City of Kirkwood
Tree Manual

The **Kirkwood Tree Manual** shall contain the technical information necessary to perform work on trees as regulated in the "Tree Code of the City of Kirkwood, Missouri". This manual is divided into four sections:

I. **Pruning of Trees**
    a. **Standards**
    b. **Pruning Categories**
    c. **Prohibited Practices**
II. **Tree Protection**
    a. **Trees to be Protected**
    b. **Standards of Practice**
III. **Planting of Trees**
    a. **Specifications**
    b. **Approved Street Tree Planting Guide**
IV. **Prohibited Species**

These sections are to outline the specific practices that must be followed when working with trees as outlined in the City Code. These sections are to be modified by the Urban Forester as the urban forest of the City changes, industry standards are updated, and/or invasive pests or species pose a threat to the established management practices.

Section 1 Pruning

of Trees

Pruning of trees as regulated by the City Code shall be performed following the standards and applications as outlined in this section. These practices will not be enforced upon those performing work on private property outside of the regulation set-forth by the City Code, but they may serve as an approved reference.

A. PRUNING STANDARDS

Outlined in this section are specific standards of practice that must be adhered to when pruning trees as regulated by the City Code.

All pruning shall adhere as a minimum practice to *ANSI A300 Part 1: Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices (Pruning)* as disturbed by the American National Standards Institute.

As general guidelines the following must be followed while performing City approved maintenance on City trees.

1. All tree work is to be performed by an International Society of Arboriculture (ISA) Certified Arborist, Municipal Specialist, Board Certified Master Arborist, or Tree Care Industry Council (TCIA) Accredited Certified Tree Care Specialist.
2. All pruning tools must be kept adequately sharp to insure smooth cuts.
3. All tools used on the pruning or removal of trees shall be properly disinfected prior to use on any other tree or plants. Tools shall also be disinfected between pruning infected and unaffected areas in the same tree. Disinfecting can be accomplished by wiping the tools with isopropyl alcohol or 10% bleach to water solution.
4. No spurs, climbing irons, or spike shoes shall be permitted for use on trees, unless the tree is to be removed.
5. Do not prune if boring insects are flying (they are attracted to fresh wounds). Do not prune Oak trees between April 1 and August 30 unless for imminent danger or other safety concerns.
6. All wood pruned/removed from the tree(s) shall be cleaned up and chipped or hauled off the City of Kirkwood's right-of-way daily. Each jobsite shall be left in "better than arrival" condition. Any holes created in turf area must be repaired by contractor.
7. Absolutely NO TOPPING will be permitted. Branches must be cut back using "Rule of 1/3".

B. **PRUNING CATEGORIES**

Approved pruning categories have been established for pruning trees found within City Properties, rights of way, and other city maintained areas. The following categories are outlined for use by private residents, City employees, or City contractors working on behalf of Kirkwood.

1. ***Light*** or ***Safety Prune*** shall consist of the minimum pruning necessary to correct extreme or undesirable conditions that may be hazardous to persons or property.
    i. Remove all dead and dying branches greater than 3 inches in diameter
    ii. Remove all broken or loose branches lodged in the trees
    iii. Remove all lower limbs that constitute a threat to persons or property, including those that fall within the City clearance standards. (The City discourages removing lower limbs to the point that the trunk exceeds one- third of the height of the tree.)
2. ***Medium Prune*** may include any or all of the specifications for Minimum pruning, in addition to the following:
    i. Removal of all dead and dying branches
    ii. Remove all dead or live branch stubs from previously broken or poorly cut branches
    iii. Remove any live branches that interfere with the tree's structural strength and healthy development. These are to include:
        a. Crossed or rubbing branches
        b. Multiple leaders in a single leader type tree
        c. Undesirable sucker and sprout growth
        d. Diseased or infested limbs
        e. Excessively heavy branch ends
        f. Multiple branches near the end of broken or stubbed limbs
3. ***Heavy Prune*** may include any or all of the specification for Medium pruning, in addition to the following:
    i. Inspection for health conditions
    ii. Crown thinning
    iii. Crown shaping
    iv. Crown restoration
    v. Up to 20% of the canopy may be removed

All Pruning shall be performed by using the "*Three Cut Method*". This method is the removal of a limb using a 3-cut process to protect the branch collar. The first two cuts remove the weight of the branch. This prevents the bark from ripped away from the trunk at and below the branch collar.

1. The **first cut** (marked A in figures below) is an undercut about

1/4 through the branch made upward from the bottom of the branch about one or two inches farther out than the collar.

2. The **second cut** (marked B in figures below) is a downward cut just outside the undercut that actually removes the entire branch, eliminating the weight of the branch before making the final natural target cut.
3. The **third cut** (marked C-D in figures below) is the natural target cut. The remaining portion of stub is removed with a cut made just outside of the branch collar tissue

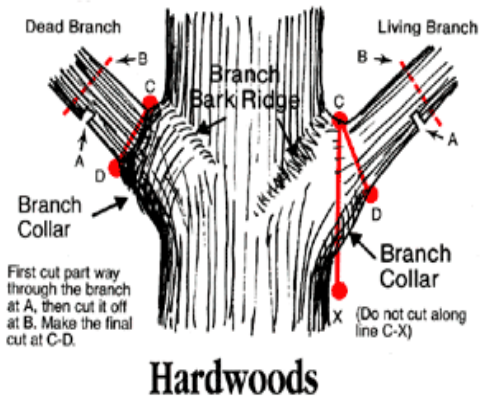


Figure 2: Pruning Hardwoods to Protect Branch Collars.

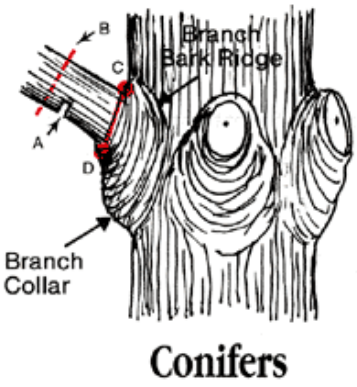


Figure 1: Pruning Conifers to Protect Branch Collars.

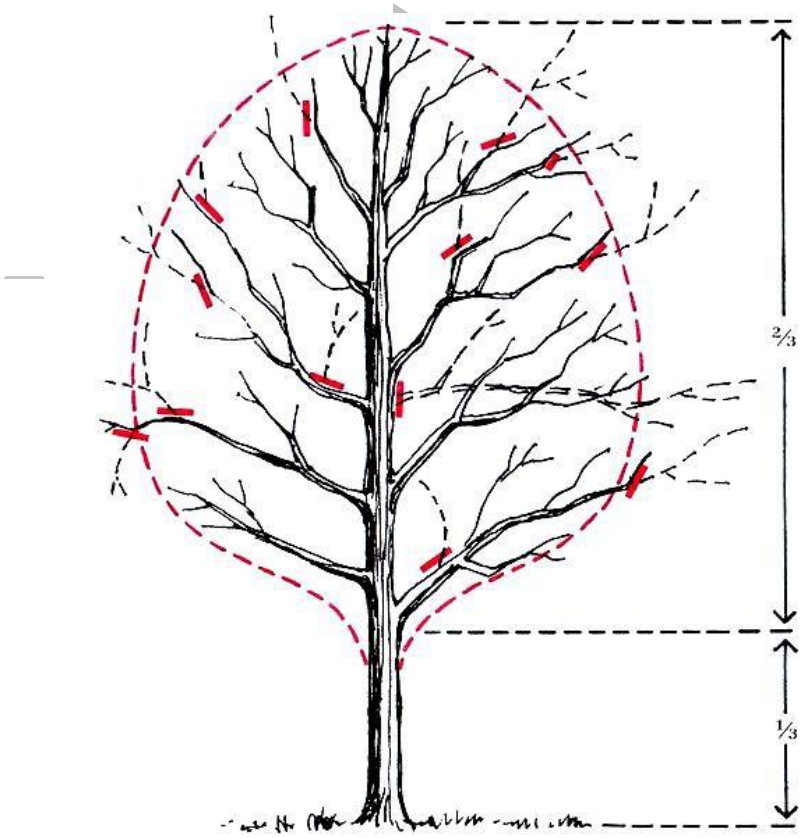


Figure 3: Pruning Practices for Structure, Shape, and Canopy reduction. The trunk shall be no more than one-third the tree height.

C. **PROHIBITED PRACTICES**

1. ***TOPPING*** or ***CROWN REDUCTION***
   All pruning shall be completed with the "rule of 1/3". The reduction of the crown by "topping" branches will not be permitted. The pruning of limbs shall be performed by pruning back to a lateral no less than 1/3 of the diameter of limb being pruned. Heading cuts will not be permitted.

Section 2 Tree Protection

The protection of trees during construction, excavation, demolition, and property improvement as regulated by the City Code shall be performed following the standards and applications as outlined in this section. These practices will be enforced upon all those performing work on projects that are regulated by the City Code.

Tree Protection for the City of Kirkwood is required to provide 3 primary functions:

1) To keep the foliage canopy and branching structure clear from contact by equipment, materials, and activities.
2) To preserve roots and soil conditions in an intact and non-compacted state.
3) To identify the Tree Protection Zone (TPZ) in which no disturbance to the soil or any and all parts of the tree both above ground and below shall be permitted.

A. **TREES TO BE PROTECTED**

1. All public trees located on City right-of-way shall be protected from any and all disturbance.
2. Private trees located on the immediate property upon which the proposed permit was applied for that meet the following criteria.
   i. **Size**
      a. Tree species with a maximum height of 40 feet or less shall be subject to protection only if the DBH is great than 4 inches.
      b. Tree species with a maximum height of 40 feet or greater shall be subject to protection standards only if the DBH is greater than 8 inches.
   ii. **Condition and Health**
      a. Trees assessed with a condition or health rating of fair or greater.
      b. All trees that are proven to be dead, hazardous, or rated at a poor or critical condition rating shall not need protection.

3. All trees in neighboring and adjacent properties within 10 feet of the property.
4. Border line, or shared trees are to be protected unless a signed agreement from both property owners is provided to the City.

B. STANDARDS OF PRACTICE

Outlined in this section are the specific standards that shall be adhered to for the protection of trees as regulated by the City Code.

1. **Tree Preservation and Protection Plan**
   All tree Preservation Plans shall be completed and signed by a Certified Arborist through the International Society of Arboriculture. All plans shall contain:
   i. **Tree Study**
      a. A site map clearly marking:
         1) Proposed improvements
         2) Trees proposed for removal
         3) Trees proposed for Tree Protection including locations of any and all tree protection methods to be used.
         4) Trees shall be numbered
      b. An appraisal and assessment of all public trees, trees on the site greater than 3 inches in diameter, and all trees on neighboring and adjacent property within 10 feet of the property line."
         This shall include:
         1) Tree Number
         2) Species name (Botanical)
         3) Diameter taken at breast height (DBH) and recorded in inches
         4) Physical Deterioration:
            i. Represented as a percentage value of 0-100
         5) Functional Obsolescence:
            i. Represented as a percentage value of 0-100
         6) External Obsolescence:

i. Represented as a percentage value of 0-100

7) Comments
8) Total appraised value represented in U.S. Dollars:
    i. The Appraisal shall be completed by using the *Trunk Formula Technique (TFT)* from the "*Guide for Plant Appraisal, 10th Edition*

ii. **Canopy Coverage Map**
    a. A site map clearly marking:
        1) Existing canopy coverage of the complete lot
        2) Proposed canopy for removal
        3) Proposed canopy after project completion
        4) Proposed site plan
        5) All trees marked and numbered
    b. A table showing canopy coverage percentages
        1) Existing canopy coverage of lot
        2) Post project completion canopy coverage of lot
        3) All trees with corresponding numbers and species

2. **Tree Protection Zone**
    i. The Tree Protection Zone (TPZ) is a restricted use area around the base of the tree extending to the drip-line or a minimum of 10 feet from the centerline of the trunk, whichever is greater. The TPZ shall be enclosed with proper fencing. Within this zone there shall be no:
        a. Excavation
        b. Storage of spoils
        c. Storage of equipment
        d. Parking
        e. Operations of any equipment
        f. Grading
        g. Or disturbance of any kind
    ii. Tree protection fencing shall enclose the entire area of the TPZ of the tree(s) to be protected throughout the duration of the project. (Appendix A)
        a. In parking areas where fencing is to be located on paving or concrete that will not be removed, posts may be supported by

an appropriate grade-level concrete base, upon approval by the Urban Forester.

b. Trees within a planting strip or *tree lawn* near sidewalks, streets, driveways or other public rights-of-way; only the planting strip and yard side of the TPZ shall be enclosed with the required protective fencing in order to keep sidewalks and streets open for public use.

iii. The Tree Protection Zone shall be constructed of:

a. Three (3) foot high green mesh fencing. Fencing shall be affixed to five (5) foot long heavy duty steel, green painted T- posts driven into the ground to a depth of a minimum of one
(1) foot six (6) inches (18 inches minimum). Posts should be spaced no more than (eight) 8 feet apart.

b. A *Tree Protection Zone* warning sign shall be affixed to tree protection fencing and prominently displayed at 20-foot intervals to be visible from all directions. All signs shall be a minimum of 8.5 inches by 11 inches, weatherproof with no holes through the paper signage, and clearly state: *"WARNING – TREE PROTECTION ZONE"*. See Appendix B

Section 3 Planting

of Trees

Planting of trees as regulated by the City Code shall be performed following the standards and applications as outlined in this section. These practices will not be enforced upon those performing work on private property outside of the regulations set-forth by the City Code, but they may serve as an approved reference.

A. PLANTING SPECIFICATIONS

Outlined in this section are specific standards of practice that must be adhered to when planting trees as regulated by the City Code.

All planting shall adhere as a minimum practice to ANSI A300 Part 6: Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices (Transplanting) as distributed by the American National Standards Institute and highlighted as Best Management Practices by the International Society of Arboriculture.

The following specifications shall be followed by all individuals, groups, contractors, and agencies performing the actions of planting trees within the City of Kirkwood Street Right of Way. Planting within the Right of Way shall be determined by the Urban Forester as detailed in the City Code.

1. **Tree Grow Space:**
    i. *Tree Lawn Size <3ft* – No trees will be planted
    ii. *Tree Lawn Size 3-4ft* – Small Growth trees only
    iii. *Tree Lawn Size 4-6ft* – Medium Growth trees only
    iv. *Tree Lawn Size >6ft* – Large Growth Trees
2. **Overhead Utility Lines:**
    Only small trees with a maximum height of 35 feet will be allowed
3. **Signs:**
    i. *Stop signs* – Trees will be planted no less than 35 from the rear of a stop sign
    ii. *Miscellaneous Signs* – Trees will be planted a minimum of 15 feet from the rear of these signs
4. **Driveways/Hardscape**:
    Trees will be planted a minimum of 8 feet from driveways and other sidewalk approaches outside of intersections.
5. **Intersections without stop signs**:
    Trees will be planted a minimum of 35 feet from the corner of an intersection
6. **Fire hydrants/utility poles**:

Trees will be planted a minimum of 10 feet from these hardscapes

7. **Tree Spacing for Mature Tree Size**
    i. Large growth trees shall have a minimum spacing of 35 feet from center
    ii. Medium growth trees shall have a minimum spacing of 25 feet from center
    iii. Small growth trees shall have a minimum spacing of 15 feet from center

The following specifications shall be followed by all individuals, groups, contractors, and agencies performing the actions of planting trees on Private property in accordance with the City Code to fulfill the requirements of an Approved Tree Study.

1. **Tree set-back:**
    i. Trees shall not be planted within 5 linear feet of a side yard or front yard property line.
    ii. Trees shall not be planted within 8 linear feet of a rear yard property line or utility easement.
2. **Overhead Utility Lines:**
    i. Trees that will grow higher than 30 feet in height shall not be planted within an electric utility easement.
3. **Restricted Trees for use as Canopy Coverage**
    i. Any arborvitae planted with the intent to act as a privacy screening shall not get credit for canopy coverage calculations.

In addition to the Specifications listed above the following general guidelines shall be followed when installing trees as regulated by the City Code.

1. Prior to digging, all utilities shall be located and marked in accordance with all Federal, State, and local law.
2. No trees other than those listed in the *Approved Street Tree Planting Guide* shall be planted.
3. All newly installed public trees must meet the American Standard for Nursery Stock. The trees must be free from disease, insects, and any other disfigurements.
4. All trees must be planted following the International Society of Arboriculture's *Best Management Practices* – Tree Planting.
5. Any planting holes drilled with an auger must have the sides of the holes "roughened" with a shovel to reduce compaction and the effects of "glazed wall"

6. When planting trees, all non-biodegradable material shall be removed from the tree. This includes but is not limited to:
    i. All rope and twine wrapped around the ball and/or trunk
    ii. The top 1/3 of burlap shall be cut and removed from the root ball
    iii. The top 1/3 of any wire baskets shall be cut and removed from the root ball

B. Approved Tree Planting Guide

Large Trees: Greater than 45 Feet in Height at Maturity		
Scientific Name	**Common Name**	**Canopy Coverage Averages (Square feet)**
Acer saccharum	sugar maple	1256
Acer nigrum	black maple	1256
Betula alleghaniensis	yellow birch	3847
Betula nigra	river birch	1963
Carpinus betulus	European hornbeam	707
Carya illinoensis	pecan	2375
Carya lacinata	shellbark hickory	2826
Carya ovata	shagbark hickory	1256
Castanea mollissima	Chinese chestnut	1963
Celtis laevigata	sugarberry	1963
Celtis occidentalis	common hackberry	1256
Cercidiphyllum japonicum	katsuratree	314
Diospyros virginiana	common persimmon	491
Fagus grandifolia	American beech	2826
Fagus sylvatica	European beech	1256
Ginkgo biloba	ginkgo	962
Gleditsia triacanthos	thornless honeylocust	1963
Gymnocladus dioica	Kentucky coffeetree	1256
Juglans nigra	black walnut	1256
Larix decidua	European larch	491
Liquidambar styraciflua	American sweetgum	2375
Liriodendron tulipifera	tuliptree	1256
Magnolia acuminata	cucumbertree	3317
Magnolia Grandiflora	Brackens Brown	314
Magnolia macrophylla	bigleaf magnolia	1256
Metasequoia	dawn redwood	491
Nyssa sylvatica	blackgum	314
Platanus occidentalis	American sycamore	2826
Platanus × acerifolia	London planetree	3847
Quercus alba	white oak	3317
Quercus bicolor	swamp white oak	1963
Quercus coccinea	scarlet oak	2375
Quercus lyrata	overcup oak	1256
Quercus macrocarpa	bur oak	3847
Quercus montana	chestnut oak	2826
Quercus muehlenbergii	chinkapin oak	2826
Quercus imbricaria	shingle oak	1963
Quercus phellos	willow oak	1256
Quercus robur	English oak	2375

Large Trees: Greater than 45 Feet in Height at Maturity (cont.)		
Scientific Name	**Common Name**	**Canopy Coverage Averages (Square feet)**
Quercus rubra	northern red oak	3317
Quercus shumardii	Shumard oak	1963
Styphnolobium japonicum	Japanese pagodatree	2826
Taxodium distichum	common baldcypress	314
Tilia americana	American linden	314
Tilia cordata	littleleaf linden	1256
Tilia tomentosa	silver linden	707
Ulmus parvifolia	Chinese elm	962
Zelkova serrata	Japanese zelkova	2826

Medium Trees: 31 to 45 Feet in Height at Maturity		
Scientific Name	**Common Name**	**Canopy Coverage Averages (Square feet)**
Aesculus × carnea	red horsechestnut	707
Alnus cordata	Italian alder	491
Asimina triloba	pawpaw	177
Cladrastis kentukea	American yellowwood	1256
Corylus colurna	Turkish filbert	962
Eucommia ulmoides	hardy rubber tree	1256
Koelreuteria paniculata	goldenraintree	707
Ostrya virginiana	American hophornbeam	491
Parrotia persica	Persian parrotia	491
Phellodendron amurense	Amur corktree	1963
Pistacia chinensis	Chinese pistache	707
Prunus maackii	Amur chokecherry	491
Prunus sargentii	Sargent cherry	1256
Pterocarya fraxinifolia	Caucasian wingnut	2826
Quercus acutissima	sawtooth oak	1925
Sassafras albidum	sassafras	962

Small Trees: 15 to 30 Feet in Height at Maturity		
Scientific Name	**Common Name**	**Canopy Coverage Averages (Square feet)**
Acer buergerianum	trident maple	314
Acer campestre	hedge maple	491
Acer ginnala	Amur maple	177
Acer griseum	paperbark maple	314
Aesculus pavia	red buckeye	79
Amelanchier arborea	downy serviceberry	314
Amelanchier laevis	Allegheny serviceberry	314
Carpinus caroliniana	American hornbeam	491
Cercis canadensis	eastern redbud	962
Chionanthus virginicus	white fringetree	314
Cornus alternifolia	pagoda dogwood	491
Cornus kousa	kousa dogwood	491
Cornus mas	corneliancherry	177
Corylus avellana	European filbert	79
Cotinus coggygria	common smoketree	113
Cotinus obovata	American smoketree	113
Crataegus phaenopyrum	Washington hawthorn	314
Crataegus viridis	green hawthorn	314
Franklinia alatamaha	Franklinia	79
Halesia tetraptera	Carolina silverbell	707
Laburnum × watereri	goldenchain tree	177
Maackia amurensis	Amur maackia	491
Magnolia × soulangiana	saucer magnolia	314
Magnolia stellata	star magnolia	79
Magnolia tripetala	umbrella magnolia	314
Magnolia virginiana	sweetbay magnolia	314
Oxydendrum arboreum	sourwood	314
Prunus subhirtella	Higan cherry	491
Prunus virginiana	common chokecherry	177
Staphylea trifolia	American bladdernut	177
Stewartia ovata	mountain stewartia	79
Styrax japonicus	Japanese snowbell	491
Syringa reticulata	Japanese tree lilac	177

Coniferous and Evergreen Trees
(Not recommended for Street Right of Way)

Large Trees: Greater than 45 Feet in Height at Maturity

Scientific Name	Common Name	Canopy Coverage Averages (Square feet)
Abies balsamea	balsam fir	314
Abies concolor	white fir	314
Chamaecyparis	Nootka falsecypress	491
Cryptomeria japonica	Japanese cryptomeria	491
× *Cupressocyparis leylandii*	Leyland cypress	79
Ilex opaca	American holly	177
Picea omorika	Serbian spruce	177
Picea orientalis	Oriental spruce	50
Pinus densiflora	Japanese red pine	79
Pinus strobus	eastern white pine	707
Pinus sylvestris	Scotch pine	962
Pinus taeda	loblolly pine	707
Pinus virginiana	Virginia pine	177
Psedotsuga menziesii	Douglas-fir	177
Thuja plicata	western arborvitae	314
Tsuga canadensis	eastern hemlock	707

Medium Trees: 31 to 45 Feet in Height at Maturity

Scientific Name	Common Name	Canopy Coverage Averages (Square feet)
Chamaecyparis thyoides	Atlantic whitecedar	177
Juniperus virginiana	eastern redcedar	314
Pinus bungeana	lacebark pine	491
Pinus flexilis	limber pine	491
Pinus parviflora	Japanese white pine	962
Thuja occidentalis	eastern arborvitae	177

Small Trees: 15 to 30 Feet in Height at Maturity

Scientific Name	Common Name	Canopy Coverage Averages (Square feet)
Ilex × *attenuata*	Foster's holly	79
Pinus aristata	bristlecone pine	491
Pinus mugo mugo	mugo pine	491

Section 4 Prohibited

Species

Trees within the public right of way are an asset to the City of Kirkwood and must be maintained as healthy non-hazardous trees. To promote the overall health and well-being of the urban forest, the species listed in this section are prohibited to be planted within the City maintained rights of ways and may be removed at any time by the discretion of the City.

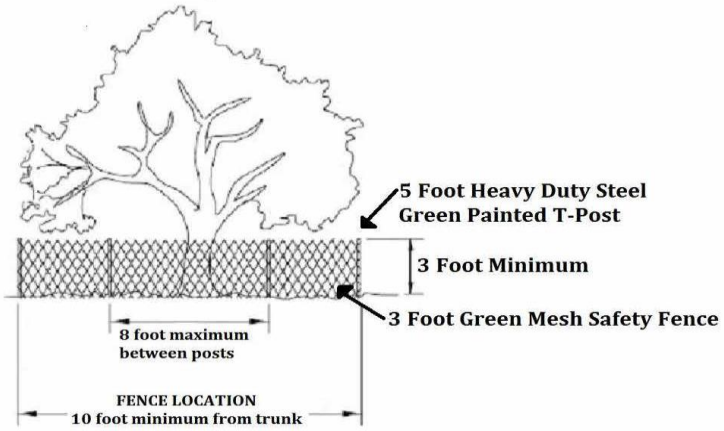
1. Tree of Heaven (*Ailanthus altissima*)
2. Callery Pear (*Pyrus calleryana*) and all varieties including Bradford pear
3. Ash species (Fraxinus) to include all native species to North America
4. Sweetgum (Liquidambar styraciflua)
5. Silver maple (Acer saccharinum)
6. Crabapple species (Malus)
7. Siberian elm (Ulmus pumila)
8. Any and all species listed as a Missouri Noxious Weed by the Missouri Department of Agriculture or a species listed as *invasive* by the Missouri Department of Conservation.

Appendix A: Tree Protection Fencing

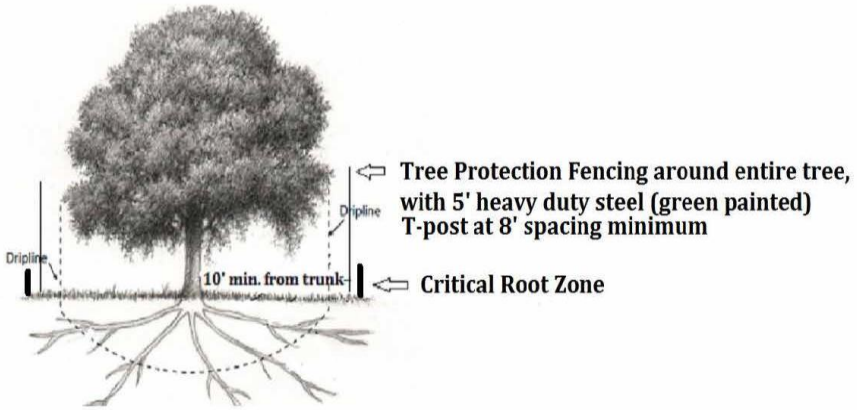
TREE PROTECTION FENCING

Revised August 2018

NOTE: 8.5" x 11" Warning signs are required on fenceing a minimum of 20' intervals, with a minimum of one sign on each elevation of fence. Sign shall be moisture protected as in Exhibit A-S.



Distance from trunk shall be as shown in tree study or 10' minimum.



Appendix B: Warning Tree Protection Zone Sign

EXHIBIT A-S

Revised October 2013 tp Y: Demo Permit Information-2013