve the best landscape affect.

b. Remove wire baskets. After the root ball is oriented in the hole, balled and burlapped trees in wire baskets shall have the upper two-thirds of the wire basket cut and removed from the ball.

c. Remove burlap. After the root ball is in the hole, the burlap should be removed from the top and sides of the ball but not from beneath the ball. If removal of the burlap will result in the soil crumbling, the burlap should be rolled back only from the top and slit along the sides with a sharp knife. If natural burlap is not used, the burlap will have to be removed entirely at planting. All non-biodegradable twine or ropes tied around the trunk of the tree or the root ball must be removed. Natural fiber ties, if tied around the trunk, shall be removed.

6. Backfill and Water. Backfill should be native topsoil, reasonably free of roots, rocks, subsoil, debris, large weeds, and foreign matter. The backfill should be worked around and beneath the ball so no air pockets remain. Firm the soil near the base of the root ball so that the tree is vertical and adequately supported, but do not pack the soil. The addition of soil alternating with tamping should continue until the hole is half full. Water is then added to partially fill the hole. After the water has soaked into the soil, backfill with soil should be completed and a water collection basin raked around the hole to facilitate watering later. Water is then added following final backfilling.

7. Basin construction. Construct around the perimeter of each root ball a shallow rain basin consisting of a ridge or berm of earth three (3") to four (4") inches high and slightly larger than the outside diameter of the root ball, so that water drains away from the trunk, but not away from the root system.

8. Mulching. Mulch tree planting pits and shrub beds with bark mulching material three (3") to six (6") inches deep immediately after planting. Keep the mulch at least two (2") inches away from the trunks to prevent trunk decay. Thoroughly water mulched areas. After watering, rake mulch to provide a uniform finished surface.

9. Initial pruning. The tree should be pruned to eliminate branches that are damaged, diseased, or that interfere with the natural structure in the tree. No healthy branch shall be removed unless one or more of the above criteria are met. Pruning cuts shall be made in compliance with International Society of Arboriculture pruning standards. No application of wound dressings shall occur.

G. Future Maintenance. The adjacent property owner shall assume the following maintenance responsibilities after the planting of a street tree.

1. Watering. The permit holder shall water thoroughly at the time of installation, as required, to maintain vigorous and healthy tree growth. The permit holder shall continue to water the tree during the next three summers. New trees should receive five (five) to ten (10) gallons of water per week for the first three summers to promote a deep root system. After the first three years, trees should be established and irrigation is no longer needed.

2. Staking. This treatment is not a standard treatment and should be used judiciously as in cases of damaged root balls, unless the tree cannot stand by itself or other conditions that have compromised the root balls. If stakes are used, they are to be loose such that they do not interfere with the free movement of the tree and should be 2/3 the height of the tree. Any stakes should be removed after the first growing season.

3. Tree wrap. This treatment is not a standard treatment and should be used with justifiable benefits (such as reduced rodent injury; mechanical injury; sunscald). Any tree wrap should be removed after the first growing season.

4. Mulching. Competing vegetation shall be controlled to the extent necessary to allow establishment, survival, and growth of the planted trees. To ensure that competing vegetation is properly controlled, trees are to have much, four (4) feet in diameter, three (3) to six (6) inches at the base of the tree, keeping the mulch at least two (2) inches away from the trunks to prevent decay.

Chapter 7 - Pruning Standards

A. Pruning Specifications and Standards

There are many erroneous terms used by the public in reference to the removal of tree parts. Shaping, trimming, shearing, tipping, topping, rounding over, hedging and flat topping are some of the terms used. These terms do not define pruning or the techniques used to prune plants. These terms represent removal of tree parts that often initiates decay or decline in trees. They are not biologically correct and do not enhance the health of the tree and often shorten the life of the tree.

Pruning is intentionally and permanently injuring a tree to meet a management objective in the landscape. It is a maintenance procedure that is performed to achieve a clear management objective. It is neither random nor performed because it is required every year. These guidelines are presented as working guidelines, recognizing that trees are individually unique in structure, form and growth response—not only between, but also within species and cultivars. The appropriate guidelines should be chosen and/or

modified depending on species, age of the tree, time of the year, condition of the tree and the management objective.

B. Pruning Permit Process

Any person (property owners or persons retained to perform the work) to perform work on street trees, must first obtain a Street Tree Work Permit with in the City of Vancouver. Permits are required by commercial licensed tree firms for pruning of any tree within the public right-of-way. The applicant must be a licensed, bonded, insured and an ISA certified arborist in order to obtain a permit. Property owners may perform minor pruning without obtaining a permit. There is no fee for a permit to prune street trees, to request a site visit contact Urban Forestry. All work sites are subject to pre and post inspection of the work site and work procedures.

1. Pruning criteria

The City Forester may authorize, deny or order pruning of or may prune trees and shrubs situated within the rights-of-way whenever one of the following criteria is met.

a. Any tree(s) that because of habit of growth, age, condition or disease becomes a public nuisance or risk to public safety.
b. Any tree(s) that obstructs a clear view of streets, signs, signals, street lights, intersections or interferes with the safe use of the street or sidewalk.
c. Any tree(s) that does not meet an eight-foot clearance over sidewalks and a fourteen-foot clearance over streets.
d. Any tree(s) that is damaging public improvements or public utilities.
e. Any tree(s) on private property that overhangs the public right-of-way and interferes with established clearance and pruning criteria.

C. Pruning Specifications and Standards

1. All equipment to be used and all pruning shall follow the American National Standard Institute Standard Z-133.1-200 and A300 and National Arborist Association Pruning Standards for Shade Trees or as amended.
2. For clearance pruning, remove branches to permit clearance of approximately eight (8) feet on the sidewalk or pedestrian side of tree and approximately fourteen (14) feet on roadside. No more than 25% of the live crown shall be removed at a time.
3. All final cuts shall be made sufficiently close to the trunk or parent limb, without cutting into the branch collar or leaving a protruding stub, so that closure can readily begin under normal conditions. For heavier limbs the three-cut procedure must be performed to prevent bark and trunk damage. Clean cuts shall be made at all times. Excessively deep flush cuts that produce large wounds or weaken the tree at the cut shall not be made. Sharp pruning tools shall be used so that clean cuts will be made at all times. All pruning tools and saws shall be kept sharpened to result in final cuts with smooth wood surface and secure bark remaining intact. All trees six inches or

less in diameter shall be pruned with hand and/or hydraulic pruning tools only.

5. It is necessary to use the three step cutting technique on branches that are too heavy to handle to prevent splitting or peeling the bark (Fig.2. Proper Pruning Principles. Three-cut procedure). Where necessary, to prevent tree or property damage, branches shall be lowered to the ground by proper ropes or equipment.
6. On trees known to be diseased, tools are to be disinfected with methyl alcohol at 70% (isopropyl alcohol diluted appropriately with water) or 10 % bleach solution after each cut and between trees where there is known to be a danger of transmitting the disease on tools.
7. Equipment that will damage the bark and cambium layer shall not be used on or in any tree.
8. Climbing spurs shall not be used when climbing trees, except to climb a tree to be removed or to perform an aerial rescue of an injured worker.
9. Ropes shall not come in direct contact with the crotch of the tree when tied into the tree. Friction or cambium savers are to be used when accessing and climbing the tree with rope and saddle. Rope injury from loading heavy limbs should be avoided.
10. Natural or mechanical rigging techniques shall be used to lower all limbs of sufficient size that may cause damage to other trees or surrounding public or private property.
11. No Topping- topping is not acceptable pruning practice. (Fig.3 Proper Pruning vs. Topping Trees)

D. Tree Pruning Specifications.

The word ‘shall’ indicates a practice is mandatory. The word ‘should’ refers to a practice that is highly recommended. Attention is to be given to develop and preserve tree structure, health and the final appearance of the trees. Appropriate pruning shall be done in order to maintain a tree form typical of the species (cultivar) of the tree being pruned.

1. General Procedures.

a. Live branches less than 1.5 inches or greater than 3 inches should not be removed.

b. Dead branches greater than .5 inches measured at the base of the branch shall be removed from the canopy of all trees.

c. Remove no more than 25 percent of live foliage from any tree.

2. Procedures to Reduce High-risk Conditions in Trees and Improve Structure (Major Pruning).

a. Remove all dead, dying and diseased branches.

b. Reduce the weight of branches or stems with included bark.

c. Reduce the weight toward the ends of all but one codominant stem.

d. Thin the outer edge of the canopy. When laterals are thinned from a branch, at least one-half of the foliage on laterals along the inner two-thirds of the branch should be retained. Excessive removal of interior laterals leads to lion's tailing. (Fig. 8. Restoring a lions-tailed tree)

e. Remove lower branches to permit clearance of approximately eight feet on the sidewalk or pedestrian area and fourteen feet on the street side. In lifting the bottom branches of trees for clearance, care should be given to the final appearance of the entire crown. The tree should have at least one-half of its foliage on branches that originate in the lower two-thirds of its crown to ensure a well-formed, tapered structure and to uniformly distribute stress within the tree. Excessive removal or 'bottoming' of the tree is prohibited. (Fig. 4. Raising the canopy)

f. Correct all interior or interfering branches, and one of all crossed or rubbing branches where practical so the removal thereof will not leave large holes in the general form of the tree. Excessive removal of interior branches as to cause a 'lion's tailing effect is prohibited. (Fig. 8. Restoring a lions-tailed tree)

3. Specific Procedures for Mature Trees (Major Pruning).

a. The weight on main scaffold limbs with included bark shall be reduced by approximately one-third by removing some secondary branches toward the ends of the limbs and/or by removing the end of the branch using a reduction cut. (Fig. 5. Reduction Cut)

b. If a tree divides into two or more codominant leaders of about equal size in the bottom two-thirds of the tree, reduce the end weight by approximately one-third using reduction and thinning cuts on all stems but the one you believe could become the strongest and most dominant leader. To accomplish this, remove the main portion of the codominant leaders growing upright or toward the center and leave those that are oriented outward. Use mostly thinning cuts, not drop-crotch cuts, on larger branches and trees. (Note: On some trees, you may not be able to perform all of this because you can not remove more than 20 percent of the foliage. Make a note of this tree and report to the City Forester.)

c. Identify those trees that have included bark in the crotches between codominant stems. Make a note of these on the inventory list. The City Forester or designee will evaluate these trees for possible cabling, pruning or other treatments. Identify limbs and trunks with vertical cracks or other potentially hazardous conditions. The presence of any structural problem, disease, insect pest or decay should be reported in writing to the City Forester.

d. If less than 25 percent of the live foliage was removed on a mature tree following procedures 1 and 2 above, thin the canopy to allow more light to reach the ground under the tree and to help reduce damage from storms. The foliage removed shall be taken from the outer edge of the canopy, not from the interior. Interior branches shall be left on the tree.

e. Crowns of trees that were storm damaged or topped will be restored to improve structure and form. Remove or shorten all sprouts except one, which will become the dominant stem at that point. Thirty percent of the foliage may be removed when performing this work.

4. Specific Procedures for Young Trees (Minor Pruning)

The primary purpose of pruning young trees is to improve the trunk and branch structure. Properly trained young trees will develop into structurally strong mature trees. The greatest structural concern in young trees is the establishment of a central leader and the reduction of codominant trunks or main leaders. Reducing one of the codominant branches is highly recommended if possible. If removal is required, it should be accomplished over several pruning cycles.

a. The subordination or removal of one side of a codominant leader or stem, due to the recognized potential risk associated with codominant leaders, is the primary objective. (Fig. 6. Maintaining a dominant leader) Branches, trunks or leaders not considered the main leader, two inches diameter or larger should be subordinated or removed. **The main leader shall not be subordinated or removed.** Codominant leaders are considered to be two or more branches, trunks or leaders of approximately the same size, originating in proximity to one another. If there is no stem considerably larger than others, subordinate all but one stem. Where there is included bark as part of the condition, preference should be given to the removal of one side, but only if such removal will not remove more than twenty percent of the canopy or destroy the aesthetic value of the canopy.

b. Some branches on young trees are considered temporary branches. These are branches that may be removed over time depending on the species, site use and management objectives. Temporary branches should remain on the tree as long as possible if they are not a structural problem. Selective removal should occur over several pruning cycles and no more than twenty percent of the live crown shall be removed in any one pruning cycle.

c. Canopy raising should shorten branches over paved areas with a reduction cut back to a living side branch at least one-third the diameter of the removed portion to allow approximately eight feet of clearance for pedestrians and vehicles. Removal of the branch may be necessary, but preference shall be given to shortening of branches instead of removing, especially if the branch diameter is more than half the trunk diameter.

When pruning is completed, approximately one-half of the live crown should originate from branches on the lower two-thirds of the tree. (Fig. 4. Raising the canopy)

d. Crown cleaning is the removal of dead, dying diseased, damaged, crowded, broken, weakly attached, low vigor branches, out-of-place branches and perhaps some water sprouts from a tree crown. Crown cleaning is **not** stripping out the interior canopy leaving only live foliage at the end of the branches. It will not be necessary to make cuts smaller than one inch in diameter, other than where branches may be shortened to accommodate clearance beneath the canopy. Canopy cleaning is to include the following:

1) If two limbs are crossing or touch each other, shorten or remove one of them so they no longer cross or touch.
2) If two limbs originate within twelve inches of each other on the trunk, shorten or remove one of them.
3) Remove dead or broken limbs one-half inch in diameter or larger.
4) Directional prune to establish a minimum of three feet or as practical of clearance from buildings, lights and other structures.

5. Restoration Pruning (Major Pruning)

Crown restoration is intended to improve the structure of trees that have been broken, topped or severely pruned using heading cuts. Many sprouts form from the cut ends of topped or broken trees. Some sprouts also develop below the cuts. They are poorly attached to the tree and can break easily. Crown restoration may require several pruning cycles over a number of years. (Fig.7. Crown restoration of a topped tree)

Objective

The objective is to develop one sprout into the main stem and one as a branch no more than about half the diameter of the stem. The size range of parts to be removed, the location in the canopy and the percentage of sprouts to be removed will vary depending on the severity of the damage and the health and vigor of the tree.

Specific Procedures

One to four sprouts, on the main branch stubs, should be selected to form a natural appearing crown. The more vigorous sprouts may need to be thinned, cut to a lateral, or even headed, to control growth. Begin by removing some sprouts completely and shortening others using reduction cuts. Removing too many sprouts at one time can stress the tree and cause additional sprouting. This leaves one sprout to become the main stem and several to remain as branches. One sprout of moderate vigor is left to become the main stem. The remaining sprouts will be shortened again in the next few years.

Chapter 8 - Removal Standards

A. Street Tree Removal Specifications and Standards

1. The tree removal shall consist of cutting down each tree in a safe manner to a point four inches above the adjacent ground level. The permit holder shall remove all tree limbs and tree trunks from the site in accordance with regulations of the City, County and State. Logs and chips if requested are to be left on private property.

2. The permit holder shall refrain from the practice of directional felling the trees. All trees shall be limbed out prior to the final cutting of the trunk. Sidewalks, curbs, streets and manhole structures shall always be protected from the impact of falling wood by use of the tree or limb ground supports. Ropes or other mechanical devices shall be used to lower all limbs of sufficient size that may cause damage to other trees or surrounding public or private property.

3. Limbs and trunks temporarily placed in the right of way shall be placed in such a manner as to eliminate any obstruction to motor vehicles and pedestrians. Brush and limbs overhanging a curb or pavement shall not be acceptable and under no circumstances shall these materials be allowed to lie in the right of way overnight.

4. All infectious diseased or parts of dead trees possibly harboring vectors of infectious diseases shall be removed from the City of Vancouver and shall become the permit holders responsibility to ensure destruction of the diseased or dead wood in accordance with the State statues and local ordinances. Under No circumstances shall logs from infectious diseased trees be left on site.

B. Street Tree Removal Criteria

Street tree removal permit will be granted when the adjacent property owner has sufficiently demonstrated that the continuing presence of the tree outweighs the public benefit provided by the tree. Trees that are determined to be dead, "hazards" or "inappropriate species" as designated by the City are automatic candidates for removal.

1. The following factors **shall not** be considered as criteria for removal of a street tree:
    a. Obstruction of view
    b. Potential future costs to public infrastructure or private property which can be avoided by root pruning and root barriers
    c. The cost of routine tree maintenance (pruning, watering, fertilizing, spraying, if necessary)
    d. Normal maintenance activities such as the raking of leaves and flowers and annual cleaning of gutters
    e. Hazards that can be controlled or eliminated through appropriate pruning or maintenance

C. Procedure for removal of trees and shrubs in right of way

The adjacent property owner shall provide the following information in letter form:

1. Property address
2. Number of trees in question, size of tree (diameter at 4.5 ft from ground) and species (if known)

3. Description of how the tree fits the criteria for removal
4. A tree planting scheme for replacements (what, where and when). The minimum size of a replacement tree is 2" in caliper unless approved by the City Forester. Suggestions on species and location are available by the Urban Forestry Program, and can be determined at time of inspection

The removal request shall be in the form of a letter to the City and sent to:

Vancouver Urban Forestry
P.O. Box 1995
Vancouver, WA 98668
360/619-1128
urbanforestry@ci.vancouver.wa.us

Upon approval of the removal, the applicant shall obtain the street tree removal permit at the Citizens Service Center, 1313 Main Street for a fee of $5 (per address, per request). The permit is valid for 90 days and the applicant should notify Urban Forestry upon completion of work.

D. Stump Grinding Specifications

The stumps and roots of trees or shrubs shall be removed to a point at least one foot below the top of the adjacent curb or proposed curb grade, treating the remaining roots with a suitable compound to prevent future sprouting or growth. All areas where stumps have been removed, and areas disturbed by the removal operations, shall be backfilled to the same level of adjoining grade with pulverized topsoil and seeded the same day grinding are removed otherwise the site shall be properly barricades overnight to ensure the safety of the public. Any roots which have disrupted or broken the adjacent street, curb or sidewalk shall be removed and said street, sidewalk, or curb shall be repaired.

1. Removal of stump grindings and debris.

Within twenty-four hours after grinding (removal) of a tree stump and buttress roots, the permit holder shall remove all stump grindings and associated debris from the site. Grinding debris generated by stump removal work shall be the responsibility of the permit holder. Stumps, grindings and debris shall be placed away from the curb and gutter, street and sidewalk immediately to eliminate hazards to the motoring public and pedestrians and to eliminate damage to public property.

2. Backfilling.

All areas where stumps have been removed and areas disturbed by the removal operations shall be backfilled to the level of adjoining grade with pulverized topsoil the same day grindings are removed, otherwise the site shall be properly barricaded overnight to ensure the safety of the public. All holes must be filled with topsoil by the second day. The permit holders shall supply their own topsoil. The topsoil shall be properly leveled and compacted so as to ensure a minimum amount of settlement of the backfill material. If there is more than a one-day delay between the time of removal of grindings and refilling with soil, the disturbed areas shall be barricaded off for public

safety and the City Forester notified. Stump grindings and debris shall not be used as backfill material. Topsoil: native; free of roots, rocks, subsoil, debris, large weeds, and foreign matter; acidity range (pH) of 6.5 to 7.0.

3. Seeding.
All adjacent disturbed areas and areas where backfill material was installed shall be seeded. The seed shall be of lawn mixture composed of 70% Perennial Ryegrass and 30% Fescue.

Chapter 9 – Safety Standards

1. All equipment to be used and all work to be performed must be in full compliance with the most current revision of the American National Standards Institute Standard Z-133.1-2000 (or as amended) and the Occupational Safety and Hazard Administration's Landscape and Horticultural Services Standards.
2. The Person shall provide personal protective equipment (head, face, eye, respiratory, clothing, footwear and chain saw-resistant leg protection) where there is reasonable probability of injury or illness that can be prevented.
3. The Person shall provide adequate barricades, flagmen, signs and/or warning devices during the performance to protect the motorists and pedestrians. All placements of cones, signs and barricades must conform to the American Traffic Safety Standards and any additional State requirements.

Chapter 10 - Traffic Control

All work that may have impact on traffic operations and pedestrian, bike, or vehicle movement on public right of way should prepare and submit Traffic Control Plans to the City of Vancouver, Department of Transportation Division for review before work begins.

The permit holder shall provide adequate barricades, certified flagperson(s), signs and/or warning devices during the performance of the tree removal to protect tree workers, motorists and pedestrians. All placements of cones, signs and barricades must conform to the American Traffic Safety Standards. Yellow flashing lights mounted on a vehicle shall not be deemed as sufficient or adequate protection.

Chapter 11 - Damage to Property

The permit holder shall take all necessary precautions to eliminate damage to adjacent trees and shrubs, lawns, curbs, walks or other real or personal property. Ropes or other mechanical devices shall be used to lower all limbs of sufficient size that may cause damage to other trees or surrounding public or private property. Any damage to property, as the result of the permit holder's operations shall be the responsibility of the permit holder. Should the damage not be rectified within the time agreed upon or to the satisfaction of the City Forester or representative, the City reserves the right to repair or

replace that which was damaged caused by the permit holder. The permit holder shall inform the City Forester of representative of any damage caused by the permit holder's operation on the day such damage occurs.

Chapter 12 - Protection of Utilities

Pruning, planting and removal operations may be conducted in areas where overhead electric, telephone, and cable television facilities exist as well as underground water, sewer, telephone, cable, and gas utilities. For the underground utilities, the permit holder must ensure that all lines are located prior to any digging or stump removal (call before you dig (360) 696-4848). The permit holder shall protect utilities from damage, shall immediately contact the appropriate utility if damage should occur, and shall be responsible for all claims for damage due to this operation. The permit holder shall make arrangements with the overhead utility for removal of all necessary limbs and branches, which may conflict with or create a hazard in conducting the operations of the permit. If the permit holder has properly contacted the utility in sufficient time to arrange for the required work by the utility, delays encountered by the permit holder in waiting for the utility to complete its work shall not be the responsibility of the permit holder.

Chapter 13 - Site Clean Up

A. The permit holder shall clean up the site and remove debris immediately upon completion of the project. Site cleanup shall include removal of sawdust, small twigs, chips, leaves, trunks and limbs from the street, curb, parkway, sidewalk, private lawns and driveways with appropriate tools for the job. The permit holder is responsible for the proper disposal of all debris from the job site. The site shall be returned to the same state it existed in prior to the removal.

B. Disposal of all logs, limbs, chips and debris generated by work shall be the responsibility of the permit holder. The permit holder shall remove all tree limbs and tree debris from the site and dispose of these limbs and debris in accordance with applicable ordinances and regulations of City, County and State. If residents request logs, these shall be left on private property and not in the right of way. If residents request chips, these too will be left on private property.

1. Limbs and trunks temporarily placed in the right of way shall be placed in such a manner as to eliminate any obstruction to motor vehicles and pedestrians. Brush and limbs overhanging a curb or pavement shall not be acceptable and under no circumstances shall these materials be allowed to lay on the right of way overnight.

2. All infectious diseased trees or parts of dead trees possibly harboring vectors of infectious diseases shall be removed and it shall become the permit holder's responsibility to ensure destruction of the diseased or dead wood in accordance with the State statutes and local ordinances. Under NO circumstances shall logs from infectious diseased trees be left for homeowners. An example of an infectious disease is Dutch elm disease. Asian long-horned beetle is an example of an insect pest.

Chapter 14 - Other Maintenance Specifications and Standards

A. Maintenance Criteria

1. Fertilization

Tree fertilization shall be done in accordance with ANSI 300 (Part 2)-1998 standards and specifications.

2. Pesticide Applications (Herbicides, insecticides, fungicides, poisons...)

This refers to the use of any pesticide regardless of its purpose. Pesticides should not be applied where there is a chance of polluting waterways such as lakes, creeks, rivers or catch basins. Always follow the MSDS and product label for application, storage, and disposal of pesticides.

3. Staking, cabling and bracing

The installation of cabling and bracing tree support systems is a specialized practice in the field of arboriculture. Proper training and field experience are necessary to perform these treatments successfully and without damaging the tree. These treatments shall be done in accordance with ANSI 300 (Part 3)-2000 standards and specifications.

4. Irrigation

New trees should receive 5-10 gallons of water per week for the first three summers to promote a deep root system. After the first three years, trees should be established and irrigation should be stopped. Continued irritation would promote lateral surface roots that could potentially damage infrastructure.

Chapter 15 - City Maintenance List (Trees)

A. Street Trees A focus of the urban forestry program is to advocate for the establishment and retention of adequate planting spaces while considering the community desire for urban aesthetics. Large trees with overhanging canopies of branches are especially desirable. Streets with a cathedral of trees overhead provide many benefits; they provide a traffic calming effect, extend the life of roads, provide a separation between streets and sidewalks, reduce pollution, noise, erosion and wind and cool our community.

Planting strips vary greatly in size. Street trees with large canopies require space to grow in order to provide benefits to the community. Wide planting strips are important, if we want large street trees to reach maturity without damaging sidewalks, curbs and streets. Street system design should provide sufficient space to accommodate large trees.

The principles set forth in the Street Tree Manual shall be applied to all street trees in the City of Vancouver. The City Maintenance list includes:

1. Maintain all street trees adjacent to City owned properties.
2. Maintain all street trees within publicly owned medians or curb to curb.
3. Major arterials where there is not an adjacent property owner

4. Downtown Core Area-Columbus Day Storm Trees
Historic perspective. In 1962 Vancouver was hit by a devastating storm that damaged the majority of downtown trees. The City with partners decided to re-tree the downtown core to revitalize the downtown core business district. This downtown core business district has historically been maintained by the City.

Chapter 16 - Tree Preservation During Construction and Development

Prior to initiating tree removal on the site, vegetated areas and individual trees to be preserved shall be protected from potentially damaging activities pursuant to the following standards:

A. Placing Materials Near Trees.
No person may conduct any activity within the protected area of any tree designated to remain, including, but not limited to, parking equipment, placing solvents, storing building material and soil deposits, dumping concrete washout and locating burn holes.

1. Attachments to Trees- During construction, no person shall attach any object to any tree designated for protection.

B. Protective Barrier
Before development, land clearing, filling or any land alteration for which a Permit is required, the applicant:

1. Shall erect and maintain readily visible protective tree fencing along the outer edge of the dripline and completely surrounding the protected area of all protected trees or groups of trees. Fences shall be constructed of chain link and at least four feet high, unless other type of fencing is authorized by the City Forester.
2. Shall prohibit excavation or compaction of earth or other potentially damaging activities within the barriers.
3. Shall maintain the protective barriers in place until the City Forester authorizes their removal or a final certificate of occupancy is issued, whichever occurs first
4. Shall ensure that any landscaping done in the protected zone subsequent to the removal of the barriers shall be accomplished with light machinery or hand labor.
5. In addition to the above, the City Forester may require the following:
    a. Cover with mulch to a depth of at least six (6) inches or with plywood or similar material the areas adjoining the critical root zone of a tree in order to protect roots from damage caused by heavy equipment.
    b. Minimize root damage by excavating a two (2) foot deep trench, at edge of critical root zone, to cleanly sever the roots of trees to be retained.
    c. Have corrective pruning performed on protected trees in order to avoid damage from machinery or building activity.
    d. Maintain trees throughout construction period by watering and fertilizing if necessary.

C. Grade

1. The grade shall not be elevated or reduced within the critical root zone of trees to be preserved without the City Forester’s authorization. The City Forester may allow coverage of up to one half of the area of the tree's critical root zone with light soils (no clay) to the minimum depth necessary to carry out grading or landscaping plans, if it will not imperil the survival of the tree. Aeration devices may be required to ensure the tree's survival.
2. If the grade adjacent to a preserved tree is raised such that it could slough or erode into the tree's critical root zone, it shall be permanently stabilized to prevent suffocation of the roots.
3. The applicant shall not install an impervious surface within the critical root zone of any tree to be retained without the authorization of the City Forester. The City Forester may require specific construction methods and/or use of aeration devices to ensure the tree's survival and to minimize the potential for root induced damage to the impervious surface.
4. To the greatest extent practical, utility trenches shall be located outside of the critical root zone of trees to be retained. The City Forester may require that utilities be tunneled under the roots of trees to be retained if the City Forester determines that trenching would significantly reduce the chances of the tree's survival.
5. Trees and other vegetation to be retained shall be protected from erosion and sedimentation. Clearing operations shall be conducted so as to expose the smallest practical area of soil to erosion for the least possible time. To control erosion, shrubs, ground cover and stumps shall be maintained on the individual lots, where feasible. Where not feasible appropriate erosion control practices shall be implemented pursuant to VMC Chapter 14.24 and 14.25.

D. Additional Requirements.
The City Forester may require additional tree protection measures, which are consistent with accepted urban forestry practices.

APPENDIX A

Street Tree Selection List

City of Vancouver
Street Tree Selection

Minimum 4' Planting Strip Width

Call (360) 619-1132 for a site inspection before planting a street tree.

Updated July 27, 2007

Common Name	Scientific Name	Cultivar	Height (in FT)	Width (in FT)	Shape	Features/Considerations	Drought Tolerant	Overhead Utilities OK	Soil Type
Trident Maple	*Acer buergeranum*		25	20	round	red in fall	✔	✔	all
Hedge Maple	*Acer campestre*	Queen Elizabeth	30	30	rounded	low maintenance; yellow in fall	✔	✔	all
Rocky Mountain Glow Maple	*Acer grandidentatum*	Schmidt	25	15	oval	orange/red in fall	✔	✔	well drained
Paperbark Maple	*Acer griseum*		25	20	upright/round	peeling brown bark; red in fall		✔	all
Crimson Sentry Maple	*Acer platanoides*	Crimson Sentry	25	15	oval	purple leaves; maroon in fall	✔	✔	all
Tartarian Maple	*Acer tartaricum*		25	20	small rounded	yellow/red in fall	✔	✔	all
Spring Flurry Serviceberry	*Amelanchier laevis*	JFS-Arb	35	20	Upright oval	white flowers, edible fruit; strong central leader	✔		all
Autumn Brilliance Serviceberry	*Amelanchier x grandiflora*	Autumn Brilliance	20	15	upright, spreading	white flowers, edible fruit; red in fall		✔	all
Princess Diana Serviceberry	*Amelanchier x grandiflora*	Princess Diana	25	15	gracefully spreading	white flowers, edible fruit		✔	all
Eastern Redbud	*Cercis canadensis*		25	35	horizontal	purple-pink flowers; yellow in fall		✔	all
Glorybower	*Clerodendrum trichotomum*		20	20	rounded	fragrant flowers in summer; blue berries in fall	✔	✔	all
June Snow Dogwood	*Cornus contoroversa*	June Snow	30	40	layered/spreading	large white flowers; red fall color, fast growing			well drained
Eddie's White Wonder Dogwood	*Cornus*	Eddie's Wh. Wond.	25	20	upright/pyramidal	White flowers; red in fall; transplants readily		✔	all
Heart Throb Dogwood	*Cornus kousa*	Schmred	20	20	rounded	long lasting pink flowers; deep red fall color		✔	well drained
Celestial Dogwood	*Cornus kousa x florida*	Rutdan	20	20	upright spreading	disease resistant; white flowers		✔	all
Stellar Pink Dogwood	*Cornus kousa x florida*	Rutgan	20	20	upright spreading	disease resistant; pink flowers		✔	all
Venus Dogwood	*Cornus kousa x nutalli*	KN 30-8	25	20	Upright oval	very large white flowers; vigorous growth		✔	well drained
Thornless Cockspur Hawthorn	*Crataegus crus-galli*	Inermis	25	25	rounded	no thorns; orange fall color	✔	✔	all
Black Hawthorn	*Crataegus douglasii*		20	15	oval	native/wildlife, shade tolerant	✔	✔	all
Crimson Cloud Hawthorn	*Crataegus laevigata*	Crimson Cloud	25	18	shrubby/round	red flowers; fruit with star-shaped area in center	✔	✔	all
Washington Hawthorn	*Crataegus phaenopyrum*		25	20	oval/rounded	white flowers; red fruit; orange/red in fall	✔	✔	all
Lavalle Hawthorn	*Crataegus x lavallei*		28	20	irregular/vase	white flowers; orange fruit	✔	✔	all
Golden Desert Ash	*Fraxinus excelsior*	Aureafolia	20	20	rounded	golden twigs	✔	✔	all
Raywood Ash	*Fraxinus oxycarpa*	Raywood	40	28	oval	fine textured; purple in fall	✔		all
Leprechaun Ash	*Fraxinus pennsylvanica*	Johnson	18	16	lollypop	purple flowers; fast grower; yellow in fal	✔	✔	all
Carolina Silverbells	*Halesia carolina*		30	20	broadly/pyramidal	white/bell flowers			well drained
Goldenrain Tree	*Koelreuteria paniculata*		30	30	rounded	yellow floral clusters; summer flowering	✔	✔	all
Amur Maackia	*Maackia amurensis*		25	20	vase	white flower clusters	✔	✔	all
Butterflies Magnolia	*Magnolia acuminata x denudada*	Butterflies	20	20	upright/pyramidal	showy yellow flowers		✔	well-drained
Galaxy Magnolia	*Magnolia liliflora x sprengeri*	Galaxy	30	15	pyramidal to oval	deciduous; strong central leader	✔		well drained
Merrill Magnolia	*Magnolia x loebneri*	Merrill	25	25	oval/rounded	white/pink flowers at early age			all
Golden Raindrops	*Malus spp.*	Golden Raindrops	20	15	vase	deep cut leaves; golden fruit	✔	✔	all
Prairiefire Crabapple	*Malus spp.*	Prairiefire	20	20	upright/rounded	disease resistant; pink flowers; red foliage	✔	✔	all
Robinson Crabapple	*Malus spp.*	Robinson	25	25	upright rounded	fast growing; pink flowers; red fruit	✔	✔	all
Sugar Tyme Crabapple	*Malus spp.*	Sutyzam	18	15	oval	pink buds; white flower	✔	✔	all
Zumi Calocarpa Crabapple	*Malus x zumi*	Calocarpa	20	25	Rounded/spreading	disease resistant; white flowers; red fruit	✔	✔	all
Tschonoskii Crabapple	*Malus tschonoskii*		28	14	narrowly oval	white flowers; greenish fruit	✔	✔	all
American Hophornbeam	*Ostrya virginiana*		35	25	upright oval	hop-like fruit; yellow in fall	✔		all
Sourwood	*Oxydendrum arboreum*		20	15	rounded	white bell clusters; orange in fall		✔	well drained
Persian Parrotia	*Parrotia persica*		30	20	rounded	early flowers; mix of fall color			well drained
Thundercloud Plum	*Prunus cerasifera*	Thundercloud	20	20	upright/rounded	light pink flowers; purple leaves	✔	✔	all
European Bird Cherry	*Prunus padus*		30	25	round	white flowers; purple leaves		✔	all
Canada Red Chokecherry	*Prunus virginiana*	Canada Red	25	22	rounded	unusual bark; purple leaves; red in fall			all
Cascade Snow Cherry	*Prunus*	Berry	25	20	upright spreading	disease resistant; white flowers		✔	all
Snow Goose Cherry	*Prunus*	Snow Goose	20	20	upright/wide	disease resistant; white flowers; widens w/ age		✔	all
Capital Pear	*Pyrus calleryana*	Capital	35	12	columnar	white flowers; red in fall	✔		all
Chanticleer Pear	*Pyrus calleryana*	Chanticleer	40	15	pyramidal	white flowers; red in fall	✔		all
Redspire Pear	*Pyrus calleryana*	Redspire	35	25	pyramidal	white flowers; red in fall	✔		all
Cascara	*Rhamnus purshiana*		25	28	oval	native/wildlife; shade tolerant; yellow-purple in fal		✔	all
Japanese Stewartia	*Stewartia pseudocamellia*		30	20	pyramidal/oval	white flowers; peeling bark; yellow red/purple in fall	✔	✔	moist acidic
Japanese Snowbell	*Styrax japonicus*		25	25	rounded	bell shaped flowers; yellow in fall	✔	✔	well drained
Ivory Silk Japanese Tree Lilac	*Syringa reticulata*	Ivory Silk	20	15	upright/rounded	creamy panicles; heavy flowering		✔	well drained

City of Vancouver
Street Tree Selection

Minimum 6' Planting Strip Width
***Refer to 4' tree list for additional trees for use under power lines**

Call (360) 619-1132 for a site inspection before planting a street tree.
Updated July 27, 2007

Common Name	Scientific Name	Cultivar	Height (in FT)	Width (in FT)	Shape	Features/Considerations	Drought Tolerant	Overhead Utilities OK*	Soil Type
Columnar Norway Maple	*Acer platanoides*	Columnar	35	15	narrow	column of green foliage; yellow in fall	✔		all
Armstrong Maple	*Acer rubrum*	Armstrong	45	15	narrow	fast growing; yellow-orange in fall			all
Bowhall Maple	*Acer rubrum*	Bowhall	40	15	narrow	great fall color			all
October Glory Maple	*Acer rubrum*	October Glory	40	35	broadly oval	outstanding fall color; bright red	✔		all
Green Mountain Maple	*Acer saccharum*	Green Mountain	45	35	broadly oval	heat tolerant; reddish-orange fall color	✔		all
Pacific Sunset Maple	*Acer truncatum x platanoides*	Warrenred	30	25	oval	orange/red in fall	✔		well drained
Red Horse Chestnut	*Aesculus x carnea*	Briotti	30	35	rounded	long rosy cluster; small variety; spiky nuts	✔		all
American Hornbeam	*Carpinus caroliniana*		25	20	oval	smooth gray trunk; yellow to orange in fall		✔	all
European Hornbeam	*Carpinus betulus*	Fastigiata	35	25	upright/oval	catkins turn brown in November; yellow in fall	✔		all
Japanese Hornbeam	*Carpinus japonicus*		30	25	rounded vase	white/yellow flowers; red in fall	✔		all
Hackberry	*Celtis occidentalis*		45	35	broadly arching	very urban tolerant; rarely lifts sidewalks	✔		all
Katsura Tree	*Cercidiphyllum japonicum*		40	40	pyramidal/rounded	heart shaped leaves; red-orange in fall			all
Yellowwood	*Cladrastis kentukea*		30	40	round	fragrant summer flowers; yellow in fall	✔		all
Dove Tree	*Davidia involucrata*		35	28	broad pyramidal	white bracts	✔		well drained
Dawyck Purple Beech	*Fagus sylvatica*	Dawyck Purple	40	12	columnar	purple leaves			all
Autumn Applause Ash	*Fraxinus americana*	Autumn Applause	40	25	oval	maroon fall color; colors early			all
Flowering Ash	*Fraxinus ornus*		30	15	pyramidal/round	yellow in fall	✔		all
Raywood Ash	*Fraxinus oxycarpa*	Raywood	40	28	oval	fine textured; purple in fall	✔		all
Marshall Ash	*Fraxinus pennsylvanica*	Marshall	50	40	broadly oval	tough/adaptable; yellow in fall	✔		all
Summit Ash	*Fraxinus pennsylvanica*	Summit	45	25	narrowly oval	yellow in fall	✔		all
Autumn Gold Ginkgo	*Ginkgo biloba*	Autumn Gold	35	30	columnar	seedless male; yellow in fall	✔		all
Princeton Sentry Ginkgo	*Ginkgo biloba*	Princeton Sentry	40	15	columnar	seedless male; yellow in fall	✔		all
Skyline Honeylocust	*Gleditsia triacanthos*	Skycole	45	35	broadly pyramidal	tolerant of pollution; golden in fall	✔		all
Shademaster Honeylocust	*Gleditsia triacanthos*	Shademaster	45	35	vase	upright branching; yellow in fall	✔		all
Mountain Silverbells	*Halesia monticola*		40	25	conical/rounded	white bell shaped flowers; yellow fall color			all
Yulan Magnolia	*Magnolia denudata*		35	30	pyramidal	creamy flowers; use on non-windy site			all
Fruitless Mulberry	*Morus alba*	Kingens	35	40	rounded	fruitless	✔		all
Sour Gum / Black Tupelo	*Nyssa sylvatica*		35	20	pyramidal	red yellow in fall			all
European Hophornbeam	*Ostrya carpinifolia*		40	25	rounded	nutlets in hop-like bunches	✔		all
Macho Cork Tree	*Phellodendron amurense*	Macho	40	30	vase shaped	seedless; yellow in fall			all
Kwanzan Flowering Cherry	*Prunus serrulata*	Kwanzan	30	20	vase/rounded	pink, double flowers; hardiest *P. serrulata* ; orange in fall			all
Akebono Cherry	*Prunus x yedoensis*	Akebono	25	25	upright	delicate pink flowers; yellow in fall		✔	all
Aristocrat Pear	*Pyrus calleryana*	Aristocrat	40	28	pyramidal	open formal appearance; red fall			all
Chanticleer Pear	*Pyrus calleryana*	Chanticleer	40	15	pyramidal	white flowers; red in fall	✔		all
Sawtooth Oak	*Quercus acutissima*		40	40	rounded	clean foliage; yellow/brown in fall			well drained
Forest Green Oak	*Quercus frainetto*	Schmidt	50	30	oval	strong central leader	✔		all
Skyrocket Oak	*Quercus robur*	Fastigiata	45	15	narrow/fastigiate	yellow/brown in fall	✔		well drained
Japanese Pagodatree	*Sophora japonica*	Regent	50	45	rounded/upright	creamy white flowers in clusters	✔		well drained
Crimean Linden	*Tilia x euchlora*		40	35	broadly pyramidal	glossy foliage; yellow in fall	✔		all
Legend Linden	*Tilia americana*	DTR 123	40	30	broadly pyramidal	strong central leader; glossy leaves	✔		all
Greenspire Linden	*Tilia cordata*	Greenspire	40	30	pyramidal	strong/uniform; yellow in fall	✔		all
Sterling Silver Linden	*Tilia tomentosa*	Sterling	45	35	pyramidal	dark green/silver underside; fewer aphids	✔		all
Wireless Zelkova	*Zelkova serrata*	Schmidtlow	25	35	spreading vase	ideal for use under power lines	✔	✔	all
Village Green Zelkova	*Zelkova serrata*	Village Green	40	38	vase shaped	clean appearance; red in fall			all
Frontier Elm	*Ulmus*	Frontier	40	30	arching vase	disease resistant; fast grower; reddish-purple in fall	✔		all
Prospector Elm	*Ulmus wilsoniana*	Prospector	40	30	vase shaped	disease resistant; urban tolerant; yellow in fall	✔		all

City of Vancouver
Street Tree Selection

Minimum 8' Planting Strip Width **Call (360) 619-1132 for a site inspection before planting a street tree.**

***Refer to 4' tree list for additional trees for use under power lines** **Updated July 27, 2007**

Common Name	Scientific Name	Cultivar	Height (in FT)	Width (in FT)	Shape	Features/Considerations	Drought Tolerant	Overhead Utilities OK*	Soil Type
Autumn Blaze Maple	*Acer x freemani*	Jeffersred	50	40	broadly oval	fast growing; brilliant long-lasting fall color	✔		all
State Street Maple	*Acer miyabei*	Morton	50	35	rounded	red in fall	✔		all
Crimson King Maple	*Acer platanoides*	Crimson King	40	35	oval/rounded	purple leaves; reddish bronze in fall			all
Deborah Maple	*Acer platanoides*	Deborah	45	40	oval/rounded	dark bronze green leaves; bronze in fall			all
Emerald Queen Maple	*Acer platanoides*	Emerald Queen	50	40	oval/upright	tolerant of pollution			all
Summershade Maple	*Acer platanoides*	Summershade	42	40	broad/rounded	fast growing; yellow in fall			all
Spaethii Maple	*Acer pseudoplatanus*	Atropurpureum	40	30	oval/upright	green/purple leaves			all
Red Sunset Maple	*Acer rubrum*	Franksred	45	35	upright/oval	vigorous/symmetrical; orange/red in fall	✔		all
Schlesinger Maple	*Acer rubrum*	Schlesingeri	45	35	vase shaped	orange/red in fall	✔		all
Bonfire Maple	*Acer saccharum*	Bonfire	50	40	broadly oval	fast growing; orange-red in fall	✔		all
Legacy Maple	*Acer saccharum*	Legacy	50	35	oval	glossy leaves; orange-red in fall	✔		all
Jacquemontii Birch	*Betula jacquemontii*		40	30	upright/oval	yellow in fall			all
River Birch	*Betula nigra*		40	35	pyramidal/rounded	yellow in fall			all
Hardy Rubber Tree	*Eucommia ulmoides*		55	45	conical/globose	yellowish in fall	✔		all
American Beech	*Fagus americana*		50	40	broadly oval	slow growing; striking grey bark	✔		all
European Beech	*Fagus sylvatica*		50	35	slightly rounded	leaves persistent through winter; striking bark			well drained
Rivers Purple Beech	*Fagus sylvatica*	Riversii	50	40	broadly oval	deep purple foliage; striking grey bark			well drained
Oregon Ash	*Fraxinus latifolia*		50	30	upright oval	native tree; drought and flood tolerant	✔		all
Kentucky Coffeetree	*Gymnocladus dioicius*		65	50	ovate	bluish green leaflets; yellow in fall	✔		all
Sweetgum	*Liquidambar styraciflua*	Palo Alto	55	45	pyramidal	aromatic leaves; brittle; red orange purple in fall			all
Tulip Tree	*Liriodendron tulipifera*		60	30	oval	yellow flowers; yellow in fall			all
Dawn Redwood	*Metasequoia glyptostoboides*		60	25	conical	fast growing; deciduous conifer; urban tolerant	✔		all
Bloodgood London Planetree	*Platanus x acerifolia*	Bloodgood	50	40	broadly pyramidal	exfoliating bark; somewhat disease resistant	✔		all
Swamp White Oak	*Quercus bicolor*		45	45	rounded	adapted to wet soils	✔		well drained
Scarlet Oak	*Quercus coccinea*		50	40	upright/oval	red in fall	✔		all
Oregon White Oak	*Quercus garryana*		65	50	oval	native; slow grower; yellow in fall	✔		all
Pin Oak	*Quercus palustris*		55	40	pyramidal	strong leader; retains leaves in winter; orange/red in fall	✔		well drained
Willow Oak	*Quercus phellos*		60	40	rounded/oval	very urban tolerant; transplants easily	✔		all
Shingle Oak	*Quercus imbricaria*		50	40	broadly oval	transplants readily; beautiful summer foliage	✔		well drained
Red Oak	*Quercus rubra*		50	45	rounded	fast growing/large; red in fall			well drained
Shumard Oak / Texas Red	*Quercus shumardii*		50	40	upright/oval	red in fall	✔		well drained
Bald Cypress	*Taxodium distichum*		55	30	pyramidal/oval	deciduous conifer; wet/dry sites; urban tolerant; rusty	✔		all
Accolade Elm	*Ulmus*	Morton	70	60	arching vase	disease resistant; fast grower; graceful arching habit	✔		all
Homestead Elm	*Ulmus*	Homestead	50	35	arching vase	tolerant to urban conditions; fast grower; yellow in fall			all
Pioneer Elm	*Ulmus*	Pioneer	50	50	rounded	disease resistant; vigorous grower	✔		all
Triumph Elm	*Ulmus*	Morton Glossy	55	45	upright oval/vase	disease resistant; glossy green foliage	✔		all
Green Vase Zelkova	*Zelkova serrata*	Green Vase	50	40	vase shaped	clean appearance; red in fall			all

APPENDIX B

Tree Care Diagrams

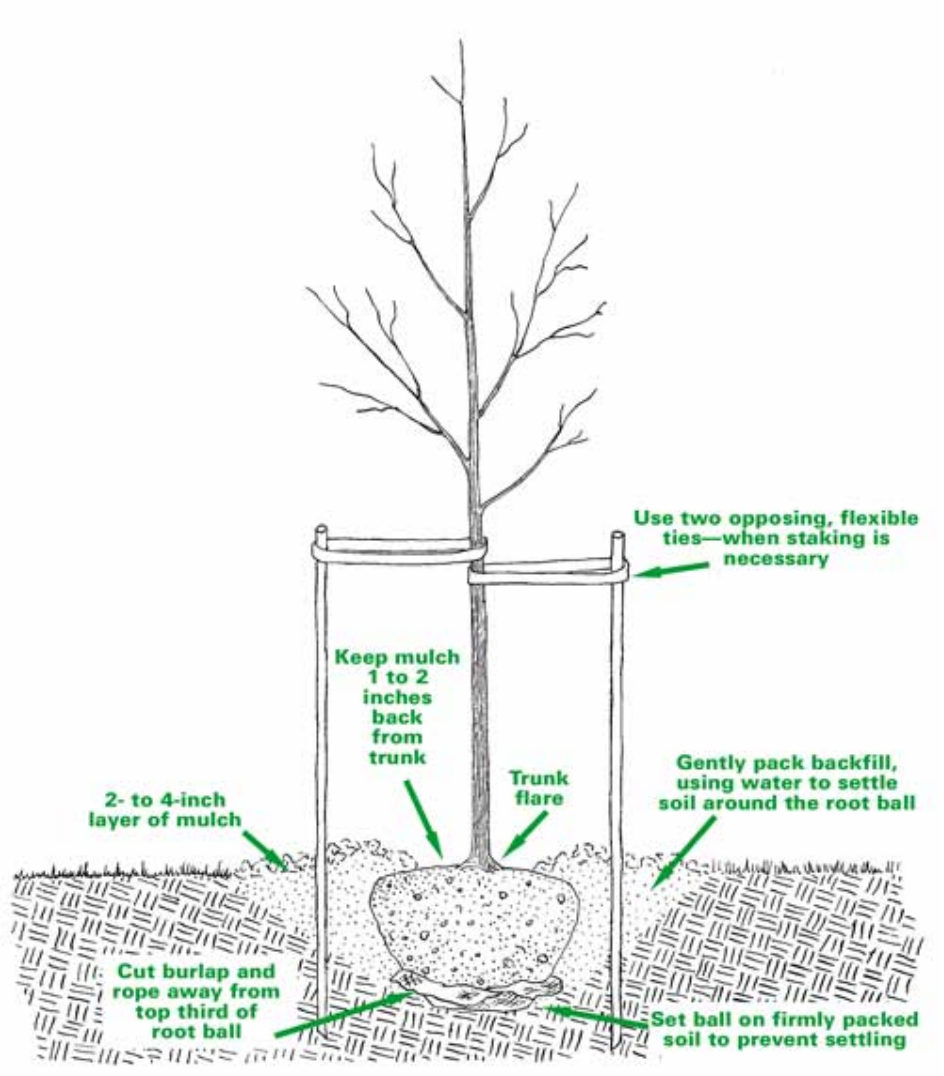


Fig. 1. New tree planting. (Copyright International Society of Arboriculture. Used with permission.)

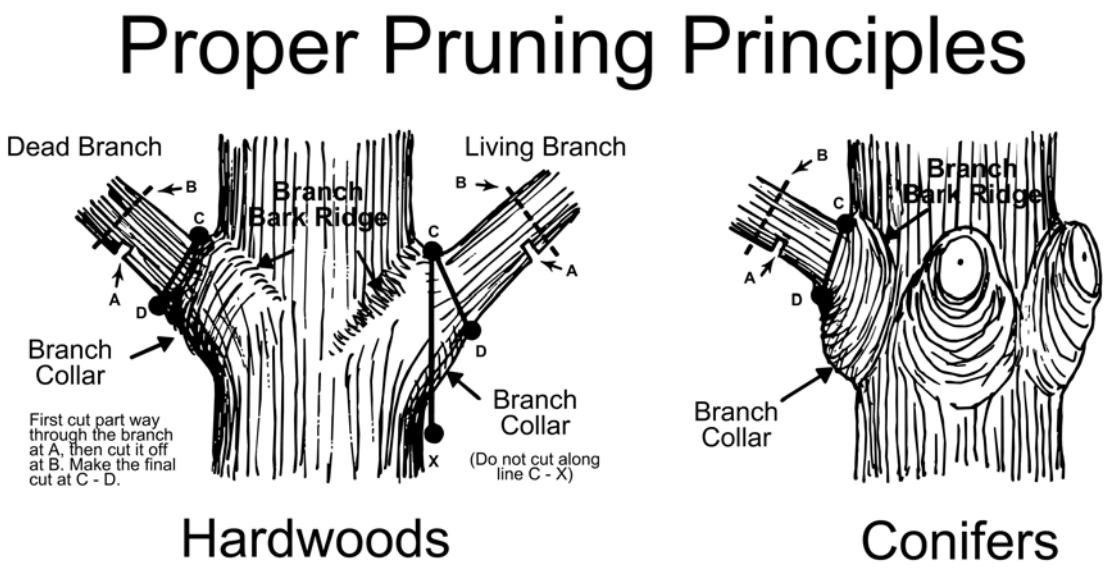
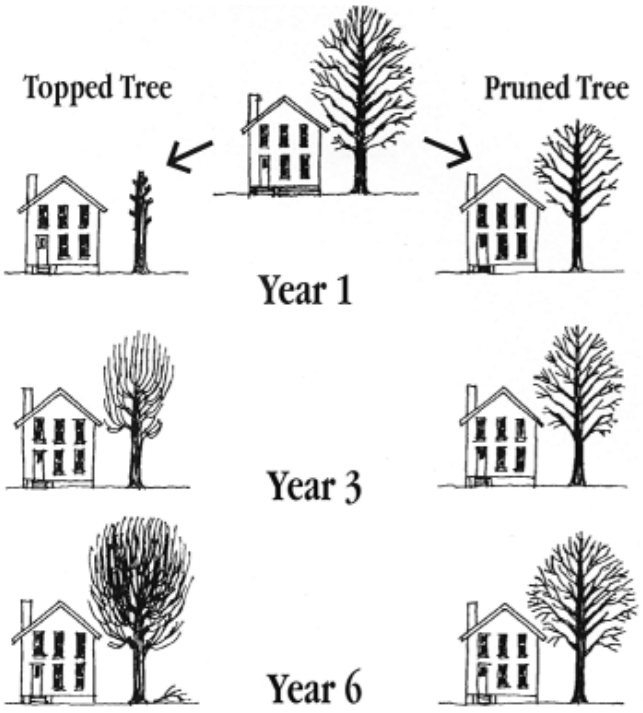


Fig.2. Proper Pruning Principles. Three-cut procedure. To remove a branch over one inch in diameter, make the first cut on the underside of the branch (A). Make the second cut through the branch at point one to two inches beyond the first cut (B). The final cut is made outside the branch bark ridge and branch collar (C to D). (Courtesy of the National Arbor Day Foundation)



Proper Pruning — The Alternative to Topping

When a decision is made to reduce the size of an older tree, it can be topped, or it can be pruned properly. Although the speed and nature of regrowth will depend on species and local factors, any comparison between irresponsible topping and competent pruning will be dramatic.

- **Year 1:**
  The topped tree is an ugly stub and a remnant of a once lovely tree. If pruned properly, the tree's size is reduced but form and beauty are retained.
- **Year 3:**
  Vigorous sprouts have sprung out of the topped tree in large numbers and are growing with abnormal rapidity. The pruned tree adds growth, but it does so more slowly and distributes it more normally.
- **Year 6:**
  In a relatively short time, the topped tree is as tall — and far bushier and more dangerous — than it was to begin with. The properly pruned tree is safer, more beautiful, and its size is better controlled.

Fig. 3. Proper Pruning vs. Topping Trees (Courtesy of the National Arbor Day Foundation)

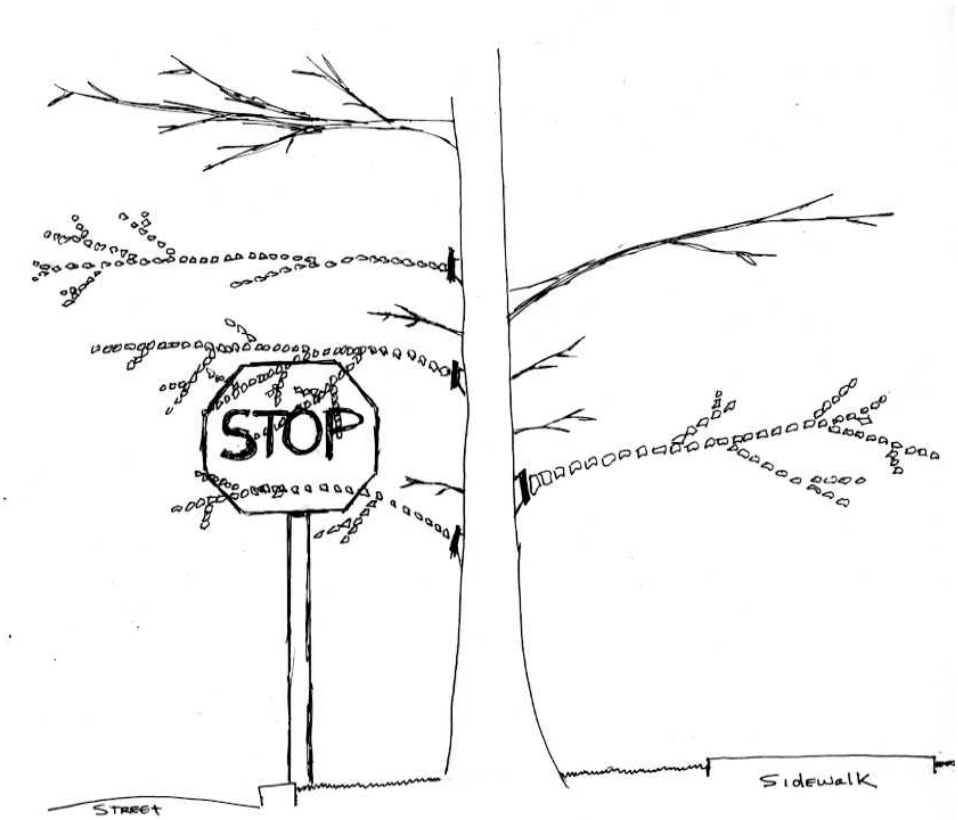


Fig. 4. Raising the canopy. Raise canopy for pedestrian; vehicle or other obstacle clearance. After proper canopy raising, a goal is to have foliage on branches in the upper 2/3 of the tree (bottom diagrams). Live crown ratio should be at least 60%.

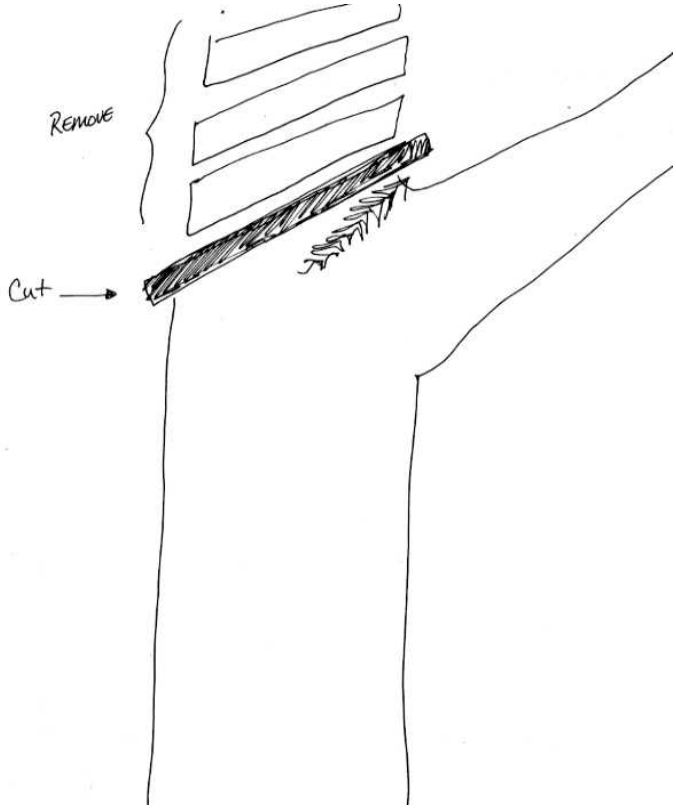


Fig 5. Reduction Cut. A reduction cut is make back to a branch no smaller than 1/2 the diameter of the cut stem.

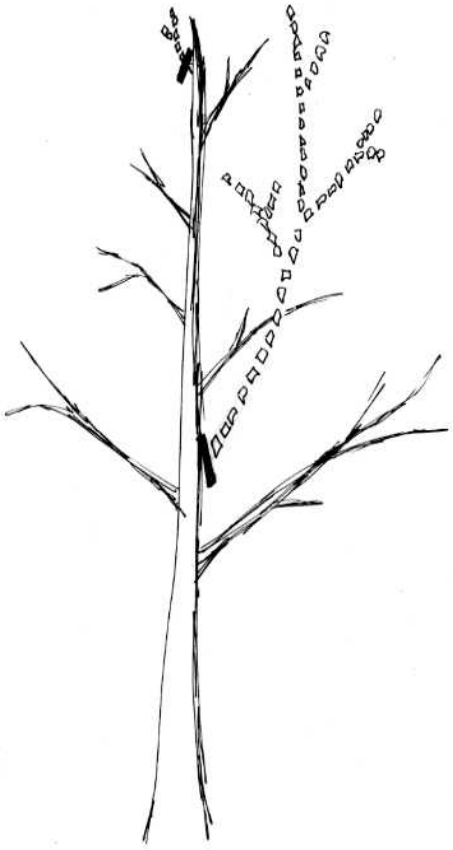


Fig. 6. Maintaining a dominant leader. Protect leader from competition by removing co-dominance leaders.

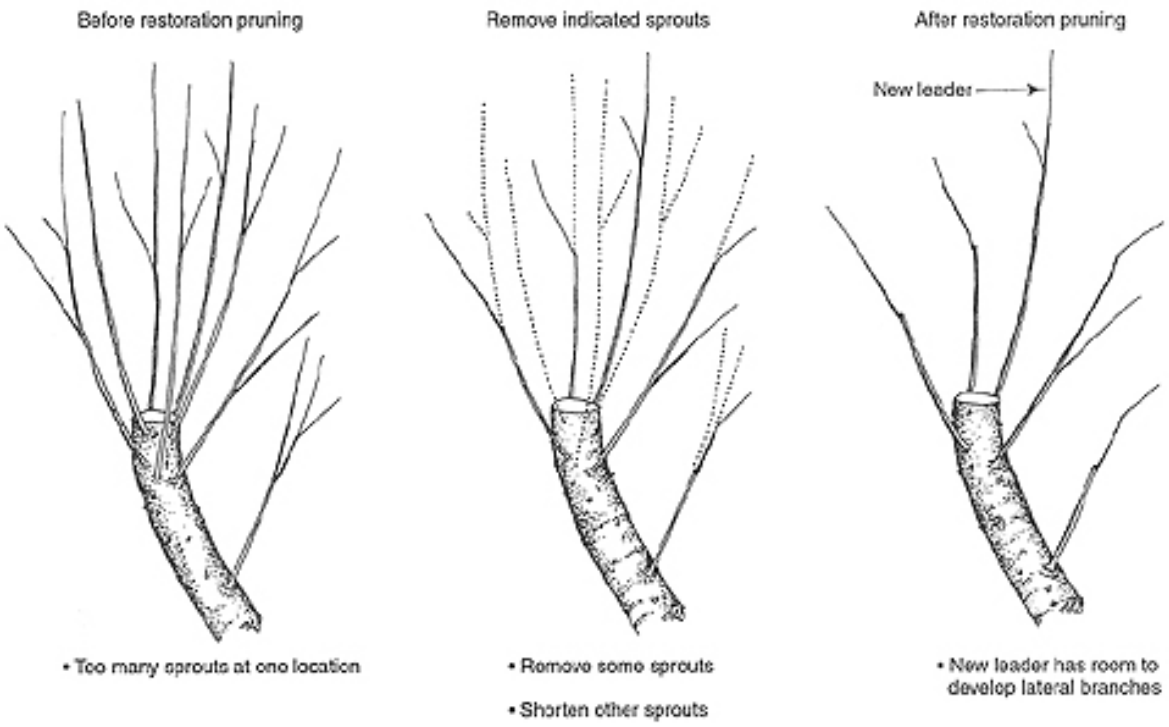


Fig.7. Crown restoration of a topped tree. Illustrations by Edward F. Gilman, Professor, Environmental Horticulture Department, IFAS, University of Florida.

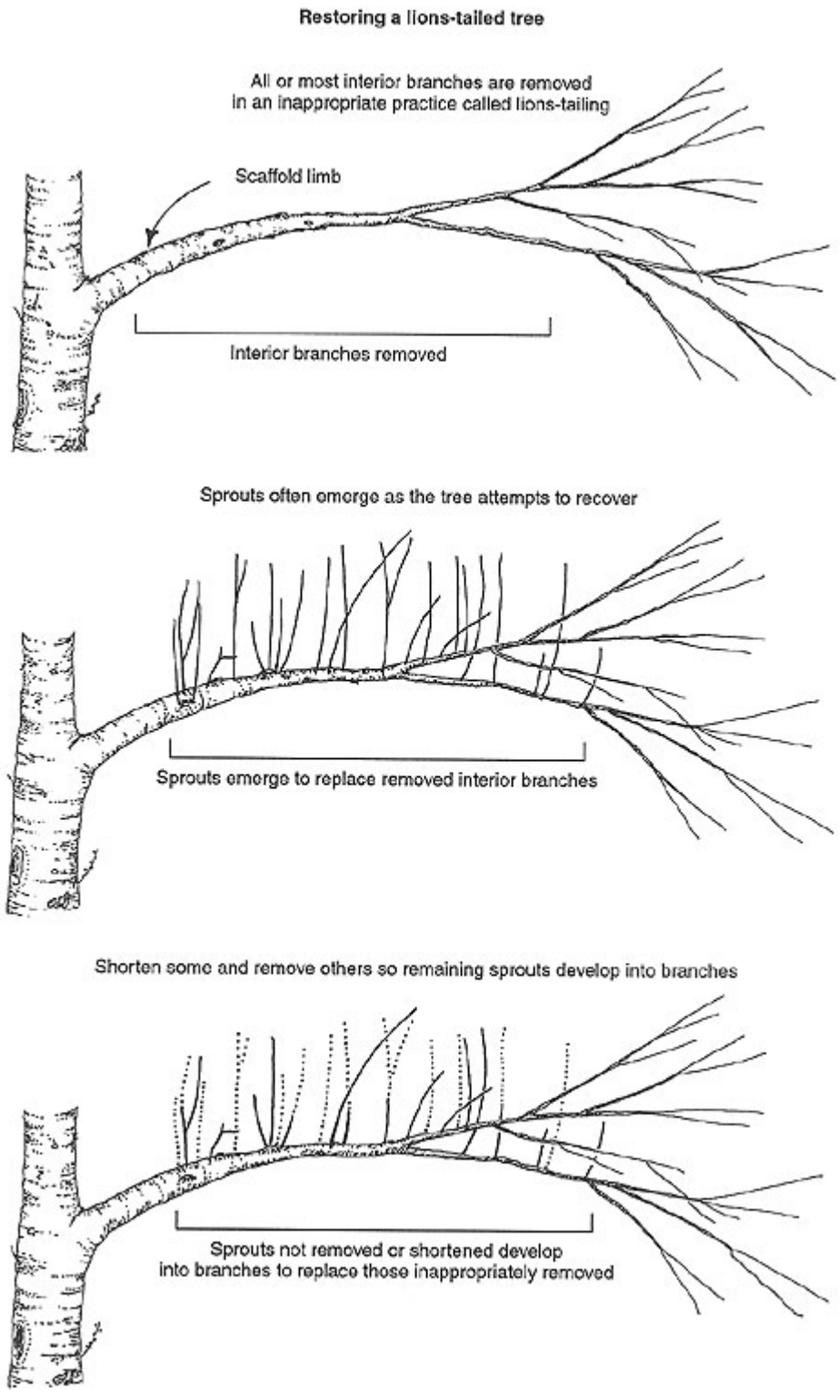


Fig.8. Restoring a lions-tail tree. Illustrations by Edward F. Gilman, Professor, Environmental Horticulture Department, IFAS, University of Florida.

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International Society of Arboriculture Consumer Tree Care Website

National Arbor Day Foundation

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