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City of Fort Collins  
Tree Management Standards  
and  
Best Management Practices

Effective  
3-31-10

City of Fort Collins  
Parks Department  
Forestry Division

City of Fort Collins  
Tree Management Standards  
And  
Best Management Practices

**License Required.** A current arborist license, issued by the City Forester of Fort Collins, is required for all companies that work on trees located anywhere within City limits. This includes all public and private trees. Tree work that requires a license includes the following activities:

- Cutting, trimming, pruning or removing of trees when the cuts necessary for such cutting, trimming, pruning or removal are made at a height of ten (10) feet or greater above the ground.
- The application of pesticides to trees of any size.

Chapter 27 of the Fort Collins Municipal Code establishes the requirements for an Arborist License. Applicants must meet the following criteria to be licensed: 1) pass written and field tests approved by the City Forester; 2) all motor vehicles must clearly display the licensee's business name and telephone number; and 3) each licensee must carry commercial liability insurance covering all of the applicant's proposed tree service operations within City limits. The insurance must be at a minimum amount of \$1,000,000 (one-million dollars) per occurrence.

The City Forester requires that all licensees that apply pesticides to trees within City limits have a current commercial applicator endorsement from the Colorado Department of Agriculture.

**Applicability of Section A.** City of Fort Collins employees and companies holding an arborist license issued by the City Forester must perform all tree pruning, removal and pesticide application on public or private property within the City in accordance with the standards of Section A. Any licensee not complying with this requirement may have its arborist license suspended or revoked pursuant to the provisions of Chapter 27 of the Fort Collins Municipal Code.

**Applicability of Section B.** City of Fort Collins employees, companies holding an arborist license or any other business or individual shall perform all work on or around trees located on City property in accordance with the Best Management Practices for arboriculture, as identified in Section B of this document, unless otherwise directed by the City Forester. The Best Management Practices are good guidelines for all arborists to follow. Companies holding an arborist license are encouraged, but not required, to follow the Best Management Practices when working on trees located on private property.

**Applicability of Section C.** This section sets standards for the protection of individuals and City trees that pertain to tree houses, swings, tree climbing and physical attachments to City owned trees.

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## **Section A: Pruning, Removal and Pesticide Application Standards.**

(these standards were adapted in part from ANSI A300 (Part 1) – 2008 Pruning, Best Management Practices/Tree Pruning, and Best Management Practices/Utility Pruning of Trees). ANSI stands for the **American National Standards Institute**.

### 1 General Pruning and Removal Standards:

- 1.1 Companies holding a Fort Collins arborist license with the pruning and removal category shall maintain a current copy of the most recent edition of all of the following. Licensed companies with the low pruning category shall maintain a current copy of the most recent edition of a, b, d and f. (The Best Management Practices (BMP's) and American National Standards Institute (ANSI) standards can be purchased from the **International Society of Arboriculture**):
  - a. City of Fort Collins Tree Management Standards and Best Management Practices
  - b. Best Management Practices/Tree Pruning (ISA)
  - c. Best Management Practices/Utility Pruning of Trees (ISA)
  - d. ANSI Z133.1-2006 for Arboricultural Operations- Safety Requirements
  - e. ANSI A300 (Part1) – 2008 Pruning
  - f. Chapter 27 of the Fort Collins Municipal Code
  - g. ISA's Tree Climber's Guide (by Lilly and Kotwica)
- 1.2 Pruning recommendations and actual pruning work shall always regard tree health and the tree's structural integrity. There are situations where pruning to reduce risk (promoting structural integrity) must be made a priority over regard for tree health. Pruning to reduce risk need not be compromised in these situations to meet this standard.
- 1.3 Specifications for pruning and removal work should include location of tree(s). Specifications can be verbal or written. For private customers, written specifications should be offered that describe the major job components.
- 1.4 The following information shall be specified prior to the commencement of tree pruning:
  - 1.4.1 Pruning objectives shall be established prior to the beginning of any pruning operation (see 7.1).
  - 1.4.2 Pruning method (type – clean, thin, raise, reduce, structure, restore) shall be specified prior to commencement of work (see 8.1).
  - 1.4.3 When pruning to clean, the location and minimum size of parts (see 2.41) to be removed shall be specified prior to commencement of work (see 8.2.1).

- 1.4.4 When pruning to thin, the location of parts to be removed shall be specified prior to commencement of work (see 8.3.4).
- 1.4.5 When pruning to reduce, the location of parts to be removed or clearance requirements shall be specified prior to commencement of work (see 8.5.5).
- 1.4.6 Exceptions for making an internodal heading cut shall be specified prior to commencement of work (see 5.11.1, 5.11.2, 5.11.4 and 5.11.5).
- 1.5 Specifications for pruning or removal should be administered by an arborist.
- 1.6 Pruning and removal cuts shall be performed by an arborist or arborist trainee under the direct supervision of an arborist. These are generic titles based on competency and experience, but they need not be the actual position titles (see 2.4 and 2.5). The arborist does not need to be on site at all times, but shall be familiar with the practices and hazards of the tree work assigned and the equipment used in such operations. Ground work does not need to be performed by an arborist or arborist trainee (see 2.25).
- 1.7 In conducting tree pruning or removal operations, all work shall be performed using methods and equipment in such a manner so as to avoid and prevent damage to other plants (except minor damage to turf), properties, structures or persons. The ANSI Z133.1 for Arboricultural Operations – Safety Requirements is the industry-developed national consensus safety standard. ANSI Z133.1 shall be referenced by the City Forester in interpreting this standard.
- 1.8 Tree pruning and removal should comply with the most recent edition of ANSI Z133.1 (the most current edition is the ANSI Z133.1-2006) for Arboricultural Operations-Safety Requirements.
- 1.9 Tree pruning and removal operations shall comply with all federal, state and local laws and regulations.
- 1.10 Off-site trees (see 2.39) shall not be cut or pruned beyond a property line without prior verbal or written approval from the owner(s) of the tree(s), or his or her authorized representative. An exception is that the City Forester can authorize pruning or removal of trees or shrubs posing a hazard to public property as described in Sec.27-57 of the Fort Collins Municipal Code, or for the control of tree diseases or insect infestations as described in Sec 27-58 of the Fort Collins Municipal Code.

- 1.11 For any arborist, arborist trainee, qualified line-clearance arborist or qualified line-clearance arborist trainee to perform tree pruning or removal work while climbing over 10 feet above the ground (measured from the ground to the climber's feet), an employee of the business shall have taken and passed a tree climbing test authorized by the City Forester. A currently licensed business that has adequately displayed or documented their climbing skills through ways other than testing, prior to the implementation of this standard, has qualified for the Climbing Category on their arborist license.
  - 1.11.1 Businesses with the "Climbing Category" on their Fort Collins arborist license have met this standard.
  - 1.11.2 Tree work from an aerial lift device is an exception.
- 1.12 During an emergency, tree work often needs to be performed as quickly as possible. At such times, it may be necessary, because of safety and the urgency of the operation, to deviate from the use of proper pruning techniques as defined in this standard. Following the emergency, corrective pruning should be done as necessary.
- 1.13 Licensed arborists should attend all meetings set up by the City Forester specifically for licensed arborists, including the **Annual Licensed Arborist** meeting.
- 1.14 Tree work crews of any licensed arborist company shall temporarily stop work on a job site when directed by the City Forester for possible violations of the safety standard 1.7, or the topping standard 8.5.3. Work shall remain stopped until the possible violation is discussed and/or corrected.
- 1.15 Specifications for removal work shall describe where the lowest cut will be made and if stump removal will be included.

## 2 Definitions:

- 2.1 **American National Standards Institute A300 standard (commonly referred to as the ANSI A300)** – In the United States, industry-developed, national consensus standards of practice for tree care.
- 2.2 **American National Standards Institute Z133.1 standard (commonly referred to as the ANSI Z133.1)** – In the United States, industry-developed, national consensus safety standards of practice for tree care.
- 2.3 **arboriculture** – Practice and study of the care of trees and other woody plants in the landscape.

- 2.4 **arborist** – Professional who possesses the technical competency gained through experience and related training to provide for or supervise tree pruning, tree removal or the management of trees and other woody plants in residential, commercial, and public landscapes.
- 2.5 **arborist trainee** – An individual undergoing on-the-job training to obtain the experience and the competence required to provide for or supervise tree pruning, tree removal or the management of trees and other woody plants. Such trainees shall be under the direct supervision of an arborist.
- 2.6 **bark inclusion** – See included bark.
- 2.7 **best management practices** – Best available, industry-recognized course of action, in consideration of the benefits and limitations, based on scientific research and current knowledge.
- 2.8 **branch** – A stem arising from a larger-stem; a subdominant stem; the pith in true branches has no connection to the parent stem.
- 2.9 **branch bark ridge** – Raised strip of bark at the top of a branch union, where the growth and expansion of the trunk or parent stem and adjoining branch push the bark into a ridge.
- 2.10 **branch collar** – Area where a branch joins another branch or trunk that is created by the overlapping vascular tissues from both the branch and the trunk. Typically enlarged at the base of the branch.
- 2.11 **branch protection zone** – Chemically and physically modified tissue within the trunk or parent branch at the base of a smaller, subordinate branch that retards the spread of discoloration and decay from the subordinate stem into the trunk or parent branch.
- 2.12 **cambium** – Thin layer(s) of meristematic cells that give rise (outward) to the phloem and (inward) to the xylem, increasing stem and root diameter.
- 2.13 **City Forester** – The City Forester of Fort Collins or a duly designated representative.
- 2.14 **cleaning** – Selective pruning to remove dead, diseased, cracked, and broken branches and foreign objects.
- 2.15 **climbing spurs** – Sharp devices strapped to a climber's lower legs to assist in climbing poles or trees being removed. Also called spikes, gaffs, irons, hooks, or climbers.
- 2.16 **closure** – The process in a woody plant by which wound wood grows over a



pruning cut or injury.

- 2.17 **codominant stem** – Forked branches nearly the same diameter (diameter ratios greater than 80%), arising from a common junction and lacking a normal branch union.
- 2.18 **compartmentalization** – Natural defense process in trees by which chemical and physical boundaries are created that act to limit the spread of disease and decay organisms.
- 2.19 **crown** – Upper part of a tree, measured from the lowest branch, including all the branches and foliage.
- 2.20 **decay** – (1) (noun) An area of wood that is undergoing decomposition. (2) (verb) decomposition of organic tissues by fungi or bacteria.
- 2.21 **dominant leader/trunk/stem** – The stem that grows much larger than all other stems and branches.
- 2.22 **espalier** – The combination of pruning, supporting, and training branches to orient a plant in one plane.
- 2.23 **facility** – A structure or equipment used to deliver or provide protection for the delivery of an essential service, such as electricity or communications.
- 2.24 **good structure/architecture/form** – Branch and trunk architecture resulting in a canopy form that resists failure.
- 2.25 **ground work** – All work on a job site except the making of pruning or removal cuts.
- 2.26 **hanger** – Loose, dangling or unsecured limb in the canopy of a tree.
- 2.27 **heading** – Cutting a shoot back to a bud, or cutting a branch back to a bud, stub or lateral branch not large enough to assume apical dominance. Cutting an older branch or stem back to a stub. Depending on the placement of the heading cut it is called: 1) heading to a bud; 2) heading to a lateral; or 3) internodal heading.
- 2.28 **included bark** – Bark that becomes embedded in a crotch (union) between branch and trunk or between codominant stems. Causes a weak structure.
- 2.29 **internode** – The area between lateral branches or buds.
- 2.30 **job briefing** – The communication of at least the following subjects for arboricultural operations: work specifications, hazards associated with the

job, work procedures involved, special precautions, electrical hazards, job assignments, and personal protective equipment.

- 2.31 **interior foliage** – Typically small-diameter (less than 3 inches) branches with foliage on the interior or inner portion of the crown.
- 2.32 **kerf** – Slit or cut made by a saw in a log. Space created by a saw cut.
- 2.33 **lateral** – A branch arising from a large stem or branch.
- 2.34 **leader** – Primary terminal shoot or trunk of a tree. Large, usually upright stem. A stem that dominates a portion of the crown by suppressing lateral branches.
- 2.35 **lion tailing** – Poor pruning practice in which an excessive number of live branches are thinned from the inside and lower part of specific limbs or a tree crown, leaving mostly terminal foliage. Results in poor branch taper, poor wind load distribution, and a high risk of branch failure.
- 2.36 **live crown ratio** – The ratio of the height of crown containing live foliage to the over all height of the tree.
- 2.37 **mature tree** – Trees that have reached at least 75 percent of their typical final height and spread.
- 2.38 **method** – A procedure or process for achieving an objective.
- 2.39 **off-site tree** – A tree located on property other than where work is authorized to occur.
- 2.40 **parent branch or stem** – A tree trunk or branch from which other branches or shoots grow.
- 2.41 **parts to be removed** – The location in the crown of a tree where pruning work will be performed. This can be specified as all of the crown or just the section(s) of the crown to be pruned.
- 2.42 **petiole** – Stalk or support axis of a leaf.
- 2.43 **permanent branches (permanent limbs)** – In structural pruning of young trees, branches that will be left in place, often forming the initial scaffold framework of a tree.
- 2.44 **photosynthesis** – Process in green plants (and in algae and some bacteria) by which light energy is used to form glucose (chemical energy) from water and carbon dioxide.

- 2.45 **phytotoxic** – Term to describe a compound that is poisonous to plants.
- 2.46 **pollarding** – Specialty pruning technique in which a tree is kept relatively short. Starting on a young tree, internodal cuts are made at a chosen height, resulting in the development of callus knobs at the cut height. Requires regular (usually annual) removal of the sprouts arising from the cuts.
- 2.47 **pruning** – Removing branches (or occasionally roots), or shortening branches or leaders on a tree. Shearing is considered a type of pruning. Certain kinds of pruning are prohibited and a violation of the standards (for example topping a tree, pruning without regard for health or structural integrity, making incorrect pruning cuts etc...). Correct pruning follows the approved methods described in these standards, to achieve a specified objective(s). Parts removed in pruning can be live or dead. Pruning does not include making sculpture from the parts of any tree, or tree removal.
- 2.48 **qualified line-clearance arborist** – An individual who, through related training and on-the-job experience, is familiar with the equipment and hazards in line clearance and has demonstrated the ability to perform the special techniques involved. This individual may or may not be currently employed by a line-clearance contractor.
- 2.49 **qualified line-clearance arborist trainee** – An individual undergoing line-clearance training under the direct supervision of a qualified line-clearance arborist. In the course of the training, the trainee becomes familiar with the equipment and hazards in line-clearance and demonstrates ability in the performance of the special techniques involved.
- 2.50 **raising** – Selective pruning to provide vertical clearance; also known as lifting.
- 2.51 **reaction zone** – Natural boundary formed chemically within a tree to separate damaged wood from existing, healthy wood. Important in the process of compartmentalization.
- 2.52 **reducing** – Pruning to decrease height or spread on entire tree or one section; also referred to as reduction or reduction pruning.
- 2.53 **reduction cut (drop-crotch cut, lateral cut)** – Pruning cut that reduces the length of a branch or stem back to a lateral branch large enough to assume apical dominance – should be at least one third of the diameter of the cut stem (both stems measured perpendicular to their main branch axis at the branch junction). If less than one-third, the cut is a heading cut to a lateral.
- 2.54 **removal (tree removal)** – Removal of most of the above ground portion of a tree by cutting to a stump or to a point on the main trunk where no side

branches remain. May also includes stump removal.

- 2.55 **removal cut (thinning cut)** – Cut that removes a branch at its point of origin. Collar cut.
- 2.56 **restoring** – The process of pruning to improve the structure, form, and appearance of trees that have been improperly trimmed, vandalized, or damaged.
- 2.57 **risk assessment** – The process of evaluating the potential of a tree to fail, the environment that may contribute to tree failure, and a potential target.
- 2.58 **scaffold limb** – A limb or branch that is among the largest diameter on the tree and will remain on the tree perhaps to maturity.
- 2.59 **shall** – As used in this standard, denotes a mandatory requirement.
- 2.60 **shearing** – Cutting back exterior growth using internodal heading cuts in one to two year old wood resulting in a defined edge with thick outer growth. Outer growth is regularly shaved to maintain the shape and outer density.
- 2.61 **shoot** – New stem or branch growth on a plant.
- 2.62 **should** – As used in this standard, denotes an advisory recommendation.
- 2.63 **specifications** – Detailed plans, requirements, and statements of particular procedures and/or standards used to define and guide work.
- 2.64 **stem** – Woody structure bearing foliage and buds that gives rise to other stems (branches).
- 2.65 **starch** – Chain of sugar molecules linked together that serves as a form of energy storage in plants.
- 2.66 **structural pruning** – Pruning to establish a strong arrangement or system of scaffold branches.
- 2.67 **stub** – Portion of a branch or stem remaining after a stub cut, branch breakage, or branch death.
- 2.68 **subordination** – Pruning to reduce the size and ensuing growth of a branch in relation to other branches or leaders.
- 2.69 **sucker** – Shoot arising from the roots. Contrast with watersprout.

- 2.70 **thinning** – In pruning, the selective removal of live branches to provide light or air penetration through the tree or to lighten the weight of the remaining branches.
- 2.71 **throwline** – Thin, lightweight cord attached to a throw bag or throwing ball used to set climbing or rigging lines in trees.
- 2.72 **topping** – Inappropriate pruning technique to reduce tree size. Cutting back a tree to a predetermined crown limit; often, but not always, at internodes.
- 2.73 **tracing** – The removal of loose, damaged tissue from in and around a wound.
- 2.74 **tree** – A large woody perennial plant having a single, usually elongated stem, generally with few or no limbs on its lower part; or any of the species listed in Appendix A including all their cultivars, varieties and hybrids.
- 2.75 **tree attachment** – any foreign object affixed to a City owned tree, such as signs, holiday lighting, bicycle locks/chains, wildlife nesting boxes, etc...
- 2.76 **trunk** – Stem of a tree.
- 2.77 **trunk flare** – (1) The area at the base of the plant's trunk where it broadens to form roots. ( 2) The area of transition between the root system and trunk.
- 2.78 **union (crotch)** – The junction between a stem and branch or between stems.
- 2.79 **utility** – A public or private entity that delivers a public service, such as electricity or communications.
- 2.80 **utility space** – The physical area occupied by a utility's facilities and the additional space required to ensure its operation.
- 2.81 **vista/view prune** – Pruning to enhance a specific view without jeopardizing the health of the tree.
- 2.82 **watersprouts** – Upright, epicormic shoots arising from the trunk or branches of a plant above the root graft or soil line. Incorrectly called a sucker. Contrast with sucker.
- 2.83 **wound** – An opening that is created when the bark of a live branch or stem is cut, penetrated, damaged, or removed.
- 2.84 **wound dressing** – Compound applied to tree wounds or pruning cuts.

### 3 Tree Inspection Before Pruning or Removal:

- 3.1 An arborist shall visually inspect each tree before beginning pruning or removal work.
- 3.2 If a condition is observed requiring attention beyond the original scope of the work, the condition should be reported to an immediate supervisor, the owner, or the person responsible for authorizing the work.

### 4 Pruning Tools and Equipment:

- 4.1 Equipment, tools, and work practices that damage living tissue and bark beyond the scope of normal work practices shall be avoided.
- 4.2 Climbing spurs shall not be used when entering and climbing trees for the purpose of pruning, tree inspection, or any purposes other than removal. An exception will be made for aerial rescue operations.

### 5 Pruning Cuts:

- 5.1 Pruning tools used in making pruning cuts shall be sharp.
- 5.2 A pruning cut that removes a branch at its point of origin (removal cut) shall be made close to the trunk, or parent branch, without leaving a stub or without cutting into the branch bark ridge or branch collar (see BMP/Tree Pruning figure 13).
- 5.3 A pruning cut that reduces the length of a branch or parent stem by cutting back to another branch or stem (a reduction cut or heading cut to a lateral) shall be made at a slight downward angle relative to the remaining stem without damaging the remaining stem (see BMP/Tree Pruning figure 15).
- 5.4 When pruning to a lateral (reduction cut), the remaining lateral branch should be large enough to assume the terminal role (see BMP/Tree Pruning figure 15). A reduction cut removes a stem or branch back to a lateral branch or stem that is large enough to assume the terminal role. This lateral branch should be at least one-third the diameter of the removed portion. A larger ratio closer to one-half is usually preferred. If the lateral branch that remains is less than one-third the diameter of the removed stem (both stems measured perpendicular to their main branch axis at the branch junction), then the cut is considered a heading cut to a lateral. A heading cut to a lateral is considered inappropriate on most landscape trees. A reduction cut may lead to decay behind the cut. The extent of decay depends on the diameter of the cut and the tree species. Large-diameter

cuts (greater than about 2 to 3 inches) are likely to lead to more decay than smaller cuts.

- 5.5 Heading cuts to a lateral (less than the one-third rule in 5.4) shall only occur when the objective for pruning (for example to reduce risk of failure, provide clearance, improve view etc...) cannot be achieved with pruning cuts that cause less impact to the tree's health or structural integrity (there is not a way to prune so as to cause less impact to the tree's health or structural integrity and still meet the objective). Topping is an inappropriate technique in meeting an objective. Heading cuts to a lateral can cause significant problems and shall be used with a great deal of discretion. Heading cuts to a lateral can cause starvation due to the reduction of total leaf area and may result in irreversible decline of a tree or main branch. Heading cuts to a lateral can also cause a large wound that may allow decay to develop in a way that will negatively impact the structural integrity of the remaining lateral branches or sprouts that occur around the cut. Pruning recommendations and actual pruning work shall always regard the health and structural integrity of the tree (see 1.2).
- 5.6 The final pruning cut should result in a flat surface with adjacent bark firmly attached.
- 5.7 When removing a dead branch, the final cut shall be made just outside the collar of living tissue (see BMP/Tree Pruning figure 14).
- 5.8 Tree branches shall be removed in such a manner so as to avoid damage to other parts of the tree or to other plants or property. Minor damage to turf is often unavoidable and will be an exception. Branches too large to support with one hand shall be pre-cut using an acceptable three-cut method to avoid splitting of the wood or tearing the bark (see BMP/Utility Pruning of Trees figure 3). Multiple cutting techniques exist for application of a three-cut method. A number of them may be used to implement an acceptable three-cut method.
- 5.9 A cut that removes a branch with a narrow angle of attachment should be made in such a way that it will not cause damage to the parent branch or stem (see BMP/Tree Pruning figure 13).
- 5.10 Severed branches (hangers – see 2.26) shall be removed from the crown upon completion of the pruning, any time the tree is left unattended, or at the end of the workday.
- 5.11 Heading cuts (heading) in the internodal zone shall not be made on a branch, or a stem, two years old or older except for the following reasons:
  - 5.11.1 On a mature tree, a large branch or stem stub may be left to slow

the movement of decay into a major branch or main stem. The exception and the reason shall be included in the specifications.

- 5.11.2. On a mature tree, a large branch or stem stub may be left for wildlife considerations. The exception and the reason shall be included in the specifications.
- 5.11.3 When shearing a tree to an unnatural shape, cuts may be made in two year old wood but not in wood three years old or older.
  - 5.11.3.1 Pruning required to clear a street, sidewalk or other defined pedestrian or vehicle passageway may include shearing or cutting back into wood three years old or older. This exception shall have a height restriction of no more than ten feet above the ground.
- 5.11.4 Through a risk assessment conducted by an arborist it has been determined that the cut should be made to reduce risk. This situation would occur where access is not available, or permission to enter a property is not obtained from property owner, to make a more preferable cut. The exception and the reason shall be included in the specifications.
- 5.11.5 Pollarding is a specialty pruning technique in which a tree is kept relatively short. Starting on a young tree, internodal cuts are made at a chosen height, resulting in the development of callus knobs at the cut height. This requires regular (usually annual) removal of the sprouts arising from the cuts (see BMP/Utility Pruning of Trees figure14). The exception and the reason shall be included in the specifications.

## 6 Wound Treatment:

- 6.1 Wound treatments shall not be used to cover wounds or pruning cuts, except when necessary for disease, insect, mistletoe, or sprout control, or for cosmetic reasons.
- 6.2 Wound treatments that are damaging to tree tissues shall not be used.
- 6.3 When tracing wounds, only loose, damaged tissue shall be removed.

## 7 Pruning Objectives:

- 7.1 Pruning objectives shall be established prior to beginning any pruning



operation.

7.2 Objectives should include, but are not limited to, any of the following (see BMP/Tree Pruning pages 4 and 5):

- Reduce risk of failure
- Provide clearance
- Reduce shade
- Reduce wind resistance
- Maintain health
- Influence flower or fruit production
- Improve a view
- Improve aesthetics

## 8 Pruning Methods (Types):

8.1 Pruning method (type) shall be specified prior to commencement of work.

8.2 Pruning to **Clean**: Cleaning shall consist of pruning to remove one or more of the following non-beneficial parts: dead, diseased and/or broken branches (see BMP/Tree Pruning figure 2).

8.2.1 Location and minimum size of parts to be removed shall be specified prior to commencement of work.

8.3 Pruning to **Thin**: Thinning shall consist of selective removal of live branches to reduce crown density (see BMP/Tree Pruning figure 3).

8.3.1 Thinning should result in an even distribution of live branches on individual branches and throughout the crown.

8.3.2 Lion tailing is a poor pruning practice and shall not occur when pruning live branches during thinning.

8.3.3 Not more than 25 percent of the live crown should be removed within an annual growing season.

8.3.4 Location of parts to be removed shall be specified prior to commencement of work.

8.4 Pruning to **Raise**: Raising shall consist of selective removal of branches to provide vertical clearance. Crown raising should shorten or remove lower branches to provide clearance for buildings, signs, vehicles, pedestrians, vistas or other considerations (see BMP/Tree Pruning figure 4).

- 8.4.1 Live crown ratio should not be reduced to less than 50 percent (see BMP/Tree Pruning figure 5).
- 8.4.2 Location and size range of parts to be removed should be specified prior to commencement of work.
- 8.5 Pruning to **Reduce** (shape, drop crotch): Reduction shall consist of pruning branches or stems to decrease the height and/or spread of a tree. This type of pruning is done to minimize risk of failure, to reduce height or spread, for utility line clearance, or to clear vegetation from buildings or other structures (see BMP/Tree Pruning figure 6).
  - 8.5.1 Not all trees can be reduced. Therefore, the species and plant health shall be considered prior to commencement of work.
  - 8.5.2 Crown reduction should be accomplished using reduction and removal cuts. The trees form, branch structure, health and structural integrity shall be considered in determining the appropriate amount of reduction to meet the objective.
  - 8.5.3 Topping shall not be used as a pruning technique to reduce tree size by cutting back a tree to a predetermined crown limit. (see BMP Utility Pruning of Trees figures 12 and figure 13). For the purposes of this standard, topping shall be interpreted using the definition in 2.72.
  - 8.5.4 When a limb on a mature tree is cut back to a lateral (reduction cut), no more than one-fourth of its foliage should be removed.
  - 8.5.5 Location of parts to be removed or clearance requirements shall be specified prior to commencement of work.
- 8.6 Pruning for **Structure**: Structural pruning shall consist of selective pruning to improve tree and branch architecture primarily on young and medium aged trees (see BMP/Tree Pruning figures 7 and 8).
  - 8.6.1 Dominant leader(s) should be selected for development as appropriate.
  - 8.6.2 Strong, properly spaced scaffold branch structure should be selected for and maintained by reducing or removing other branches.
  - 8.6.3 Temporary branches should be retained or reduced as appropriate.
  - 8.6.4 Interfering, overextended, defective, weak and/or poorly attached

branches should be removed or reduced.

8.6.5 Size and location of leaders or branches to be subordinated or removed should be specified prior to commencement of work.

8.7 Pruning to **Restore**: Restoration shall consist of selective pruning to redevelop structure, form and appearance of severely pruned, vandalized or otherwise damaged trees (see BMP/Tree Pruning figure 9).

8.7.1 Location in tree, size range of parts, and percentage of sprouts to be removed should be specified prior to commencement of work.

## 9 Utility Pruning:

9.1 **Purpose:** The purpose of utility pruning is to prevent the loss of service, comply with mandated clearance laws, prevent damage to equipment, maintain access, and uphold the intended usage of the facility/utility space while adhering to accepted tree care performance standards.

9.2 Pruning cuts shall be made in accordance with sub-clauses 5.1 through 5.11.

9.3 A minimum number of pruning cuts should be made to accomplish the purpose of utility pruning. The structure and growth habit of the tree shall be considered prior to commencement of work (see BMP/Utility Pruning of Trees figure 8).

9.4 Utility pruning should be accomplished by removing entire branches. Branches that, when cut, will produce vigorous sprouts that would grow into facilities and/or utility space should be removed (see BMP/Utility Pruning of Trees figure 8).

9.5 Branches shall be cut to laterals (reduction cuts), or the parent branches (removal cuts), and not at a pre-established clearing limit. If clearance limits are established, pruning cuts shall be made at laterals or parent branches outside the specified clearance zone (see BMP/Utility Pruning of Trees figures 9, 12 and 13). Topping is an inappropriate technique in meeting this objective.

9.6 Trees growing next to, and into or toward utility spaces should be pruned by reducing branches to laterals to direct growth away from the utility space or by removing entire branches. Branches that, when cut, will produce vigorous sprouts that would grow into facilities and/or utility space should be removed (see BMP/Utility Pruning of Trees figures 9 and 10).

- 9.7 During a utility-declared emergency, service must be restored as quickly as possible. At such times, it may be necessary, because of safety and the urgency of service restoration, to deviate from the use of proper pruning techniques as defined in this standard. Following the emergency, corrective pruning should be done as necessary.
- 9.8 Only a qualified line-clearance arborist or line-clearance arborist trainee shall be assigned to line clearance work in accordance with industry requirements and regulations.
- 9.9 Job briefings shall be performed as out-lined in ANSI Z133.1 sub-clause 3.1.4.
- 9.10 To be compliant with the Colorado Revised Title 9 Safety-Industrial and Commercial, Article 2.5 – High Voltage Power Line Safety Requirements, Statute: Only qualified employees of an electric utility shall perform any activity that may bring an individual or equipment within ten feet of high voltage overhead lines (lines in excess of 600 volts). Contractors working directly for the utility shall be considered qualified. Non-qualified employees or individuals must contact the appropriate utility to make arrangements for safe activity.

## 10 Pesticide Application Standards:

- 10.1 Companies holding a Fort Collins arborist license with the pesticide applicator category shall maintain a current copy of the most recent edition of the following (The Best Management Practices (BMP's) and American National Standards Institute (ANSI) standards can be purchased from the **International Society of Arboriculture**):
  - City of Fort Collins Tree Management Standards and Best Management Practices
  - ANSI Z133.1-2006 for Arboriculture Operations – Safety Requirements
  - Best Management Practices/Integrated Pest Management
  - Insect Management Recommendations for Turf and Ornamentals – Colorado State University Cooperative Extension
  - Insects and Diseases of Woody Plants of the Central Rocky Mountains - Colorado State University Cooperative Extension
- 10.2 Pesticide application to trees shall adhere to all state and federal licensing, pesticide storage, handling, disposal and application regulations.
- 10.3 In conducting pesticide application operations, all work shall be performed using methods and equipment in such a manner so as to avoid and prevent

damage to other plants, properties, structures or persons. ANSI Z133.1 for Arboricultural Operations – Safety Requirements is the industry-developed national consensus standard for safety. ANSI Z133.1 shall be referenced by the City Forester in interpreting this standard.

- 10.4 Work should comply with the most recent edition of ANSI Z133.1 (most current edition is ANSI Z133.1-2006) for Arboricultural Operations-Safety Requirements.
- 10.5 Pesticide application practices shall comply with all federal, state and local laws and regulations.
- 10.6 Pesticide application crews of any licensed arborist company shall temporarily stop work on a job site when directed by the City Forester for possible violations of 10.3. Work shall remain stopped until the possible violation is discussed and/or corrected.

## **Section B: Best Management Practices.**

### **1 Use of Best Management Practices:**

- 1.1 Best Management Practices 1.3.1 and 1.3.2 shall be used as an aid in the interpretation of the standards in Section A.
- 1.2 City of Fort Collins employees, companies holding an arborist license or any other business or individual shall perform all work on or around trees located on City property in accordance with the Best Management Practices for arboriculture, as identified in 1.3, unless otherwise directed by the City Forester. The Best Management Practices are good guidelines for all arborists to follow. Companies holding an arborist license are encouraged, but not required, to follow the Best Management Practices when working on trees located on private property.
- 1.3 These documents are published by and available from **The International Society of Arboriculture**. The most recent editions of these Best Management Practices shall be used.
  - 1.3.1 Best Management Practices/Tree Pruning
  - 1.3.2 Best Management Practices/Utility Pruning of Trees
  - 1.3.3 Best Management Practices/Tree Support Systems
  - 1.3.4 Best Management Practices/Tree Lightning Protection Systems

1.3.5 Best Management Practices/Tree Planting

1.3.6 Best management Practices/ Integrated Pest Management

1.3.7 Best Management Practices/Managing Trees During Construction

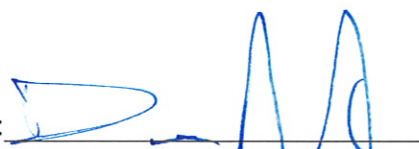
1.3.8 Best Management Practices/Tree and Shrub Fertilization.

## **Section C: Miscellaneous Standards.**

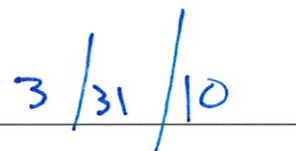
### **1 Miscellaneous Standards Regarding Human Health Risk and Protection of City Trees:**

- 1.1 Tree houses and swings shall not be installed in trees on City property.
- 1.2 For trees on City property, all installation, placement or removal of any tree attachment (see 2.75) shall be done in a manner (including timing and duration of installation) so as not to cause damage to any tree in the present, or in the future, as determined by the City Forester.
- 1.3 Climbing to perform work shall not occur in City trees except by authorized and qualified individuals as determined by the City Forester.
  - 1.3.1 Climbing of City trees shall occur only:
    - when performing tree maintenance
    - when installing or removing tree attachments or objects
    - for City sponsored arboricultural training or competition
    - during rescue or emergency situations
    - when taking an arboricultural tree climbing test that has been authorized by the City Forester
  - 1.3.2 During City sponsored arboricultural events, such as training or competitions, or during an authorized tree climbing test, participants of various skill levels may climb designated trees on City property if they have filled out and signed the appropriate waiver(s). Such events must have on-site supervision by one or more arborists that are qualified to climb.

Approved by:

  
Darin Atteberry, City Manager

Date:



**Appendix A:**  
**Tree species list referenced in section 2.74**  
**under the definition of “tree”**

**Conifer List:**

| <u>Scientific Name</u>              | <u>Common Name</u>          |
|-------------------------------------|-----------------------------|
| <i>Abies concolor</i>               | white (concolor) fir        |
| <i>Abies lasiocarpa</i>             | subalpine (alpine) fir      |
| <i>Calocedrus decurrens</i>         | incense cedar               |
| <i>Cedrus atlantica</i>             | Atlas cedar                 |
| <i>Cedrus deodora</i>               | Deodar cedar                |
| <i>Cedrus libani</i>                | Cedar of Lebanon            |
| <i>Chamaecyparis nootkanensis</i>   | Alaska cedar                |
| <i>Cupressus arizonica</i>          | Arizona cypress             |
| <i>Cupressus bakeri</i>             | Modoc cypress               |
| <i>Cupressus sempervirens</i>       | Italian cypress             |
| <i>Juniperus chinensis</i>          | Chinese juniper             |
| <i>Juniperus monosperma</i>         | one-seed juniper            |
| <i>Juniperus osteosperma</i>        | Utah juniper                |
| <i>Juniperus scopulorum</i>         | Rocky Mountain juniper      |
| <i>Juniperus virginiana</i>         | eastern red cedar           |
| <i>Larix decidua</i>                | European larch              |
| <i>Larix kaempferi</i>              | Japanese larch              |
| <i>Metasequoia glyptostroboides</i> | dawn redwood                |
| <i>Picea abies</i>                  | Norway spruce               |
| <i>Picea engelmannii</i>            | Engelmann spruce            |
| <i>Picea glauca</i>                 | Black Hills (white) spruce  |
| <i>Picea omorika</i>                | Serbian spruce              |
| <i>Picea pungens</i>                | Colorado blue (blue) spruce |
| <i>Pinus aristata</i>               | bristlecone pine            |
| <i>Pinus bungeana</i>               | lacebark pine               |
| <i>Pinus contorta</i>               | lodgepole pine              |
| <i>Pinus densiflora</i>             | Japanese red pine           |
| <i>Pinus edulis</i>                 | pinyon pine                 |
| <i>Pinus flexilis</i>               | limber pine                 |
| <i>Pinus monophylla</i>             | single leaf pinyon pine     |
| <i>Pinus monticola</i>              | western white pine          |
| <i>Pinus mugo</i>                   | Mugo pine                   |
| <i>Pinus nigra</i>                  | Austrian pine               |
| <i>Pinus parviflora</i>             | Japanese white pine         |
| <i>Pinus ponderosa</i>              | Ponderosa pine              |
| <i>Pinus strobiformis</i>           | southwest white pine        |
| <i>Pinus strobus</i>                | eastern white pine          |
| <i>Pinus sylvestris</i>             | Scotch pine                 |
| <i>Pinus thunbergiana</i>           | Japanese black pine         |
| <i>Pinus wallichiana</i>            | Himalayan pine              |
| <i>Pseudotsuga menziesii</i>        | Douglas fir                 |

|                                 |                     |
|---------------------------------|---------------------|
| <i>Sequoiadendron giganteum</i> | giant sequoia       |
| <i>Taxodium distichum</i>       | baldcypress         |
| <i>Thuja occidentalis</i>       | eastern arborvitae  |
| <i>Thuja orientalis</i>         | oriental arborvitae |
| <i>Thuja plicata</i>            | western red cedar   |

### Shade Tree and Ornamental List:

| <u>Scientific Name</u>        | <u>Common Name</u>                      |
|-------------------------------|---|
| <i>Acer buergeranum</i>       | trident maple                           |
| <i>Acer campestre</i>         | hedge maple                             |
| <i>Acer ginnala</i>           | Ginnala (Amur) maple                    |
| <i>Acer glabrum</i>           | Rocky Mountain maple                    |
| <i>Acer grandidentatum</i>    | canyon (bigtooth) maple                 |
| <i>Acer griseum</i>           | paperbark maple                         |
| <i>Acer negundo</i>           | boxelder (Manitoba or ash-leaved) maple |
| <i>Acer nigrum</i>            | black maple                             |
| <i>Acer palmatum</i>          | Japanese maple                          |
| <i>Acer platanoides</i>       | Norway maple                            |
| <i>Acer pseudoplatanus</i>    | sycamore maple                          |
| <i>Acer rubrum</i>            | red maple                               |
| <i>Acer saccharinum</i>       | silver maple                            |
| <i>Acer saccharum</i>         | sugar maple                             |
| <i>Acer tataricum</i>         | Tatarian maple                          |
| <i>Acer truncatum</i>         | Shantung (purpleblow) maple             |
| <i>Aesculus glabra</i>        | Ohio buckeye                            |
| <i>Aesculus hippocastanum</i> | horsechestnut                           |
| <i>Aesculus x camea</i>       | red horsechestnut                       |
| <i>Aesculus californica</i>   | California buckeye                      |
| <i>Ailanthus altissima</i>    | tree-of-heaven                          |
| <i>Albizia julibrissin</i>    | mimosa (silk tree or albizia)           |
| <i>Alnus glutinosa</i>        | European (common) alder                 |
| <i>Alnus tenuifolia</i>       | thinleaf (mountain) alder               |
| <i>Amelanchier alnifolia</i>  | Saskatoon (western) serviceberry        |
| <i>Amelanchier arborea</i>    | downy serviceberry                      |
| <i>Amelanchier canadensis</i> | thicket serviceberry                    |
| <i>Amelanchier laevis</i>     | smooth-leaf serviceberry                |
| <i>Amelanchier utahensis</i>  | Utah serviceberry                       |
| <i>Betula nigra</i>           | river birch                             |
| <i>Betula occidentalis</i>    | water (river) birch                     |
| <i>Betula papyrifera</i>      | paper birch                             |
| <i>Betula pendula</i>         | European white birch                    |
| <i>Carpinus betulus</i>       | European hornbeam                       |
| <i>Carpinus caroliniana</i>   | American hornbeam                       |
| <i>Carya illinoensis</i>      | pecan                                   |
| <i>Carya cordiformis</i>      | bitternut hickory                       |
| <i>Carya laciniosa</i>        | shellbark hickory                       |
| <i>Carya ovata</i>            | shagbark hickory                        |



|                                 |                                     |
|---------------------------------|-------------------------------------|
| <i>Castanea dentata</i>         | American chestnut                   |
| <i>Castanea mollissima</i>      | Chinese chestnut                    |
| <i>Catalpa bignonioides</i>     | southern catalpa                    |
| <i>Catalpa speciosa</i>         | western (northern) catalpa          |
| <i>Celtis occidentalis</i>      | common hackberry                    |
| <i>Celtis laevigata</i>         | sugarberry                          |
| <i>Celtis reticulata</i>        | netleaf hackberry                   |
| <i>Cercidiphyllum japonicum</i> | Katsuratree                         |
| <i>Cercis canadensis</i>        | eastern redbud (Judas tree)         |
| <i>Cercis occidentalis</i>      | western (California) redbud         |
| <i>Cercocarpus ledifolia</i>    | curleaf mountain-mahogany           |
| <i>Chilopsis linearis</i>       | desert willow                       |
| <i>Cladrastis lutea</i>         | yellowwood                          |
| <i>Cornus alternifolia</i>      | pagoda (alternate-leaf) dogwood     |
| <i>Cornus florida</i>           | flowering dogwood                   |
| <i>Cornus kousa</i>             | Kousa dogwood                       |
| <i>Cornus mas</i>               | Cornelian cherry dogwood            |
| <i>Corylus americana</i>        | American (hazelnut) filbert         |
| <i>Corylus columa</i>           | Turkish (hazelnut) filbert          |
| <i>Corylus cornuta</i>          | beaked (hazelnut) filbert           |
| <i>Cotinus coggygria</i>        | common smoketree (smokebush)        |
| <i>Cotinus obovatus</i>         | chittamwood or American smoketree   |
| <i>Cowania mexicana</i>         | cliffrose (quininebush)             |
| <i>Crataegus species</i>        | hawthorns                           |
| <i>Elaeagnus angustifolia</i>   | Russian olive                       |
| <i>Fagus grandifolia</i>        | American beech                      |
| <i>Fagus sylvatica</i>          | European beech                      |
| <i>Fraxinus americana</i>       | white ash                           |
| <i>Fraxinus anomola</i>         | singleleaf (dwarf) ash              |
| <i>Fraxinus excelsior</i>       | European ash                        |
| <i>Fraxinus pennsylvanica</i>   | green ash                           |
| <i>Fraxinus quadrangulata</i>   | blue ash                            |
| <i>Fraxinus velutina</i>        | Modesto (velvet) ash                |
| <i>Gleditsia triacanthos</i>    | honeylocust                         |
| <i>Gymnocladus dioica</i>       | Kentucky coffeetree                 |
| <i>Juglans cinerea</i>          | butternut                           |
| <i>Juglans major</i>            | Arizona walnut                      |
| <i>Juglans microcarpa</i>       | little walnut                       |
| <i>Juglans nigra</i>            | black walnut                        |
| <i>Juglans regia</i>            | English (Persian) walnut            |
| <i>Koelreuteria paniculata</i>  | golden rain tree                    |
| <i>Laburnum x watereri</i>      | goldenchain tree (Waterer laburnum) |
| <i>Liquidambar styraciflua</i>  | American sweetgum                   |
| <i>Liriodendron tulipifera</i>  | tuliptree (yellow or tulip poplar)  |
| <i>Maclura pomifera</i>         | Osage-orange                        |
| <i>Magnolia acuminata</i>       | cucumber magnolia                   |
| <i>Magnolia kobus</i>           | Kobus magnolia                      |
| <i>Magnolia stellata</i>        | star magnolia                       |
| <i>Magnolia x loebneri</i>      | Loebner magnolia                    |
| <i>Magnolia x soulangiana</i>   | saucer magnolia                     |

|                               |                                       |
|-------------------------------|---------------------------------------|
| <i>Malus species</i>          | apples and crabapples                 |
| <i>Melia azedarach</i>        | Chinaberry                            |
| <i>Morus alba</i>             | white mulberry                        |
| <i>Morus rubra</i>            | red mulberry                          |
| <i>Ostrya knowltonii</i>      | Knowlton hophornbeam                  |
| <i>Ostrya virginiana</i>      | eastern hophornbeam (ironwood)        |
| <i>Phellodendron amurense</i> | Amur corktree                         |
| <i>Pistacia chinensis</i>     | Chinese pistache                      |
| <i>Pistacia vera</i>          | pistachio                             |
| <i>Platanus occidentalis</i>  | American sycamore (planetree)         |
| <i>Platanus x acerifolia</i>  | London planetree                      |
| <i>Populus alba</i>           | white (silver) poplar                 |
| <i>Populus angustifolia</i>   | narrowleaf cottonwood                 |
| <i>Populus balsamifera</i>    | balsam poplar                         |
| <i>Populus bolleana</i>       | Bolleana poplar                       |
| <i>Populus deltoides</i>      | eastern cottonwood                    |
| <i>Populus fremontii</i>      | Fremont cottonwood                    |
| <i>Populus nigra</i>          | Lombardy poplar                       |
| <i>Populus sargentii</i>      | plains cottonwood                     |
| <i>Populus species</i>        | miscellaneous cottonwood              |
| <i>Populus tremuloides</i>    | quaking aspen                         |
| <i>Populus trichocarpa</i>    | black cottonwood                      |
| <i>Populus x acuminata</i>    | lanceleaf cottonwood                  |
| <i>Populus x canadensis</i>   | hybrid poplar                         |
| <i>Prosopis glandulosa</i>    | honey mesquite                        |
| <i>Prunus americana</i>       | American plum                         |
| <i>Prunus armeniaca</i>       | apricot                               |
| <i>Prunus avium</i>           | sweet (mazzard) cherry                |
| <i>Prunus cerasifera</i>      | purpleleaf (cherry) plum              |
| <i>Prunus cerasus</i>         | sour cherry                           |
| <i>Prunus domestica</i>       | common plum                           |
| <i>Prunus mahaleb</i>         | St. Lucie cherry                      |
| <i>Prunus mume</i>            | Japanese apricot                      |
| <i>Prunus nigra</i>           | Canada plum                           |
| <i>Prunus padus</i>           | Mayday tree or European birdcherry    |
| <i>Prunus pennsylvanica</i>   | pin cherry                            |
| <i>Prunus persica</i>         | peach                                 |
| <i>Prunus salicina</i>        | Japanese plum                         |
| <i>Prunus sargentii</i>       | Sargent cherry                        |
| <i>Prunus serotina</i>        | black cherry                          |
| <i>Prunus serrulata</i>       | Japanese flowering (oriental) cherry  |
| <i>Prunus subhirtella</i>     | Higan cherry                          |
| <i>Prunus virginiana</i>      | common chokecherry                    |
| <i>Prunus x yedoensis</i>     | Yoshino cherry                        |
| <i>Ptelea angustifolia</i>    | wafer-ash or western (common) hoptree |
| <i>Pyrus species</i>          | pears                                 |
| <i>Quercus acutissima</i>     | sawtooth oak                          |
| <i>Quercus alba</i>           | white oak                             |
| <i>Quercus bicolor</i>        | swamp white oak                       |
| <i>Quercus buckleyi</i>       | Texas red oak                         |

|                              |                                    |
|------------------------------|------------------------------------|
| <i>Quercus cerris</i>        | turkey oak                         |
| <i>Quercus gambelii</i>      | Gambel (scrub) oak                 |
| <i>Quercus imbricaria</i>    | shingle (laurel) oak               |
| <i>Quercus macrocarpa</i>    | bur oak                            |
| <i>Quercus muehlenbergii</i> | chinkapin oak                      |
| <i>Quercus palustris</i>     | pin oak                            |
| <i>Quercus robur</i>         | English oak                        |
| <i>Quercus rubra</i>         | northern red oak                   |
| <i>Quercus shumardii</i>     | Shumard oak                        |
| <i>Quercus turbinella</i>    | shrub live oak                     |
| <i>Quercus undulata</i>      | wavyleaf oak                       |
| <i>Robinia neomexicana</i>   | New Mexican locust                 |
| <i>Robinia pseudoacacia</i>  | black locust                       |
| <i>Robinia x ambigua</i>     | Idaho flowering locust             |
| <i>Salix amygdaloides</i>    | peach leaf willow                  |
| <i>Salix babylonica</i>      | weeping willow                     |
| <i>Salix fragilis</i>        | crack willow                       |
| <i>Salix matsudana</i>       | Navajo or globe willow             |
| <i>Salix nigra</i>           | black willow                       |
| <i>Sambucus cerulea</i>      | blue elder                         |
| <i>Sophora japonica</i>      | Japanese pagodatree (scholar tree) |
| <i>Sorbus alnifolia</i>      | Korean mountain ash                |
| <i>Sorbus americana</i>      | American mountain ash              |
| <i>Sorbus aucuparia</i>      | European mountain ash (rowan)      |
| <i>Sorbus decora</i>         | showy mountain ash                 |
| <i>Sorbus scopulina</i>      | Greene mountain ash                |
| <i>Syringa pekinensis</i>    | Peking tree lilac                  |
| <i>Syringa reticulata</i>    | Japanese tree lilac                |
| <i>Tamarix ramosissima</i>   | common tamarisk (salt-cedar)       |
| <i>Tilia americana</i>       | American linden                    |
| <i>Tilia cordata</i>         | littleleaf (European) linden       |
| <i>Tilia tomentosa</i>       | silver linden                      |
| <i>Tilia x euchlora</i>      | Crimean linden                     |
| <i>Ulmus americana</i>       | American elm                       |
| <i>Ulmus davidiana</i>       | David elm                          |
| <i>Ulmus japonica</i>        | Japanese elm                       |
| <i>Ulmus parvifolia</i>      | lacebark (Chinese) elm             |
| <i>Ulmus procera</i>         | English elm                        |
| <i>Ulmus pumila</i>          | Siberian elm                       |
| <i>Ulmus species</i>         | miscellaneous elms                 |
| <i>Zelkova serrata</i>       | Japanese zelkova                   |