

Chapter 5 - TREE PROTECTION AND PRESERVATION ^[15]

⁽¹⁵⁾ **Editor's note**— Ord. No. 2002-08, §§ 1, 2, adopted April 8, 2002, amended former Ch. 5, Arbor, §§ 5-1—5-5, in its entirety to read as herein set out. Former Ch. 5 derived from Ord. No. 711, § I, 3-22-99; Ord. No. 726, §§ 1—4, 6-28-99; Ord. No. 734, § 1, 9-27-99.

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Sec. 5-1. - Applicability.

This chapter shall be applicable to all land lying in the incorporated area of the City of Winter Springs, Florida.

(Ord. No. 2002-08, § 2, 4-8-02; Ord. No. 2003-22, § 2, 10-13-03)

Sec. 5-2. - Intent and purpose.

(a) *Purpose.* The purpose of this chapter is to establish protective regulations for trees within the city in order to maintain and protect the city forest, to better control problems of flooding, soil conservation, air pollution and noise, and to make the city a healthier, more attractive and safer place in which to live.

(b) *Intent.* The intent of this chapter is to encourage the protection of the maximum number of trees within the primary tree protection zone and of large specimen trees within the secondary tree protection zone. It is further the intent of this chapter to encourage the protection of trees native to Central Florida and to encourage proper removal of exotic, pest trees.

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To this end, it shall be unlawful to cut down, damage, poison, or in any other manner destroy or cause to be destroyed any tree or other vegetation as covered by the provisions of this chapter except in accordance with the provisions set forth herein. Notwithstanding, in case of emergencies involving natural disaster such as, but not limited to, flood, freeze or other natural disasters, the requirements of this chapter may be temporarily waived by the city commission by resolution.

(Ord. No. 2002-08, § 2, 4-8-02; Ord. No. 2003-22, § 2, 10-13-03; Ord. No. 2011-16, § 2, 2-27-12)

Sec. 5-3. - Definitions.

As used in this chapter, the following terms shall have the meanings indicated unless the context clearly indicates otherwise:

- (a) *Caliper*. Measurement of tree twelve (12) inches from soil level.
- (b) *City*. The City of Winter Springs, Florida.
- (c) *City forest*. The aggregate of all street trees and all park trees.
- (d) *Crown*. The mass of branches, twigs and leaves at the top of a tree, with particular reference to its shape.
- (e) *DBH*. Diameter at breast height measured four and one-half (4½) feet from ground level at the base of tree. If a tree has co-dominant stems at or below four and one-half (4½) feet from ground level, it shall be measured as two (2) separate trees.
- (f) *Desirable trees*. Trees particularly adaptive to Central Florida identified as "desirable trees" in Appendix B of this chapter, as may be amended by the city manager or city commission.
- (g) *Dripline*. The vertical line running through the outermost portion of the tree crown extending to the ground.
- (h) *Encroachment*. The protrusion into a vehicular accessway, pedestrian-way, or required landscape area.
- (i) *Heavy machinery*. Mechanical land clearing, earth-moving, or earth-working equipment with a gross weight in excess of five thousand (5,000) pounds. For purposes of this chapter, all machinery which utilizes steel tracks for traction shall be considered to be heavy machinery, regardless of weight.
- (j) *Historic tree*. A tree which has been found by the city commission to be of notable historic interest to the city based on its age, species, size, historic association or unique characteristics.
- (k) *Land clearing (grubbing)*. The disturbance or removal of vegetation using backhoes, bulldozers, root rakes, or similar mechanical means which may kill trees or damage their roots, branches, or trunks. Routine lawn mowing, sod replacement, planting of landscape material, shrub pruning, and shrub removal shall not be considered land clearing and grubbing provided no grade change occurs.
- (l) *Person*. Any individual, firm, corporation, partnership, joint venture association, principal, trustee, municipal corporation, political subdivision, or special district, or any agent or representative thereof.
- (m) *Preferred Plant/Tree*. Preferred plants shall mean the plant materials listed in Appendix B: Desirable Trees and shall be of the size specified in the column labeled "Preferred Plant Size/Minimum

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Height," which may be amended from time to time by the city manager in writing.

(n) *Primary tree protection zone.* This shall mean the front, side and rear yard areas as established and required by the Land Development Code of the city as the same may, from time to time, be amended.

(o) *Protected area.* An area surrounding a protected, historic, or specimen tree within which physical intrusion is prohibited in order to prevent damage to the tree, roots and soil around the tree base, the dimensions of which shall be established by the city and set forth in the tree removal permit, in according with section 5-14

(p) *Protective barrier.* Shall be a polygon of 2" x 4" wide stakes spaced a maximum of eight (8) feet from each other at the perimeter of the tree protection zone and which extend out of the ground at least thirty-six (36) inches, with the top four (4) inches marked by fluorescent orange paint or tape.

(q) *Replacement trees.* Replacement trees shall at a minimum comply with the provisions of subsection 5-9

(r) *Secondary tree protection zone.* This shall mean all areas not included in the primary tree protection zone. Subdivision street rights-of-way and easements are also defined as being within the secondary tree protection zone.

(s) *Silviculture.* A process, following acceptable forest management principles, whereby the crops constituting forests are tended, harvested and reproduced.

(t) *Specimen tree.* A tree, other than an undesirable tree, structurally unsound tree that cannot be recovered by pruning, dead tree, or diseased tree, that has a DBH of twenty-four (24) inches or more. Specimen trees shall not include laurel oak (*Quercus laurifolia*), sand pine (*Pinus clausa*), cherry laurel (*Prunus caroliniana*) or any tree found on the Florida Exotic Pest Plant Council's Invasive Plant Species List.

(u) *Stem.* The main trunk of a plant; its primary axis that develops buds and shoots instead of roots.

(v) *Structure.* Anything constructed, erected or placed, the use of which requires more or less permanent location on or in the ground or attached to something having a permanent location on or in the ground. This definition shall not include sidewalks, walkways, driveways or similar type improvements.

(w) *Transplant.* The act of relocating an existing tree upon the same lot.

(x) *Tree.* Self-supporting woody, perennial plants which have a trunk with a DBH of at least four (4) inches and normally grow to an overall crown height of a minimum of fifteen (15) feet. Cabbage palm greater than fifteen (15) feet tall.

(y) *Tree protection zone.* Shall mean that area located around the perimeter of the tree in which no activity such as clearing, filling, excavating, storage of materials, parking of vehicles, or any other activity that in the opinion of the city arborist may damage the tree may occur. This zone is calculated according to Appendix C to this chapter.

(z) *Tree removal.* Shall mean any act which will cause a tree situated on real property to die within a period of two (2) years from the time of the act including, but not limited to, by cutting, girdling, relocating, interfering with the water supply, applying chemicals, regrading around the base of the tree

trunk.

(aa) *Tree replacement assessment.* Tree replacement assessment shall mean the total amount of monetary compensation owed to the City of Winter Springs may be required by this chapter for the replacement of trees cut, destroyed, or removed as a result of development or redevelopment.

(bb) *Tree replacement credit.* The tree replacement credit shall be established by the city commission and set forth in Appendix B: Desirable Trees.

(cc) *Tree trunk.* The main stem of a tree apart from limbs and roots.

(dd) *Undesirable trees.* All types of trees identified as "undesirable trees" in Appendix A of this chapter as amended from time to time by the city manager in writing.

(Ord. No. 2002-08, § 2, 4-8-02; 2003-22, § 2, 10-13-03; Ord. No. 2011-16, § 2, 2-27-12)

Sec. 5-4. - Permit required for tree removal and land clearing; separate violations; criteria; contractor permit required.

(a) *Permit required.* No person shall engage in tree removal or engage in land clearing located within the city, without first obtaining a permit as provided in this chapter. If a property owner has retained a contractor to perform the land clearing or tree removal, the contractor shall be responsible for obtaining the permit required by this chapter prior to the land clearing or tree removal. It shall be a separate violation of this chapter for each tree removed and each day a person is engaged in land clearing without a permit.

(b) *Criteria.* Upon receipt of a completed application and verification on-site by the city arborist, a permit may be issued for tree removal under any one of the following conditions:

- (1) Trees located on building and construction sites as shown on city approved plans, provided said trees are replaced elsewhere on the property in accordance with section 5-9 of this chapter.
- (2) Trees with a trunk(s) located within ten (10) feet of a structure and that pose a clear hazard or that have caused damage to said structure as determined by the city arborist.
- (3) Trees severely diseased, severely injured or dead.
- (4) Trees that interfere with the construction or repair of public infrastructure and facilities.
- (5) Undesirable trees, per Appendix A.
- (6) Trees removed by the city or other governmental agency and which are located within a public road, drainage rights-of-way, or permanent utilities and drainage easements.
- (7) Trees that have been approved by the city arborist and which shall be replaced elsewhere on the property.
- (8) Trees that prohibit or have the effect of prohibiting the installation or operation of a solar collector, clothesline, or other energy device based on a renewable resource.
- (9) All trees and plants, within a licensed tree nursery, planted for harvest shall be exempt from the terms and provisions of this chapter only if trees are planted and growing on the premises of the licensee and are for sale or intended for sale in its ordinary course of business.

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(c) *Review standards.* When making a determination on whether a tree meets one of the conditions set forth in section 5-4(b) and therefore, whether to approve or deny an application under this chapter, the city shall apply one (1) or more of the following standards of review deemed relevant:

- (1) Necessity to remove trees which pose a clear and obvious safety hazard to pedestrian or vehicular traffic or threaten to cause disruption to public services or a significant obstacle to accessing and utilizing public easements and rights-of-way.
- (2) Necessity to remove trees which pose a clear and obvious safety hazard to buildings and other improvements on a lot or parcel of land. Ordinary small cracks or uplifts in pavement, sidewalks, and non-occupied structures that are typically caused by settling and small roots shall not be considered a safety hazard.
- (3) Necessity to remove diseased trees or trees weakened by age, storm, fire or other injury or trees with severe structural defects that pose a clear and obvious safety hazard to people, buildings or other improvements on lot or parcel of land.
- (4) Necessity to remove trees which prohibit or have the effect of prohibiting the installation or operation of a solar collector, clothesline, or other energy device based on a renewable resource. The applicant shall submit operating instructions or other manufacturer guidance setting forth the amount of sunlight exposure required for proper operation of the energy device or other such evidence of the necessity to remove trees.
- (5) The extent to which tree removal is likely to result in damage to the property of other owners, public or private, including damage to lakes, ponds, streams, or rivers through runoff or erosion.
- (6) Any proposed landscaping including plans whereby the applicant has planted or will plant trees to replace those that are proposed to be cleared.
- (7) Topography of the land and the effect of tree removal on erosion, soil retention and the diversion or increased flow of surface water.
- (8) Good forestry practices, such as the number of healthy trees that a given parcel of land will reasonably support and the proven techniques that sustain healthy trees.
- (9) Necessity to remove trees in order to construct, approved and permitted improvements to allow economic enjoyment of the property, including:
 - a. Need for access around the proposed structure for construction equipment (maximum of ten (10) feet).
 - b. Need for access to the building site for construction equipment.
 - c. Essential grade changes.
 - d. Need for locating street or road rights-of-way, utilities, drainage ways, as well as the need to provide reasonable use and property access.
- (10) The extent of any damage or demonstrated hardship which would result to the applicant from a denial of the requested permit.
- (11) The species and size of the trees proposed for removal.

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(12) The following factors shall also be considered:

- a. Trees forming the current canopy.
- b. Preservation of the next generation of trees.

(d) *Silviculture exemption.* All trees planted specifically for silvicultural purposes shall be exempt from the provisions of this chapter provided the property owner can provide documentation to the city evidencing that:

- (1) The property is registered as a silvicultural site with the division of forestry; and
- (2) Trees of typical harvestable size and type exist on the property which are capable of being harvested for income and that the property owner has, or intends to, generate income from the harvested trees.

(e) *Contractor license required; contractor obtaining permits.* Any person or entity engaged in the business of tree removal or pruning shall be licensed by the city on an annual basis. Licenses may be obtained from the city by completing an application prepared by the city and paying the required license fee. The license application shall contain at a minimum the name, address, and telephone number of the contractor and a copy of the contractor's local business tax receipt and proof of liability and workers' compensation insurance. It shall be unlawful for any person or entity to engage in the business of tree removal or pruning within the City of Winter Springs without a license required under this subsection. It shall also be unlawful for any such person or entity to fail to obtain a permit on behalf of a property owner pursuant to section 5-4(a) of this chapter.

(Ord. No. 2002-08, § 2, 4-8-02; 2003-22, § 2, 10-13-03; Ord. No. 2006-23, § 4, 12-11-06; Ord. No. 2010-04, § 2, 3-8-10; Ord. No. 2011-16, § 2, 2-27-12)

Sec. 5-5. - City arbor division.

(a) *Establishment of office.* There is hereby created within the department of community development, the arbor division. The community development director shall head this office and the city manager shall appoint one (1) or more employees of the department to act in the capacity of arborist for the city.

(b) *Scope of authority.* The city arborist shall be charged with the responsibility and authority to review and oversee all activities within the city limits which involve tree removal, land clearing, or danger to and by any tree. Notwithstanding, the city arborist shall have absolutely no authority to vary any plans, permits, or agreements approved by the city commission.

(c) *Responsibilities.* The role of the city arborist shall include, but not necessarily be limited to:

- (1) Receiving and processing applications for tree removal, land clearing and other permits under this chapter.
- (2) Inspection of all property subject to an application.
- (3) Confirming all information provided by the applicant is correct and accurate.
- (4) To approve or deny all permit applications under this chapter.
- (5) To issue cease and desist work orders upon persons in violations of this chapter for a

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maximum of two working days. Upon review of the violation by the city manager, the city manager may extend the cease and desist work order until the violation is brought into compliance and all resulting fines incurred as a result of the violation have been paid. The city manager's decision may be appealed to the city commission pursuant to section 5-16(b) of this chapter.

- (6) To bring violators of this chapter before the code enforcement board.
- (7) To issue code enforcement citations for any violation of this chapter.
- (8) To augment the city's forest by the planting or approval of planting of additional trees on public property.
- (9) To keep a permanent record of all historic or specimen trees designated by the city commission.
- (10) To educate the public regarding this chapter and the importance of maintaining a city forest.
- (11) To handle other related job duties assigned by the city manager.
- (12) To serve as a member of the staff development review committee.
- (13) To educate city personnel responsible for tree removal, planting, pruning and landscape maintenance.
- (14) To assist in implementing, and issue permits in furtherance of, any development agreement, plan, or permit approved by the city commission relating to landscaping and trees.

(Ord. No. 2002-08, § 2, 4-8-02; 2003-22, § 2, 10-13-03; Ord. No. 2011-16, § 2, 2-27-12)

Sec. 5-6. - Permit application.

(a) *Filing application and payment of fees.* An application for tree removal and land clearing shall be filed on official forms provided by the city's arborist. The applicant shall be required to pay a fee as may be established by resolution of the city commission, except that no fee shall be required for the removal of trees that (i) are dead, diseased, or suffer from severe structural defects, (ii) pose a clear and obvious safety hazard to structures and people, (iii) are removed for a public project sponsored and paid for by the city, or (iv) any tree found on the Florida Exotic Pest Plant Council's Invasive Plant Species List. If the applicant is not the property owner, then the applicant shall attach the written permission of the property owner to the application. All completed applications shall be returned to the arborist, along with the following:

- (1) A tree inventory, for the portion of the site to be developed, consisting of a scaled drawing of a scale of one (1) inch equals fifty (50) feet or less for undeveloped land or for developed single family residential land, a sketch approximately one (1) inch equals fifty (50) feet or less indicating:
 - a. Property boundaries.
 - b. The location of all individual trees including the tree's common or scientific name, and DBH of trees.
 - c. An indication of all trees proposed for removal.
 - d. Within the primary tree protection zone, a plan shall designate the trees to be retained

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and those proposed to be removed, relocated or replaced. Those trees proposed for removal, relocation or replacement shall also be identified by common or botanical name.

e. Within the secondary tree protection zone, a plan shall designate the trees to be retained, and those proposed to be removed.

f. The location of existing and proposed improvements, if any, including proposed additions to existing buildings, existing and proposed buildings, structures, impervious surfaces (e.g. pool decks, drives, parking areas), stormwater retention areas, utilities, and other such improvements.

g. A replacement plan indicating the means of compensating for the tree(s) to be removed including the species and size of any replacement tree(s).

h. Location of trees preserved for replacement credit.

i. If grade changes are proposed on the site, a grading plan drawn to scale shall be provided. In addition, a written statement shall be provided by a landscape architect or other competent professional indicating the probability of whether the grade change will result in the death of tree(s) intended to be preserved. Said statement shall immediately be brought to the attention of the city arborist at the time the application is filed and prominently attached to the front of the application.

j. A protection plan describing how preserved tree(s) shall be preserved on the site and adjacent properties during construction, tree removal, and grading.

k. An aerial photograph showing the boundaries of the subject property and adjacent properties.

(2) Valid reasons for the removal of trees.

(3) The appropriate permit fees.

(b) *Time for application.* Applications for a tree removal or land clearing permit shall be made prior to removal or clearing; except that in the following cases, application shall be filed when indicated:

(1) All new subdivisions shall be required to submit an application for a tree removal or land clearing permit, at the time of initial submittal of the subdivision plan, to the city so that due consideration may be given to protection of trees during the subdivision design process. Each application for a tree removal permit shall be subject to review under the staff development review committee process.

(2) Any commercial, industrial, multi-family or other use requiring site plan approval under the city land development regulations shall be required to submit an application for a tree removal and land clearing permit at the time of site plan submittal so that due consideration may be given to the protection of trees during the site plan design process. Each application for a tree removal permit shall be subject to review under the staff development review committee process.

(3) All new single-family and duplex dwelling units shall be required to submit an application for a tree removal and land clearing permit at the time of application for a building permit; the tree inventory may be shown on the building permit plot plan.

(c) *Exempting portion of the tree survey.* Upon request, the city arborist may permit an applicant to omit certain portions of the tree inventory where compliance with the requirements set forth herein would be unnecessarily burdensome and the exempted portions are not needed for the city to evaluate the application.

(d) *Permit fee.* A nonreturnable permit fee to be established by resolution of the city commission shall be paid for purposes of processing the application, enforcing the provisions of this chapter, and inspecting the real property subject to the application.

(e) *Posting of permit.* The permit must be posted upon the property and visible from the street to be valid.

(f) *City commission approved plans, permits, and agreements.* All permits issued by the city arborist under this chapter shall be required to be consistent, and not in conflict, with any plans, permits, or development agreements approved by the city commission. All permits or portions thereof issued by the city arborist in conflict with any approval of the city commission shall be deemed null and void and the approval of the city commission shall remain in full force and effect.

(Ord. No. 2002-08, § 2, 4-8-02; 2003-22, § 2, 10-13-03; Ord. No. 2011-16, § 2, 2-27-12)

Sec. 5-7. - Tree pruning standards.

(a) *Standards adopted.* Trees intended for shade purposes shall be allowed to reach mature canopy spread and shall be pruned in accordance with the ANSI A 300 Part I Pruning standard and ANSI Z133.1 safety standard. Pruning should be performed with defined pruning objectives and according to a specific pruning plan to accomplish the objective including the minimum and/or maximum branch size to be removed.

(b) *Unlawful pruning.* The pruning techniques described in section 5-10(i) of this chapter shall be deemed unlawful.

(2003-22, § 2, 10-13-03)

Sec. 5-8. - Specimen or historic trees.

(a) *Designation.* Certain trees, herein referred to as "specimen" or "historic" trees, are of especially great concern to the public because of ecological value, of indigenous character, size, age or historic association. Determination that a tree is a historic tree shall be made by resolution of the city commission after a recommendation of the beautification board of Winter Springs, and the city arborist shall keep a permanent record of all trees so designated by the city commission. Specimen trees are all trees (other than "undesirable trees" identified in Appendix A, dead trees or diseased trees) which have a DBH of twenty-four (24) inches or more. Designation as an historic tree may occur in any one (1) of the following ways:

(1) An applicant may request designation of an historic tree as part of any master plan, preliminary subdivision plat, or site plan application. To do so, the applicant shall submit an expert evaluation by a landscape architect, horticulturalist, city arborist, or other horticultural expert as part of the application.

(2) A property owner may request such designation at any time. To do so, the property owner shall submit an expert evaluation by a landscape architect, horticulturalist, city arborist or other horticultural expert.

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(3) The city's arborist may recommend such designation as part of their review of any application for development, stating in writing their reasons for such designation, or may make such designation as part of an overall tree protection planning program for the city or portion thereof.

(4) Historic tree designations shall be subject to approval by resolution of the city commission and the city commission may grant tree replacement credits, upon granting an historic tree designation.

(b) *Removal.* Notwithstanding any other provision of this chapter, specimen or historic trees shall not be removed except for extraordinary circumstances and hardships and only by final permit approved by the city commission.

(Ord. No. 2002-08, § 2, 4-8-02; 2003-22, § 2, 10-13-03; Ord. No. 2011-16, § 2, 2-27-12)

Sec. 5-9. - Tree replacement guidelines.

(a) *Tree replacement.* All trees that are removed or destroyed and subject to replacement by this chapter shall be replaced by a species of tree cited in Appendix B, desirable trees or such other trees properly approved by the city arborist. Replacement shall occur prior to the issuance of a certificate of occupancy (if approval is pending) or within sixty (60) days of removal or destruction, whichever date is earlier, unless a greater replacement period is provided for good cause by permit.

(b) Criteria for replacement trees is as follows:

(1) *Characteristics of replacement trees.* The replacement tree(s) shall have at least equal shade potential, screening properties, and/or other characteristics comparable to that of the tree(s) requested to be removed.

(2) *Size of replacement trees.* Replacement tree(s) are to be made according to the tree replacement standards set forth in Table 1 [at the end of this section]; or (2) otherwise agreed upon by the city commission and applicant.

(3) *Tree species.* Relocated or replacement trees shall include only species and sizes defined as desirable trees (Appendix B) under this chapter.

(4) *Transplanting and maintenance requirements.* All trees transplanted pursuant to this chapter shall be maintained in a healthy, living condition. Any such trees which die shall be replaced and maintained by the property owner. The city shall retain jurisdiction for one (1) year to ensure compliance with this chapter.

(5) *Waivers of replacement tree(s) specifications.*

a. *General waivers.* The number of required replacement trees may be waived by the city commission, if the city commission determines that the remaining number of trees to be preserved on site are of sufficient number and quality to substantially comply with the purpose and intent of this chapter and a tree replacement fee is paid to the city's "tree bank," which is hereby established. Monies collected in the tree bank shall be used for enhancement and maintenance of trees on public lands. The contribution to the tree bank may be waived by the city commission for individual homeowners, on a case-by-case basis, if the homeowner can demonstrate that the payment of the fee will cause the homeowner an undue economic hardship. Substitute tree(s) allowed under this waiver provision must have the approval of the city commission. The amount to be paid into the tree bank shall be set

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forth in Table 1 and should be based upon wholesale market value of the trees being replaced, plus installation and maintenance costs to establish the tree.

b. *Renewable resource waivers.* The tree replacement and tree bank requirements of this section shall not apply if a permit based on sections 5-4(b)(8) and 5-4(c)(4) is issued. If the permittee does not maintain and operate the permitted energy device for at least three (3) years, the permittee must replace the removed trees or pay a tree replacement fee to the city's tree bank as required by this section.

(6) *Replacement guidelines.* The following tree replacement guidelines shall apply:

a. All plant material specified shall be Florida Grades and Standard One (1) or better.

b. For each tree located within a public conservation area (excluding jurisdictional wetlands determined by the St. John's River Water Management District or the U.S. Army Corp of Engineers, or as depicted on Map V-3: Existing Wetlands in the City of Winter Springs Comprehensive Plan) dedicated to the city as part of a development project, three (3) replacement tree credits may be applied to the total number of trees required to be replaced by this chapter. However, the minimum tree requirement set forth in section 5-13 shall still apply. Such public conservation area must be at least one (1) acre with widths not less than one hundred twenty-five (125) feet, unless otherwise approved by the city commission. In addition, trees approved by the city arborist to reforest such conservation area shall also be applied to the replacement requirement on a one-for-one basis.

c. If the city commission determines, due to site conditions or configuration, it is impossible or impracticable for the applicant/developer to meet the requirements for tree replacement, under this subsection, the city commission may allow the applicant/developer to pay into the city's "tree bank" the amount it would have spent on replacement trees.

d. Tree replacement credit shall be allowed for the installation of preferred plants in accordance with the provisions set forth in Appendix B: Desirable Trees. In addition, for new development, tree replacement credit shall be allowed for the preservation of existing Desirable Trees on the development site, excluding wetland areas and existing conservation areas, as follows:

DBH of Preserved Tree	Reduction in Replacement Trees
4? up to but not including 9?	1 credit
9? up to but not including 12?	2 credits
12? up to but not including 16?	3 credits
16? up to but not including 24?	4 credits
Specimen and Historic Trees	0 credits

e. Trees planted under a powerline shall not exceed a mature height of twenty-five (25) feet.

f. Diversity of species shall be required for replacement trees and not more than twenty

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(20) percent of the replacement trees shall be of a single species.

g. All landscape plans shall be prepared by a landscape architect licensed by the State of Florida, unless the city determines the proposed landscaping or tree removal has a de minimus impact on the property.

(c) *Replacement cost.* The property owner shall be responsible for the cost of replacing the trees removed from their property.

(d) *Elimination of undesirable trees and shrubs.* The natural vegetative communities existing within the city shall be protected by the control and elimination of invasive, nonnative species. To that end, the following guidelines shall apply:

- (1) Planting of trees and shrubs listed in Appendix A, Undesirable Trees, is prohibited.
- (2) Removal of trees and shrubs listed on Appendix A, Undesirable Trees, from commercial, office, industrial, or multifamily sites (excluding jurisdictional wetlands) shall be completed, whenever practicable, as a requirement for approval of any development permit issued by the city or the issuance of a certificate of occupancy if applicable.
- (3) Control and elimination procedures shall in no way promote the proliferation of the species through the dispersal of seed or other vegetatively reproducing parts.
- (4) Control and elimination procedures shall in no way harm or cause the decline of preserved or planted trees and landscaping.

(e) *Limited exception for existing single-family lots.* Notwithstanding any other tree replacement standard set forth in this section, a tree removal permit for a single tree shall be granted, as a matter of right, for each existing single family home lot, provided the city arborist determines that:

- (1) The tree is not a specimen or historic tree;
- (2) The tree canopy covering the pervious portion of the lot after removal of the tree will be greater than fifty (50) percent; and
- (3) A permit under this subsection (e) had not been granted during the preceding ten-year period.

(Ord. No. 2002-08, § 2, 4-8-02; 2003-22, § 2, 10-13-03; Ord. No. 2010-04, § 2, 3-8-10; Ord. No. 2011-16, § 2, 2-27-12) <?xpp rotatepg?>

TABLE 1. TREE REPLACEMENT STANDARDS

DBH of Protected Tree	Number of Replacement Canopy Trees Required for Each Tree Removed		Number of Replacement Small Trees or Palms Required for Each Tree Removed		Preferred Plant		Contribution to Tree Bank*
4" up to but not including 9"	1	o r	1	o r	Preferred Plant(s) w/Credits	o r	\$250.00

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9? up to but not including 12?	2	o r	2	Preferred Plant(s) w/Credits	\$500.00
12? up to but not including 16?	3		Not allowed	Preferred Plant(s) w/Credits	\$750.00
16? up to but not including 24?	4		Not allowed	Preferred Plant(s) w/Credits	\$1,000.00
>24?	To Be Preserved		To Be Preserved	To Be Preserved	To Be Preserved

*These amounts may be adjusted biannually to compensate for increases to costs of plants as well as to costs of installation and establishment.

<?xpp restore?>

Sec. 5-10. - Prohibitions.

- (a) *Placement of materials, machinery, or temporary soil deposits.* It shall be unlawful to place material, machinery, or temporary soil deposits within the tree protection zone, as calculated according to Appendix C: Calculating Tree Protection Zone, before or during construction. Before or during construction the builder shall erect and maintain suitable protective barriers around all trees to be preserved. Upon written request, the city arborist, on a case by case basis, may allow material or temporary soil deposits to be stored within the protective barrier if no other storage is available.
- (b) *Climbing spurs.* It shall be unlawful to use climbing spurs or other similar device to aid in the climbing of a live tree, where such device causes the puncture or tears the bark of the tree.
- (c) *Tree spiking.* It shall be unlawful to introduce any type of poison or reactive material to a tree for the purpose of causing it to die or become diseased.
- (d) *Structure and pavement location.* It shall be unlawful to place any structure or impervious paving within eight-foot radius of any tree trunk or stem having a DBH of four (4) inches or more at caliper.
- (e) *City trees.* It shall be unlawful to trim, prune, or remove any tree which is within the city's rights-of-way or upon any other city property without the permission of the city evidenced by the appropriate permit.
- (f) *Attachments.* It shall be unlawful to attach anything to a tree or stem, including nails or spikes, having a DBH of four (4) inches or more, other than protective wires, braces or other similar noninjurious materials.
- (g) *Cut and fill guidelines.* It shall be unlawful to remove or add any material or ground within the tree protection zone unless otherwise permitted by the arborist.
- (h) *Encroachment of the dripline.* During the construction stage of development, the developer or property owner shall not cause or allow land clearing, the use of heavy equipment or material within the dripline of any tree or groups of trees to be retained. Neither shall the developer cause or allow the disposal of waste material such as paint, oil, solvents, asphalt, concrete, mortar or any other material harmful to the life of a tree within the dripline of any tree or groups of trees, or where planting beds are to be situated.
- (i) *Shearing, hat racking, topping or poodle trimming of trees (lollipop), lions-tailing, pollarding of*

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Trees. Trees intended for shade purposes shall be allowed to reach their mature canopy spread. It shall be unlawful to engage in excessive pruning techniques on trees intended for shade purposes. Excessive shearing, pruning or shaping shall only be allowed with a permit by demonstrating necessity or without a permit in times of emergency only. The following are deemed unlawful excessive pruning techniques which are prohibited on shade trees:

(1) *Lions tailing:* The improper practice of removing most secondary and tertiary branches from the interior portion of the canopy leaving most live foliage at the edge of the canopy.

(2) *Topping, hatracking, stag heading, de-horning, lopping, and rounding over:* the improper practice of reducing tree size by making heading cuts through a stem more than two (2) years old; a pruning practice that destroys tree architecture and serves to initiate discoloration and perhaps decay in the cut stem.

(3) *Pollarding:* The pruning technique that removes sprouts back to the same location annually or biannually maintaining a tree to a specific height.

(4) *Shearing:* A pruning technique which is typically accomplished with cuts made through wood less than a year old at the sides of the canopy to create uniform dense canopies.

(5) *Poodle trimming:* Combines shearing and removing lower limbs to create tree forms that look like a "lollipop."

(j) *Construction near adjacent property.* Walls, structures, and pavement shall not be constructed in any way which will result in damage to roots within the tree protection zones of trees located on adjacent properties.

(Ord. No. 2002-08, § 2, 4-8-02; 2003-22, § 2, 10-13-03; Ord. No. 2011-16, § 2, 2-27-12)

Sec. 5-11. - Reserved.

Sec. 5-12. - Permit contents; expiration; removal after expiration of permit.

(a) *Permit contents.* The tree removal permit, when issued, shall specifically identify which trees shall be permitted to be removed. The removal permits merely authorize the removal of the trees specified therein. Nothing in this chapter shall be construed to require the removal of such trees by the permittee.

(b) *Permit expiration.* Any permit issued under this chapter shall automatically expire six (6) months after issuance, except for permits issued in conjunction with a building permit which shall automatically expire six (6) months after issuance or at such time the building permit expires, whichever is later.

(c) *Restrictions on tree removal after permit expiration.* Trees not removed during the life of the permit may not be removed without the issuance of a new permit based upon a new application.

(d) *Permit display.* The permit shall be located and maintained upon the site at all time until final inspection or until issuance of a certificate of occupancy if applicable. For new developments, the permit shall be attached to the "posting board" with other permits. For existing developments and existing single-family residences, the permit shall be displayed so as to be easily visible from the street.

(Ord. No. 2002-08, § 2, 4-8-02; 2003-22, § 2, 10-13-03)

Sec. 5-13. - Minimum tree requirement.

No certificate of occupancy shall be issued on the types of construction indicated below unless the underlying parcel has at least the required minimum number of approved trees:

- (a) Any new single-family or duplex dwelling unit on a lot of less than six thousand (6,000) square feet or greater: not fewer than two (2) trees.
- (b) Any new single-family or duplex dwelling unit on a lot equal to six thousand (6,000) square feet: not fewer than two (2) trees plus one (1) additional tree for each four thousand (4,000) square feet over six thousand (6,000) square feet.
- (c) Any commercial, industrial, multi-family or other structure requiring site plan approval under the city land development regulations: no fewer than six (6) trees or four (4) trees per acre, whichever is greater.

(Ord. No. 2002-08, § 2, 4-8-02; 2003-22, § 2, 10-13-03)

Sec. 5-14. - Tree protection during development and construction; periodic inspection.

(a) *Restrictions during construction.* It shall be unlawful for any person, during the construction of any structures or other improvements, to place solvents, petroleum products, paint or masonry materials, construction machinery or temporary soil deposits within the dripline of any tree for which a tree removal permit is required but has not been obtained. This provision includes soil that is placed in the dripline permanently for the purpose of a grade change, unless the grade is changed according to the guidelines described in the *Florida Division of Forestry, Department of Agriculture and Consumer Services Publication, Tree Protection Manual for Buildings and Developers.*

(b) *Burden of tree protection on property owner.* It shall be the responsibility of a property owner and their agents to ensure that any tree shown on the tree inventory for which a tree removal permit has not been obtained is to be protected. The property owner shall guarantee survival of retained trees and replacement trees for one (1) year from completion of permitted construction, unless a greater time period is required by development agreement. If a retained or replacement tree dies during that time period, the property owner shall replace the tree in accordance with a remedial action approved under section 5-17 of this chapter.

(c) *Protective barriers and signage required.* Protective barriers shall be installed prior to construction (as determined using Appendix C: Calculating Tree Protection Zone) around every tree or group of trees to be preserved. Waterproof, rigid "Protection Zone Area" signs, as shown on Appendix D: Tree Protection Area Signage and not smaller than two (2) feet by three (3) feet shall be posted at 100-foot increments along the protective barriers.

(d) *Site inspections.* The city arborist may conduct periodic inspections of the site. It is the responsibility of the property owner and their agents to ensure that all provisions of this chapter are met.

(e) *Adjacent properties.* The property owner and their agents shall ensure that the tree protection zones of trees located on adjacent properties are protected as required by this chapter for trees located on the site being developed.

(Ord. No. 2002-08, § 2, 4-8-02; 2003-22, § 2, 10-13-03; Ord. No. 2011-16, § 2, 2-27-12)

Sec. 5-15. - Voluntary tree planting.

This chapter shall not be interpreted to restrict, regulate or limit the voluntary planting of any tree within the city. The provisions of this chapter govern only the planting of trees which are required to be planted or retained under this chapter. Trees or plants planted in the city's rights-of-way are subject to removal or trimming by the city at any time.

(Ord. No. 2002-08, § 2, 4-8-02; 2003-22, § 2, 10-13-03)

Sec. 5-16. - Waivers; incentive program and appeals.

(a) *Waivers.* The city commission may grant a waiver to provisions of this chapter where the applicant demonstrates that the literal interpretation of the chapter will deny the applicant reasonable use of the property or where such waiver can be demonstrated to be consistent with the purpose and intent of the chapter. The preservation of any approved tree over four (4) inches in DBH may be considered as the basis for the granting of a waiver from the literal application of the provisions of the city's land development regulations. If, in the determination of the city commission, the sole basis for the request for waiver is to preserve such tree which would otherwise have to be removed, it may direct any required waiver fee to be waived.

(b) *Appeals.* Any person adversely affected by an administrative interpretation of this chapter by the city arborist may first appeal that interpretation to the city manager by filing a written notice of appeal of said interpretation within ten (10) calendar days of said interpretation. The city manager shall decide said appeal within five (5) business days. Any person adversely affected by an administrative decision of the city manager under this chapter may appeal that interpretation to the city commission by filing a written notice of appeal of said interpretation within thirty (30) calendar days of said interpretation. Failure to file an appeal within the time periods required by this subsection shall result in the administrative interpretation to be declared final and shall be deemed a waiver of the person's right to further appellate review and proceedings. The city commission shall decide said appeal within thirty (30) days of the city's receipt of said notice of appeal and the city commission's decision shall be final. Except for the mandatory time periods required for the notice of appeal, the time periods required for a decision may be extended by mutual agreement between the city and the person filing the notice of appeal.

(c) *Incentive program.* The city commission reserves the right to offer and approve incentives for purposes of protecting and preserving mature trees and planting enhanced landscaping. Such incentives shall have a public benefit and may include, but are not limited to, varying provisions of the city's land development regulations (e.g. reduced parking; modified setbacks) and providing credits to city development fees. Any incentives granted under this subsection shall be consistent with the comprehensive plan and shall be by development agreement or other formal approval.

(Ord. No. 2002-08, § 2, 4-8-02; 2003-22, § 2, 10-13-03; Ord. No. 2011-16, § 2, 2-27-12)

Sec. 5-17. - Remedial action.

(a) *Violations require remedial action.* Where violations of this chapter have occurred, remedial action shall be taken to restore the property consistent with a restoration plan approved by the city arborist or the city commission if the violation is inconsistent with plans, permits, or agreements approved by the city commission. The restoration plan may require mitigation of any other damage to the property, as well as tree replacements.

(b) *Tree replacement remediation requirements.* Each tree destroyed or receiving major damage during construction must be replaced by either a comparable size and desirable type of tree as listed within Appendix B or providing a contribution to the tree bank equal to four (4) times the contribution listed on Table 1. Tree Replacement Standards [following section 5-9] or planting four (4) preferred plants listed within Appendix B before issuance of a certificate of occupancy or certificate of completion.

(c) *Property owner to guarantee survival of replaced trees.* The property owner shall guarantee the survival of the trees required to be placed under subsection (b) above for a period of two (2) years from the date the certificate of occupancy or certificate of completion is issued, unless a greater time period is required by development agreement. If the replacement tree dies, the tree shall be replaced in accordance with this section.

(Ord. No. 2002-08, § 2, 4-8-02; 2003-22, § 2, 10-13-03; Ord. No. 2011-16, § 2, 2-27-12)

Sec. 5-18. - Enforcement; penalties.

(a) *Enforcement.* The city may enforce the provisions of this chapter by any lawful means including, but not limited to, issuing a civil citation, bringing charges before the city's code enforcement board or special master, and seeking injunctive and equitable relief. For purposes of determining the penalties provided under this chapter, the removal or death of a tree in violation of this chapter shall be deemed irreparable or irreversible.

(b) *Penalties.* In addition to all other remedies set forth in this chapter, one or more of the following civil fines shall apply to violations of this chapter:

(1) *Failure to obtain a permit under section 5-4(a):* Fine of two hundred fifty dollars (\$250.00) per tree or five hundred dollars (\$500.00) per specimen or historic tree removed, not to exceed five thousand dollars (\$5,000.00).

(2) *Removal of a tree without a permit:* Fine of fifty dollars (\$50.00) per caliper inch, not to exceed five thousand dollars (\$5,000.00) per tree.

(3) *Removal of a specimen or historic tree without a permit:* Fine of one hundred dollars (\$100.00) per caliper inch, not to exceed five thousand dollars (\$5,000.00) per tree.

(4) *Failure to abide by a cease and desist order issued under this Chapter:* Fine of five hundred dollars (\$500.00) per day.

(5) *Failure to obtain a contractor's license under section 5-4(e):* Fine of two hundred fifty dollars (\$250.00) (1st offense); five hundred dollars (\$500.00) (2nd and each subsequent offense).

(6) *Failure to abide by the requirements of section 5-10 of this Chapter:* Fine of two hundred fifty dollars (\$250.00) per occurrence.

(7) *Any other violation of this chapter:* Fine as provided by law and this chapter.

(c) *Civil fine determination.* In determining the amount of the civil fine under subsection (6) above, the following factors shall be considered:

(1) The gravity of the violation.

(2) Any actions taken by the violator to correct the violation.

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- (3) Any previous violations of this chapter committed by the violator.
- (4) The number and size of the trees removed, if any.
- (5) The historical significance of any tree removed if the tree was deemed historic.
- (6) Whether the violation is irreparable or irreversible in nature.
- (7) The remedial actions offered by the violator to restore the property consistent with this chapter.

(Ord. No. 2002-08, § 2, 4-8-02; 2003-22, § 2, 10-13-03)

Sec. 5-19. - Authorization to adopt rules and regulations and fees for implementation.

The city commission is hereby authorized to adopt, by resolution, such rules and regulations and fees as are necessary or proper to implement this chapter.

(Ord. No. 2002-08, § 2, 4-8-02; 2003-22, § 2, 10-13-03)

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- APPENDIX A UNDESIRABLE TREES
- APPENDIX B DESIRABLE TREES
- APPENDIX C CALCULATING TREE PROTECTION ZONE
- APPENDIX D TREE PROTECTION AREA SIGNAGE

⁽¹⁵⁾ **Cross reference**— Code enforcement board to enforce certain ordinances of the city, § 2-56 et seq.; beautification board, § 2-76 et seq.; buildings and building regulations, Ch. 6; flood damage prevention, Ch. 8; land development, Ch. 9; motor vehicles and traffic, Ch. 12; nuisances, Ch. 13; planning, Ch. 15; signs and advertising, Ch. 16; streets, sidewalks and other public places, Ch. 17; zoning, Ch. 20. (Back)

APPENDIX A

UNDESIRABLE TREES

Common Name	Botanical Name
Mimosa, silk tree	<i>Albizia julibrissin</i>
Woman's tongue	<i>Albizia lebbek</i>
Orchid tree	<i>Bauhinia variegata</i>
Bischofia	<i>Bischofia javanica</i>
Carrotwood	<i>Cupaniopsis anacardioides</i>
Australian pine	<i>Casuarina litorea (=C. equisetifolia)</i>
Suckering Australian pine	<i>Casuarina glauca</i>
Camphor tree	<i>Cinnamomum camphora</i>

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Laurel fig	<i>Ficus nicrocarpa</i>
Glossy privet	<i>Ligustrum lucidum</i>
Chinese privet, hedge privet	<i>Ligustrum sinense</i>
Melaleuca, paper bark	<i>Melaleuca quinquenervia</i>
Chinaberry	<i>Melia azedarach</i>
Catclaw mimosa	<i>Mimosa pigra</i>
Strawberry guava	<i>Psidium guajava</i>
Guava	<i>Psidium Montana (=P. littorale)</i>
Downy rose-myrtle	<i>Rhodomyrtus tomentosa</i>
Popcom tree, Chinese tallow tree	<i>Sapium sebiferum</i>
Schefflera, Queensland umbrella tree	<i>Schefflere actinophylla (=Brassaia actinophylla)</i>
Brazilian pepper, Florida holly	<i>Schinus terebinthefolius</i>
Tung-oil tree	<i>Aleurites fordii</i>
Paper mulberry	<i>Broussonctia papyrifera</i>
Australian pine	<i>Casuarina cunninghamiana</i>
Indian rosewood, sissoo	<i>Dalbergia sissoo</i>
Ear-pod tree	<i>Enterolobium contortisilquum</i>
Goldenrain tree	<i>Koelreuteria elegans</i>
Lead tree	<i>Leucaena leucocephala</i>
Senegal date palm	<i>Phoenix reclinata</i>
Castor bean	<i>Castor bean</i>
Rose-apple	<i>Syzygium jambos</i>

(Ord. No. 2002-08, § 2, 4-8-02; Ord. No. 2003-22, § 2, 10-13-03) <?xpp rotatepg?>

APPENDIX B

DESIRABLE TREES

Common Name	Botanical Name	Replacement Tree Size/Minimum Height	Preferred Plant Size/Minimum Height	Replacement Credits Preferred Plant	Notes
Canopy Trees					
Bald cypress	<i>Taxodium distichum</i>	15 gal.; 6" min. hgt.	25 gal.; 10" min. hgt.	2:1	30—70" mature height, deciduous, bronze fall

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					color, chartreuse spring color
Bald cypress	<i>Taxodium distichum</i>		65 gal.; 14" min. hgt.	3:1	
Black gum, swamp tupelo	<i>Nyssa sylvatica var. biflora</i>	15 gal.; 6" min. hgt.	30 gal.; 10" min. hgt.	2:1	50—75" mature height, orange-red fall color, deciduous, prefers wet soils
Carolina cherry laurel	<i>Prunus caroliniana</i>	15 gal.; 6" min. hgt.	30 gal.; 10" min. hgt.	2:1	40" mature height, evergreen, glossy leaves, black fruits
Chinese elm (Drake)	<i>Ulmus parviflora</i>	15 gal.; 9" min. hgt.	30 gal.; 10" min. hgt.	1:1	Medium tree, evergreen, attractive bark, fine texture
Dahoon	<i>Ilex cassine</i>	15 gal.; 6" min. hgt.	30 gal.; 10" min. hgt.	2:1	40" mature height, evergreen, red fruits on female trees
Dahoon	<i>Ilex cassine</i>	15 gal.; 6" min. hgt.	65 gal.; 10" min. hgt.	3:1	
Florida elm	<i>Ulmus americana floridana</i>	15 gal.; 6" min. hgt.	30 gal.; 7" min. hgt.	3:1	60—70" mature height, deciduous, long living, shade tree
Laurel oak	<i>Quercus laurifolia</i>	15 gal.; 6" min. hgt.	N/A		100" mature height, begins to deteriorate at about 50 years
Live oak	<i>Quercus virginiana</i>	15 gal.; 7" min. hgt.	30 gal.; 10" min. hgt.	2:1	100—150" mature height, majestic spread, evergreen, long-lived
Live oak	<i>Quercus virginiana</i>	—	65 gal.; 12" min. hgt.	4:1	
Live oak	<i>Quercus virginiana</i>		FG; 4.5" min. caliper	5:1	
Longleaf pine	<i>Pinus palustris</i>	15 gal.; 6" min. hgt.	30 gal.; 9" min. hgt.	3:1	80—125" mature height, high branching
Pignut hickory	<i>Carya glabra</i>	15 gal.; 6" min. hgt.	30 gal.; 9" min. hgt.	2:1	40—80" mature height, kernal inside nut is edible, shade tolerant
Red maple	<i>Acer rubrum</i>	15 gal.; 8" min. hgt.	30 gal.; 10" min. hgt.	2:1	50—120" mature height, red spring flowers, orange-red fall color
Red maple	<i>Acer rubrum</i>	—	65 gal.; 12" min. hgt.; 3" caliper	4:1	
Red maple	<i>Acer rubrum</i>	—	FG; 4" caliper	4:1	
Sand live oak	<i>Quercus geminata</i>	15 gal.; 6" min. hgt.	FG; 3" min. caliper	5:1	Small to medium sized tree, dark green leaves, asymmetric form
Slash pine	<i>Pinus elliotii</i>	15 gal.; 6" min. hgt.	30 gal.; 9" min. hgt.	3:1	80—125" mature height,

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		min. hgt.	min. hgt.		high branching
Southern magnolia	<i>Magnolia grandiflora</i>	15 gal.; 6" min. hgt.	30 gal.; 8" min. hgt.	3:1	60" mature height, large glossy leaves, showy white flowers
Southern magnolia	<i>Magnolia grandiflora</i>	—	65 gal.; 10" min. hgt.	4:1	
Southern magnolia	<i>Magnolia grandiflora</i>	—	FG; 12" min. hgt.; 2.5? cal	5:1	
Sugarberry, hackberry	<i>Celtis laevigata</i>	15 gal.; 6" min. hgt.	30 gal.; 8" min. hgt.	2:1	60—80" mature height, fruit attracts birds, large graceful form, prefers moist soils, soft wood
Sweetbay	<i>Magnolia virginiana</i>	15 gal.; 6" min. hgt.	FG; 10" min. hgt.	3:1	60" mature height, creamy white flowers, seed cone with bright red seeds, evergreen, leaves with whitish undersides, prefers wet soils
Sweetgum	<i>Liquidambar styraciflua</i>	15 gal.; 6" min. hgt.	30 gal.; 10" min. hgt.	3:1	60—120" mature height, yellow fall color, deciduous, seeds in spiny bals
Sycamore	<i>Platanus occidentalis</i>	15 gal.; 6" min. hgt.	30 gal.; 10" min. hgt.	3:1	80—100" mature height, varicolor bark, golden fall color, deciduous
Water ash, Carolina ash	<i>Fraxinus caroliniana</i>	15 gal.; 6" min. hgt.	N/A		30—40" mature height, soft wood, bright green compound leaves, prefers moist areas
Water oak	<i>Quercus nigra</i>	15 gal.; 6" min. hgt.	30 gal.; 10" min. hgt.	2:1	95" mature height; dull, bluish green foliage; shade tree
Winged elm	<i>Ulmus alata</i>	15 gal.; 6" min. hgt.	30 gal.; 10" min. hgt.	3:1	50—80 feet mature height, corky winged bark; rusty fall color

Small Trees

Camelia	<i>Camelia spp.</i>	FG; 8" min height	FG; 8" min height	2:1	Showy spring flowers
Carolina willow	<i>Salix caroliniana</i>	15 gal.; 6" min. hgt.	N/A		20—30" mature height, good for erosion control, soft green foliage, black ridged bark, prefer"s moist to wet soils
Chapman oak	<i>Quercus chapmanii</i>	15 gal.; 4" min. hgt.	N/A		Small tree, evergreen, prefers well-drained soils

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Chickasaw plum	<i>Prunus angustifolia</i>	15 gal.; 6" min. hgt.	30 gal.; 6" min. hgt.	3:1	Small spreading tree, armed, white flowers before leaves emerge in spring
Crape myrtle	<i>Lagerstroemia</i>	15 gal.; 6" min. hgt.	30 gal.; 8" min. hgt.; standard	1:1	Showy flowers, evergreen
Devils-walking-stick	<i>Aralia spinosa</i>	15 gal.; 5" min. hgt.	N/A		15-20" mature height, umbrella-like crown, large white flower clusters, spines, spreads freely
Festive holly	<i>Ilex X Festive™</i>	15 gal.; 4" min. hgt.	30 gal.; 6" min. hgt.	1:1	Pyramidal evergreen, spiny foliage, 10" mature height
Florida anise tree	<i>Illicium floridanum</i>	15 gal.; 40? min. hgt.	N/A		20" mature height, maroon-red flowers, prefers moist soils, compact and dense form
Flowering dogwood	<i>Comus florida</i>	15 gal.; 6" min. hgt.	FG; 3.5? min. caliper	3:1	20—30" mature height, showy white spring bracts, red autumn color
Fringe tree	<i>Chionanthus virginicus</i>	15 gal.; 5" min. hgt.	30 gal.; 6" min. hgt.		20—30" mature height, upright branches forming dome shape, white delicate flowers, golden fall color
Hercules-club, pricklyash	<i>Zanthoxylum clava-herculis</i>	15 gal.; 5" min. hgt.	N/A		Small armed tree, deciduous
Japanese privet	<i>Ligustrum japonicum</i>	15 gal.; 5" min. hgt.	30 gal.; 6" min. hgt.	2:1	15" mature height, evergreen, upright spreading form
Little Gem magnolia	<i>Magnolia grandiflora "Little Gem"</i>	15 gal.; 6" min. hgt.	30 gal.; 7" min. hgt.	3:1	20—25" mature height, showy white flowers, dark green glossy leaves
Little Gem magnolia	<i>Magnolia grandiflora "Little Gem"</i>	—	65 gal.; 10" min. hgt.	4:1	
Loquat	<i>Eriobotrya japonica</i>	15 gal.; 6" min. hgt.	30 gal.; 8" min. hgt.	2:1	Medium tree, evergreen, dark green foliage, dark yellow fruits, fruits edible
Musclewood, American hornbeam	<i>Carpinus caroliniana</i>	15 gal.; 6" min. hgt.	15 gal.; 6" min. hgt.	2:1	Small tree, deciduous, prefers moist to occasionally wet soils, prefers shade to partial shade, trunks "muscle-like"
Myrtle oak	<i>Quercus</i>	15 gal.; 5"	15 gal.; 5"	2:1	Small, scrubby tree;

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	<i>myrtifolia</i>	min. hgt.	min. hgt.		evergreen, prefers drier soils
Oakleaf holly	<i>Ilex X "Oakleaf"</i>	15 gal.; 6" min. hgt.	30 gal.; 8" min. hgt.	1:1	14—20" mature height, upright to pyramidal form, evergreen, red berries, oak-shaped leaves
Podocarpus , Nagi	<i>Podocarous nagi</i>	15 gal.; 6" min. hgt.	N/A		40" mature height, strongly upright, symmetrical branching, evergreen, dark green foliage
Podocarpus , Yew	<i>Podocarpus macrophyllus</i>	15 gal.; 6" min. hgt.	N/A		50" mature height, evergreen, compact, foliated to ground, dark green foliage
Red mulberry	<i>Morus rubra</i>	15 gal.; 6" min. hgt.	N/A		Small tree, large leaves, edible fruits, attracts birds
Redbud	<i>Cercis canadensis var. canadensis</i>	15 gal.; 6" min. hgt.	15 gal.; 6" min. hgt.	2:1	20—35" mature height, rosy purple spring flowers, deciduous, high branching, sensitive to auto pollutants
Redbud	<i>Cercis canadensis var. canadensis</i>	—	30 gal.; 8" min. hgt.	3:1	
Rusty lyonia, staggerbush	<i>Lyonia ferruginea</i>	15 gal.; 6" min. hgt.	N/A		20—25" mature height, rusty colored new growth, evergreen, crooked and asymmetric form
Silverthorn	<i>Elaeagnus pungens</i>	15 gal.; 6" min. hgt.	N/A		20" mature height; sprawling, weeping form; leaves with silvery undersides
Southern red cedar	<i>Juniperus silicicola</i>	15 gal.; 6" min. hgt.	30 gal.; 7" min. hgt.	3:1	25" mature height, evergreen with reddish-brown bark, prefers neutral soils, symmetrical when young, often asymmetric and windswept with age.
Sparkleberry	<i>Vaccinium arboreum</i>	15 gal.; 5" min. hgt.	N/A		20—30" mature height, red fall color, deciduous
Sweet/Tea Olive	<i>Osmanthus fragrans</i>	15 gal.; 5" min. hgt.	15 gal.; 5" min. hgt.	1:1	20" mature height, evergreen, open, foliage restricted to branch tips
Tabebuia	<i>Tabebuia spp.</i>	15 gal.; 6" min. hgt.	30 gal.; 10" min. hgt.	1:1	Height variable, not strongly frost hardy
Titi	<i>Cyrilla racemiflora</i>	15 gal.; 5" min. hgt.	N/A		15—30" mature height, prefers acid to very acid

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					soils, prefers moist to wet soils, wide spreading branches, white racemes of flowers in early summer
Tortulosa juniper	<i>Juniperus chinensis "Tortulosa"</i>	15 gal.; 5" min. hgt.	25 gal.; 7" min. hgt.	1:1	
Tough bumelia	<i>Bumelia tenax</i>	15 gal.; 5" min. hgt.	N/A		Small tree, coppery leaf undersides, scrubby form
Turkey oak	<i>Quercus laevis</i>	15 gal.; 5" min. hgt.	N/A		20—30" mature height; copper fall color; deeply lobed leaves; prefers sandy, well-drained soils
Walter's viburnum	<i>Viburnum obovatum</i>	15 gal.; 5" min. hgt.	25 gal.; 7" min. hgt.; standard	2:1	12—20" mature height, white spring flower clusters, prefers moist to we soils
Wax myrtle	<i>Myrica cerifera</i>	15 gal.; 5" min. hgt.	25 gal.; 7" min. hgt.	2:1	15—20" mature height; dark blue, chalky fruits; olive-green foliage, evergreen, low maintenance
Wax myrtle	<i>Myrica cerifera</i>	—	FG; 12" min. hgt.	3:1	
Weeping willow	<i>Salix babylonica</i>	15 gal.; 8" min. hgt.	30 gal.; 10" min. hgt.	1:1	15—25" mature height, draping linear leaves
Wild olive	<i>Osmanthus americanus</i>	15 gal.; 5" min. hgt.	N/A		15—25" mature height, olive-green foliage, beautiful shape in light shade to sun
Yaupon	<i>Ilex vomitoria</i>	15 gal.; 5" min. hgt.	25 gal.; 7" min. hgt., standard	3:1	20—25" mature height, red-orange translucent fruits, evergreen, often multi-trunked
Yaupon	<i>Ilex vomitoria</i>		65 gal.; 10" min. hgt., standard	4:1	

Palms

Cabbage palm	<i>Sabal palmetto</i>	10" min. hgt.	15" min. hgt.; clear trunk	2:1	50—80" mature height, long lived				
Cabbage palm	<i>Sabal palmetto</i>	—	18" min. hgt.; clear trunk	3:1					
Canary Island date	<i>Phoenix canariensis</i>	15 gal.; 40? mir hgt	30 gal.; 7" min. hgt.	1:1	60" mature height, diamond patterned trunk,				

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palm					evergreen, feather-like fronds
Date palm	<i>Phoenix dactylifera</i>	15 gal.; 3" min. hgt.	FG; 10" min. hgt.; clear trunk	1:1	80" mature height, pinnate leaves to 10" long, grey-green color
European fan palm	<i>Chamaerops humilis</i>	15 gal.; 3" min. hgt.	15 gal.; 3" min. hgt.; multiple	1:1	15" mature height, palmate fronds, gray-green color
Needle palm	<i>Rhapidophylum hystrix</i>	15 gal.; 3" min. hgt.	25 gal.; 4" min. hgt.; triple	5:1	3-8" mature height, prefers moist soil, evergreen, palmate fronds, declining native species
Pindo palm	<i>Butia capitata</i>	15 gal.; 3" min. hgt.	25 gal.; 6" min. hgt.	1:1	20" mature height, pinnate fronds fine texture, blue-green color
Pygmy date palm	<i>Phoenix roebelenii</i>	15 gal.; 3" min. hgt.	25 gal.; 5" min. hgt.; triple	1:1	8" mature height
Sago palm, King	<i>Cycas revoluta</i>	15 gal.; 3" min. hgt.	30 gal.; 4" min. hgt.	1:1	20" mature height, dark green feather-like leaves
Sago palm, Queen	<i>Cycas circinalis</i>	15 gal.; 3" min. hgt.	30 gal.; 4" min. hgt.	1:1	20" mature height, dark green feather-like leaves
Washington palm	<i>Washingtonia robusta</i>	15 gal.; 3" min. hgt.	25 gal.; 7" min. hgt.	1:1	60" mature height, palmate leaves, rapid growth, develops "shag" of hanging dead fronds, good as avenue tree
Washington palm	<i>Washingtonia robusta</i>	15 gal.; 4" min. hgt.	65 gal.; 10" min. hgt.	1:1	
Windmill Palm	<i>Trachycarpus fortunei</i>	15 gal.; 3" min. hgt.	25 gal.; 5" min. hgt.	1:1	20" mature height, palmate fronds, gray-green color
min. hgt. = minimum height					
min. calliper = minimum calliper					
gal. = gallon					
FG = field grown					

(Ord. No. 2002-08, § 2, 4-8-02; Ord. No. 2003-22, § 2, 10-13-03) <?xpp restore?>

APPENDIX C

CALCULATING TREE PROTECTION ZONE

The following guidelines shall be applied to determine the Tree Protection Zone:

1. Evaluate the species tolerance of the tree: good, moderate, or poor (See list on next page)
2. Identify tree age: young (<20% of the tree's life expectancy), mature (20% - 80% of the tree's life expectancy), or overmature (>80% of the tree's life expectancy)
3. Using the table below, find the distance from the trunk that should be protected per inch of trunk diameter.
4. Multiply the distance by the trunk diameter to calculate the optimum radius (in feet) for the tree protection zone.

Example:

A healthy 60-year old, 30" diameter California black walnut (poor tolerance, mature age)

$$1.25" \times 30" = 37.5" \text{ radius tree protection zone.}$$

Species Tolerance	Tree Age	Distance from trunk feet (per inch trunk diameter)
Good	Young	0.5"
	Mature	0.75"
	Overmature	1.0"
Moderate	Young	0.75"
	Mature	1.0"
	Overmature	1.25"
Poor	Young	1.0"
	Mature	1.25"
	Overmature	1.5"

Source: *Trees and Development, a Technical Guide to Preservation of Trees During Land Development*, Nelda Matheny and James Clark, 1998, International Society of Arboriculture, Champaign, IL

(Ord. No. 2002-08, § 2, 4-8-02; Ord. No. 2003-22, § 2, 10-13-03) <?xpp rotatepg?>

		Relative Tolerance—Assigned either by source or by Matheny		
Common Name	Scientific Name	and Clark	Comments	Source
Balsam fir	<i>Abies balsamea</i>	Good	Tolerant of root loss and saturated soils.	Hightshoe
White fir	<i>Abies</i>	Moderate	Tolerant of root loss. Intolerant of	Day,

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	<i>concolor</i>		saturated and high salt soils.	Hightshoe
Acacia	<i>Acacia</i> spp.	Poor	Intolerant of root injury.	Matheny & Clark
Florida maple	<i>Acer barbatum</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization). Response constrained by soil aeration and water availability.	Coder
Vine maple	<i>Acer circinatum</i>	Good	Best retained as clumps.	Peepete
Chalk maple	<i>Acer leucoderme</i>	Poor	Response is site dependent.	Coder
Bigleaf maple	<i>Acer macrophyllum</i>	Good	Select specimens with good crown structure.	
			Tolerant of root pruning and injury but not of fill.	Beck
Bigleaf maple	<i>Acer macrophyllum</i>	Poor	Declines following addition of fill.	Dunster
Box elder	<i>Acer negundo</i>	Good	Tolerant of root loss and saturated soils. May tolerate some fill. Select superior individuals for preservation.	Coder, Hightshoe, Sydnor
Striped maple	<i>Acer pensylvanicum</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization). Limited tolerance to microclimate change. Tolerance greatest within native range.	Coder
Norway maple	<i>Acer platanoides</i>	Moderate-good	Moderately tolerant of root pruning.	S. Clark, Fraedrich
Sycamore maple	<i>Acer pseudoplatanus</i>	Moderate	—	Gilbert
Red maple	<i>Acer rubrum</i>	Moderate-good	Response probably associated with geographic location. Tolerant of root pruning and saturated soils.	Coder, Fraedrich, Hightshoe
Silver maple	<i>Acer saccharinum</i>	Poor-moderate	Likely to slowly die back following root injury (Day). May tolerate some root pruning (Fraedrich) or loss (Hightshoe). Some tolerance for crown reduction pruning, fill soils and saturated soils. Response variable within species (Coder)	Coder, Day, Fraedrich, Hightshoe, Sydnor
Sugar maple	<i>Acer saccharum</i>	Poor-moderate	Tolerant of root loss. Intolerant of saturated and fill soils.	S. Clark, Hightshoe, Sydnor
Mountain maple	<i>Acer spicatum</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization). Limited tolerance to microclimate change. Tolerance greatest within native range.	Coder
California	<i>Aesculus</i>	Good	—	Matheny

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buckeye	<i>californica</i>			& Clark
Red horse-chest nut	<i>Aesculus x camea</i>	Good	Shows good resistance to "contractor pressures."	Gilbert
Yellow buckeye	<i>Aesculus flava</i>	Poor	Intolerant of mechanical injury (poor compartmentalization). Response constrained by soil aeration and water availability.	Coder
Ohio buckeye	<i>Aesculus glabra</i>	Poor	Intermediate tolerance to root loss and saturated soils. Poor acclimation response. Tolerant of some fill.	Hightshoe, Sydnor
Red buckeye	<i>Aesculus pavia</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization).	Coder
Tree of heaven	<i>Ailanthus altissima</i>	Good	Tolerant of root pruning. Generally good acclimation response following disturbance.	Day, Fraedrich, Sydnor
Alders	<i>Alnus spp.</i>	Good	Show considerable resistance to "contractor pressures."	Gilbert
Red alder	<i>Alnus rubrn</i>	Poor-moderate	Retain only in groups or as individuals with strong taper and structure. Relatively short-lived. Intolerant to root injury.	Beck, Dunster, Peepre
Hazel alder	<i>Alnus serrulata</i>	Good	—	Coder
Serviceberry	<i>Amelanchier spp.</i>	Good	Intermediate tolerance to root loss. Tolerant of saturated soils. Generally good acclimation response to site change.	Hightshoe, Sydnor
Downy serviceberry	<i>Amelanchier arboren</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization). Response constrained by soil aeration and water availability.	Coder
Devil's-walkingstick	<i>Aralia spinosa</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization).	Coder
Madrone	<i>Arbutus menziesii</i>	Poor	Intolerant of site disturbance.	Matheny & Clark
Pawpaw	<i>Asimina triloba</i>	Good	—	Coder

Eastern

baccharis	<i>Baccharis halimifolia</i>	Good	—	Coder
Birch	<i>Betula spp.</i>	Poor-moderate	Intolerant of root pruning. Mature trees particularly sensitive to development impacts.	Gilbert, Fraedrich
Yellow birch	<i>Betula alleghanien sis</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization). Limited tolerance to microclimate change. Tolerance greatest within native range. Response varies due to soil and water availability.	Coder

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Sweet birch	<i>Betula lenta</i>	Moderate	Intermediate tolerance to root loss. Intolerant of saturated soils. Intolerant of mechanical injury. Limited tolerance to microclimate change. Tolerance greatest within native range.	Coder, Hightshoe
River birch	<i>Betula nigra</i>	Moderate-good	Variable tolerance of root loss and saturated soils. Tolerant of minor amounts of fill.	S. Clark, Coder, Hightshoe, Sydnor
Paper birch	<i>Betula papyrifera</i>	Poor-moderate	Intolerant of construction impacts outside of native range; moderate within. Prone to sunscald. Low tolerance to root injury. Bronze birch borer much more severe under stress. Best retained in groups or as select individuals.	S. Clark, Day, Peepre, Sydnor
Gray birch	<i>Betula populifolia</i>	Moderate-good	Tolerant of construction impacts within native range; moderate response outside. Construction impacts/injury increases susceptibility to bronze birch borer.	S. Clark, Sydnor
Gum bumelia	<i>Bumelia lanuginosa</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization). Response constrained by soil aeration and water availability.	Coder
Buckthorn bumelia	<i>Bumelia lycioides</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization). Response constrained by soil aeration and water availability.	Coder
Incense cedar	<i>Calocedrus decurrens</i>	Moderate	—	Matheny & Clark

Blue beech;

hombbeam	<i>Carpinus caroliniana</i>	Moderate	Intolerant of root loss and saturated soils. Susceptible to two-lined chestnut borer, particularly under conditions of environmental stress. Limited tolerance to climatic change. Tolerance greatest within native range.	Coder, Hightshoe, Sydnor
Water hickory	<i>Carya aquatica</i>	Good	—	Coder
Bitternut hickory	<i>Carya cordiformis</i>	Good	Intermediate tolerance to root loss and saturated soils. Will tolerate some fill.	Hightshoe, Sydnor
Bitternut hickory	<i>Carya cordiformis</i>	Poor	Response constrained by soil aeration and water availability.	Coder
Pignut hickory	<i>Carya glabra</i>	Moderate-good	Moderately tolerant of construction damage. Tolerant of some fill. Windfirm. Response constrained by soil and water availability.	S. Clark, Coder, Sydnor
Pecan	<i>Carya illinoensis</i>	Moderate-good	Moderately tolerant of construction damage. Tolerant of some fill.	S. Clark, Sydnor

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Shagbark hickory	<i>Carya ovata</i>	Moderate-good	Moderately tolerant of construction damage. Tolerant of some fill. Windfirm.	S. Clark, Sydnor
Shagbark hickory	<i>Carya ovata</i>	Poor	Response constrained by soil aeration and water availability.	Coder
Sand hickory	<i>Carya pallida</i>	Moderate	—	Coder
Mockemut hickory	<i>Carya tomentosa</i>	Moderate-good	Moderately tolerant of construction damage. Tolerant of some fill. Windfirm.	S. Clark, Sydnor
Mockemut hickory	<i>Carya tomentosa</i>	Poor-moderate	Response constrained by soil aeration and water availability.	Coder
Florida chinkapin	<i>Castanea alnifolia</i>	Moderate	Pest problems associated with development impacts.	Coder
Allegheny chinkapin	<i>Castanea pumila</i>	Poor	Pest problems associated with development impacts.	Coder
Catalpa	<i>Catalpa</i> spp.	Moderate	Tolerant of saturated soils. Intermediate in tolerance to root loss.	Hightshoe
Southern catalpa	<i>Catalpa bignonioides</i>	Good	—	Coder
Northern catalpa	<i>Catalpa speciosa</i>	Good	Generally tolerant of disturbance including root injury. Prone to basal decay.	Day, Sydnor
Deodar cedar	<i>Cedrus deodara</i>	Good	Tolerant of root and crown pruning. Intolerant of excessive soil moisture; leads to <i>Armillaria</i> and <i>Phytophthora</i> .	Ellis
Sugarberry	<i>Celtis laevigata</i>	Good	Intolerant of mechanical injury (poor compartmentalization).	Coder
Georgia hackberry	<i>Celtis tenuifolia</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization). Response constrained by soil aeration and water availability.	Coder
Hackberry	<i>Celtis occidentalis</i>	Good	Tolerant of root loss. Intermediate (Hightshoe) or low (Day) in tolerance to saturated soils.	Day, Hightshoe, Sydnor

Common

buttonbush	<i>Cephalanthus occidentalis</i>	Good	Intolerant of mechanical injury (poor compartmentalization).	Coder
Katsura-tree	<i>Cercidiphyllum japonicum</i>	Poor-moderate	Sensitive to fill and root disturbance. Requires tree protection zone at the dripline. Requires postconstruction care, particularly supplemental irrigation.	Cullen
Redbud	<i>Cercis canadensis</i>	Moderate	Response constrained by soil aeration and water availability.	Coder

Alaska yellow-

cedar	<i>Chamaecyparis nootkatensis</i>	Good	Relatively windfirm. Intolerant of changes in water table/soil moisture.	Peepre
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	s			
False cypress	<i>Chamaecyparis</i> spp.	Good	Show considerable resistance to "contractor pressures."	Gilbert
Fringetree	<i>Chionanthus virginicus</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization). Response constrained by soil aeration and water availability.	Coder
Yellow-wood	<i>Cladrastis lutea</i>	Poor	Response is site dependent.	Coder
Cinnamon clethra	<i>Clethra acuminata</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization). Response constrained by soil aeration and water availability.	Coder
Buckwheat tree	<i>Cliftonia monophylla</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization). Response constrained by soil aeration and water availability.	Coder
Pagoda dogwood	<i>Coniis alternifolia</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization).	Coder
Flowering				
dogwood	<i>Coniis florida</i>	Poor	Intolerant of site disturbance.	Sydnor
Flowering				
dogwood	<i>Cornus florida</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization). Pest problems associated with development impacts.	Coder
Pacific dogwood	<i>Coniis nuttallii</i>	Good	—	Peepre
Swamp dogwood	<i>Coniis stricta</i>	Good	Intolerant of mechanical injury (poor compartmentalization).	Coder
Beaked hazel	<i>Corylus conuita</i>	Good	—	Coder
Hawthorn	<i>Crataegus</i> spp.	Moderate	Intermediate tolerance to root loss and saturated soils.	Hightshoe
Cockspur				
hawthorn	<i>Crataegus crus-galli</i>	Good	Sensitive to windthrow if canopy raised. Some tolerance to disturbance.	Sydnor
Washington				
hawthorn	<i>Crataegus phaenopyrum</i>	Good	Susceptible to windthrow. Tolerates some disturbance.	Sydnor
Dotted hawthorn	<i>Crataegus punctata</i>	Good	Susceptible to windthrow. Tolerates some disturbance.	Sydnor
Cypresses	<i>Cupressus</i> spp.	Good	Show considerable resistance to "contractor pressures."	Gilbert
Montececypress	<i>Cupressus macrocarpa</i>	Poor	Intolerant of site disturbance.	Matheny & Clark
Swamp	<i>Cyrilla</i>	Moderate	Intolerant of mechanical injury (poor	Coder

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cyrilla	<i>racemiflora</i>		compartmentalization).	
Persimmon	<i>Diospyros virginiana</i>	Good	Tolerant of saturated soils. Pest problems associated with development impacts.	Sydnor
Eastern coralbean	<i>Erythrina berbacen</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization).	Coder
Eucalyptus	<i>Eucalyptus spp.</i>	Moderate	Moderately tolerant of root loss. Intolerant of fill.	Matheny & Clark
Eastern wahoo	<i>Euonymus atropurpureus</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization).	Coder
Beech	<i>Fagus spp.</i>	Poor	Intolerant of root pruning. Poor response to injury. Intolerant of fill soil.	Fraedrich, Sydnor
American beech	<i>Fagus grandifolia</i>	Poor	Response is site dependent.	Coder
European beech	<i>Fagus sylvatica</i>	Poor	Mature trees particularly susceptible.	Gilbert
Swamp privet	<i>Forestea acuminate</i>	Good	—	Coder
Ash	<i>Fraxinus spp.</i>	Moderate	Moderately tolerant of root pruning.	S. Clark, Fraedrich
White ash	<i>Fraxinus americana</i>	Moderate-good	Tolerant of root loss. Intermediate in tolerance to saturated soils. Intolerant of mechanical injury (poor compartmentalization). Response constrained by soil and water availability.	S. Clark, Coder, Hightshoe, Sydnor
Carolina ash	<i>Fraxinus caroliniana</i>	Good	—	Coder
European ash	<i>Fraxinus excelsior</i>	Moderate	—	Gilbert
Black ash	<i>Fraxinus nigra</i>	Good	Tolerant of root loss and saturated soils.	Hightshoe
Green ash	<i>Fraxinus pennsylvanica</i>	Good	Tolerant of root pruning and loss. Benefits from supplemental Irrigation following injury. Tolerant of saturated soils and fill.	Coder, Day, Hightshoe, Sydnor
Blue ash	<i>Fraxinus quadrangulata</i>	Good	—	Sydnor
Shamel ash	<i>Fraxinus uhdei</i>	Good	Tolerant of root pruning. Best with irrigation following disturbance.	Bills
Modesto ash	<i>Fraxinus velutina 'Modesto'</i>	Good	Tolerant of root pruning. Requires supplemental irrigation following root loss/injury.	Matheny & Clark
Ginkgo	<i>Ginkgo biloba</i>	Good	Tolerant of root pruning.	Fraedrich, Sydnor
Water locust	<i>Gleditsia aquatica</i>	Good	—	Coder
Honey locust	<i>Gleditsia triacanthos</i>	Good	Tolerant of root pruning and site disturbance. Intermediate tolerance to	Coder, Fraedrich.

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	<i>f. Inermis</i>		saturated soils.	Hightshoe, Sydnor
Loblolly bay	<i>Gordonia lasianthus</i>	Good	—	Coder
Kentucky coffee-tree	<i>Gymnoceadus dioicus</i>	Good	Intermediate tolerance to root loss and saturated soils. Tolerant of site disturbance.	Hightshoe, Sydnor
Carolina silverbell	<i>Halesia carolina</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization). Response constrained by soil aeration and water availability. Limited tolerance to microclimate change. Tolerance greatest within native range.	Coder
Two-winged silverbell	<i>Halesia diptera</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization). Response constrained by soil aeration and water availability.	Coder
Little silverbell	<i>Halesia parviflora</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization). Response constrained by soil aeration and water availability.	Coder
Witch-hazel	<i>Hamamelis virginiana</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization). Response constrained by soil aeration and water availability.	Coder
Carolina holly	<i>Ilex ambigua</i>	Good	—	Coder
Dahoon	<i>Ilex cassine</i>	Good	—	Coder
Large gallberry	<i>Ilex coriacea</i>	Good	—	Coder
Possumhaw	<i>Ilex decidua</i>	Good	—	Coder
Mountain winterberry	<i>Ilex montana</i>	Moderate-good	Limited tolerance to microclimate change. Tolerance greatest within native range.	Coder
Myrtle dahoon	<i>Ilex myrtifolia</i>	Good	—	Coder
American holly	<i>Ilex opaca</i>	Good	Tolerates some fill.	Coder, Sydnor
Common winterberry	<i>Ilex verticillata</i>	Good	—	Coder
Yaupon holly	<i>Ilex vomitoria</i>	Good	—	Coder
California black walnut	<i>Juglans hindsii</i>	Poor	Dies slowly following even minor root injury or changes to water table. Crown reduction pruning may be fatal. Requires tree protection zone at or beyond the dripline.	Matheny & Clark
Black walnut	<i>Juglans nigra</i>	Poor-moderate	Intolerant of root loss. Intermediate tolerance to saturated soils. Intolerant of	Hightshoe, Sydnor

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			mechanical injury (poor compartmentalization). Response constrained by soil aeration and water availability.	
English walnut	<i>Juglans regia</i>	Poor	Usually grafted onto California black walnut stock.	Matheny & Clark
Rocky Mountain juniper	<i>Juniperus scopulorum</i>	Poor	Sensitive to root pruning and fill soil. Likely to decline following grade change and loss of roots. Very susceptible to borers when stressed.	Day

Eastern red

cedar	<i>Juniperus virginiana</i>	Good	Tolerant of root loss. Intolerant of saturated soils. Intolerant of mechanical injury.	Coder, Hightshoe, Sydnor
Mountain laurel	<i>Kahnia latifolia</i>	Good	—	Coder
Tamarack	<i>Larix laricina</i>	Moderate	Tolerant of root loss and saturated soils.	Hightshoe
Sweetgum	<i>Liquidambar styraciflua</i>	Poor-good	Intermediate response to fill and root injury. Breadth of tolerance may be due to pre-existing site conditions and within species variation.	S. Clark, Coder, Matheny & Clark, Sydnor
Tuliptree	<i>Liriodendron tulipifera</i>	Moderate	Intolerant of root pruning. Sensitive to wounding.	Fraedrich, Sydnor
Tuliptree	<i>Liriodendron tullpifera</i>	Poor	Intolerant of mechanical injury (poor compartmentalization). Response constrained by soil aeration and water availability.	Coder
Cucumber tree	<i>Magnolia acuminata</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization).	Coder
Fraser magnolia	<i>Magnolia fraseri</i>	Poor	Intolerant of mechanical injury (poor compartmentalization). Limited tolerance to microclimate change. Tolerance greatest within native range.	Coder

Southern

magnolia	<i>Magnolia grandiflora</i>	Poor or good	Response dependent upon location; good within native range; poor outside it. In California, it declines following root injury and site disturbance.	Matheny & Clark, Sydnor
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Southern

magnolia	<i>Maguolia grandiflora</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization).	Coder
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Pyramid

magnolia	<i>Magnolia pyramidata</i>	Poor	Intolerant of mechanical injury (poor compartmentalization). Limited tolerance to microclimate change. Tolerance	Coder
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			greatest within native range.	
Sweet bay	<i>Magnolia virginiana</i>	Good	Tolerant of saturated soils.	Coder, Sydnor
Apples	<i>Malus</i> spp.	Moderate	—	Gilbert
Southern crabapple	<i>Malus angustifolia</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization). Limited tolerance to microclimate change. Tolerance greatest within native range. Pest problems associated with development impacts.	Coder
Sweet crabapple	<i>Malus coronaria</i>	Moderate-good	Intolerant of mechanical injury (poor compartmentalization). Limited tolerance to microclimate change. Tolerance greatest within native range. Pest problems associated with development impacts.	Coder, Sydnor
Apple	<i>Malus domestica</i>	Good	Tolerant of some fill.	Sydnor
Ptairie crabapple	<i>Malus ioensis</i>	Good	—	Sydnor
White mulberry	<i>Morus alba</i>	Moderate	—	Matheny & Clark
White mulberry	<i>Morus alba</i>	Good	Tolerant of disturbance and fill.	Sydnor
Red mulberry	<i>Morus rubra</i>	Good	Tolerant of disturbance and fill.	Coder, Sydnor
Southern				
bayberry	<i>Myrica cerifera</i>	Good	—	Coder
Evergreen bayberry	<i>Myrica heterophylla</i>	Good	—	Coder
Water tupelo	<i>Nyssa aquatica</i>	Good	—	Coder
Ogeechee tupelo	<i>Nyssa ogeche</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization). Response constrained by soil aeration and water availability.	Coder
Black gum	<i>Nyssa sylvatica</i>	Good	Response constrained by soil aeration and water availability.	Coder, Sydnor
Devilwood	<i>Osmanthus americanus</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization).	Coder
American hophornbeam	<i>Ostrya virginiana</i>	Moderate	Intolerant of root loss and saturated soils. Two-lined chestnut borer will attack following disturbance. Response is site dependent.	Coder, Highishoe, Sydnor
Sourwood	<i>Oxydendrum arboreum</i>	Moderate	Windfirm.	Sydnor
Sourwood	<i>Oxydendrum</i>	Poor	—	Coder

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	<i>m arboreum</i>			
Empress-tree	<i>Paulownia tomentosa</i>	Good	Tolerant of site disturbance.	Sydnor
Redbay	<i>Persea borbonia</i>	Good	—	Coder
Norway spruce	<i>Picea abies</i>	Moderate	Often windthrows. Intolerant of root loss.	Sydnor.
White spruce	<i>Picea glauca</i>	Moderate	Tolerant of root loss. Intermediate in tolerance to saturated soils.	Hightshoe
Black spruce	<i>Picea mariana</i>	Good	Tolerant of root loss and saturated soils.	Hightshoe
Colorado spruce	<i>Picea pungens</i>	Moderate	Intolerant of saturated soils. Intermediate in tolerance to root loss. Often windthrows.	Day, Hightshoe, Sydnor
Pinckneya	<i>Pinckneya pubens</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization).	Coder
Jack pine	<i>Pinus banksiana</i>	Good	Tolerant of root loss. Intolerant of saturated soils.	Hightshoe, Sydnor
Canary Island pine	<i>Pinus canariensis</i>	Good	Tends to have sinker roots close to trunk.	Ellis
Shortleaf pine	<i>Pinus echinata</i>	Moderate-good	Pest problems associated with development impacts. Tolerant of some fill soil.	Coder, Sydnor
Plinyon pine	<i>Pinus edulis</i>	Moderate	Tolerant of root pruning. Intolerant of saturated and poorly drained soils.	Day
Slash pine	<i>Pinus elliottii</i>	Good	—	Coder
Spruce pine	<i>Pinus glabm</i>	Good	—	Coder
Austrian pine	<i>Pinus nigra</i>	Good	Tolerant of some fill and root pruning/injury.	Day, Sydnor
Longleaf pine	<i>Pinus palustris</i>	Moderate-good	Limited tolerance to microclimate change. Tolerance greatest within native range.	Coder
Ponderosa pine	<i>Pinus ponderosa</i>	Good	Tolerant of fill within dripline and root pruning. Intolerant of poor drainage, overwatering, and high-soluble salts.	Day
Table mountain pine	<i>Pinus pungens</i>	Moderate-good	Limited tolerance to microclimate change. Tolerance greatest within native range.	Coder
Monterey pine	<i>Pinus radiata</i>	Moderate	Requires supplemental irrigation following disturbance.	Ellis
Red pine	<i>Pinus resinosa</i>	Good	Tolerant of root loss. Intolerant of saturated soils.	Hightshoe, Sydnor
Pitch pine	<i>Pinus rigida</i>	Good	—	Coder, Sydnor
Digger pine	<i>Pinus sabiniana</i>	Moderate	—	Matheny & Clark
Pond pine	<i>Pinus serotina</i>	Good	—	Coder
White pine	<i>Pinus</i>	Moderate	Tolerant of root loss. Intolerant of	Coder,

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	<i>strobus</i>		saturated soils or changes in soil moisture. Response often site dependent.	Hightshoe, Sydnor
Scots pine	<i>Pinus sylvestris</i>	Good	Tolerant of root loss. Intolerant of saturated soils.	Hightshoe, Sydnor
Loblolly pine	<i>Pinus taeda</i>	Moderate-good	Moderate tolerance to root loss. Intolerant of saturated soils. Injury increases susceptibility to southern pine beetle.	S. Clark, Coder, Sydnor
Virginia pine	<i>Pinus virginiana</i>	Poor-moderate	Prone to windthrow and root decay.	Matheny & Clark, Sydnor
Virginia pine	<i>Pinus virginiana</i>	Good	—	Coder
Planer tree	<i>Planera aquatica</i>	Good	—	Coder
London plane	<i>Platanus x acerifolia</i>	Poor or good	Response appears to be location dependent. In eastern U.S., stress intolerant in northern part of range. In California, very tolerant. Benefits from supplemental irrigation.	Matheny & Clark, Sydnor
Eastern sycamore	<i>Platanus occidentalis</i>	Moderate	Intermediate tolerance to construction damage. Moderate tolerance of fill soil.	S. Clark, Sydnor
Eastern sycamore	<i>Platanus occidentalis</i>	Good	—	Coder
Western sycamore	<i>Platanus racemosa</i>	Moderate	—	Matheny & Clark
Poplars	<i>Populus</i> spp.	Good	Show considerable resistance to "contractor pressures."	Gilbert
Eastern cottonwood	<i>Populus deltoides</i>	Moderate-good	Intermediate to good tolerance of root loss, fill soil, and saturated soils.	S. Clark, Coder, Hightshoe, Sydnor
Western cottonwood	<i>Populus fremoutii</i>	Poor	Prone to windthrow and decay.	Matheny & Clark
Bigtooth aspen	<i>Populus grandidentata</i>	Poor-moderate	Tolerant of root loss. Intolerant of saturated soils.	Hightshoe, Sydnor
Lombardy poplar	<i>Populus nigra 'Italica'</i>	Moderate-good	Tolerant of minor amounts of fill. Intolerant of changes in soil moisture. Decays rapidly. Susceptible to windthrow.	Beck
Plains cottonwood	<i>Populus sargentii</i>	Moderate	Defoliation and dieback may follow excessive root loss. Intolerant of crown reduction pruning. Supplemental irrigation required following root injury. Tolerant of some grade change.	Day
Quaking aspen	<i>Populus tremuloides</i>	Moderate	Tolerant of root loss. Intolerant of saturated soils.	Day, Hightshoe
Black	<i>Populus</i>	Poor	Mature trees prone to windthrow and	Peepre

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cottonwood	<i>trichocarpa</i>		trunk failure.	
American plum	<i>Prunus americana</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization). Response constrained by soil aeration and water availability.	Coder
Chickasaw plum	<i>Prunus angustifolia</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization). Response constrained by soil aeration and water availability.	Coder
Carolina laurelcherry	<i>Prunus caroliniana</i>	Good	—	Coder
Canada plum	<i>Prunus nigra</i>	Moderate	Tolerant of root loss. Intolerant of saturated soils.	Hightshoe
Fire cherry	<i>Prunus pensylvanica</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization).	Coder
Black cherry	<i>Prunus serotina</i>	Poor	Intermediate tolerance to root loss. Intolerant of saturated soils. Select young, vigorous individuals for preservation.	Hightshoe, Sydner
Black cherry	<i>Prunus serotina</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization).	Coder
Flatwoods plum	<i>Prunus umbellata</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization).	Coder
Douglas-fir	<i>Pseudotsuga menziesii</i>	Poor-good	Tolerant of fill soil if limited to one-quarter of root zone. However, may decline slowly following addition of fill. Tolerates root pruning. Intolerant of poor drainage. Susceptible to bark beetles following injury.	Beck, Dunster
Hoptree	<i>Ptelea trifoliata</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization).	Coder
Callery pear	<i>Pyrus calleryana</i>	Moderate	Intolerant of root pruning.	Fraedrich
Oaks	<i>Quercus</i> spp.	Moderate	—	Gilbert
Coast live oak	<i>Quercus agrifolia</i>	Good	Sensitive to addition of fill soil around base of trunk. Intolerant of frequent summer irrigation. Bark is sensitive to sunburn following pruning.	Matheny & Clark
White oak	<i>Quercus alba</i>	Poor	Intolerant of root loss and saturated soils.	Hightshoe
White oak	<i>Quercus alba</i>	Moderate	—	S. Clark
White oak	<i>Quercus alba</i>	Good	A common survivor of construction activity. Moderate tolerance to fill soil. Response constrained by soil aeration and water availability.	Coder, Sydner
Swamp	<i>Quercus</i>	Good	Tolerant of some fill.	Day, Sydner

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white oak	<i>blcolor</i>			
Scarlet oak	<i>Quercus coccinea</i>	Poor-moderate	Intolerant of construction injury.	S. Clark, Sydnor
Scarlet oak	<i>Quercus coccinea</i>	Good	—	Coder
Durand oak	<i>Quercus durandii</i>	Good	—	Coder
Southern red oak	<i>Quercus falcata</i>	Moderate-good	Largely intolerant of construction injury.	S. Clark, Coder, Sydnor
Cherrybark oak	<i>Quercus falcata var. pagodaefolia</i>	Good	—	Coder
Oregon white oak	<i>Quercus garryana</i>	Good	—	Bell, Matheny & Clark
Shingle oak	<i>Quercus imbricaria</i>	Good	—	Sydnor
Bluejack oak	<i>Quercus incana</i>	Good	—	Coder
California black oak	<i>Quercus kelloggii</i>	Moderate	—	Matheny & Clark
Turkey oak	<i>Quercus laevis</i>	Good	—	Coder
Laurel oak	<i>Quercus laurifolia</i>	Moderate	Subject to nutritional problems when alkaline subbase is used. Intolerant of extreme variation in moisture. Poor compartmentalization response.	Siebenthaler
Valley oak	<i>Quercus lobata</i>	Moderate	Intolerant of summer irrigation and fill soil.	Matheny & Clark
Overcup oak	<i>Quercus lyrata</i>	Good	—	Coder
Bur oak	<i>Quercus macrocarpa</i>	Moderate	Relatively tolerant of root injury, although may be associated with crown dieback. Supplemental irrigation required following root injury. Intermediate tolerance to saturated soils (prairie areas, U.S.).	Day, Hightshoe
Bur oak	<i>Quercus macrocarpa</i>	Good	Tolerant of fill and compacted soils (eastern U.S.)	Sydnor
Blackjack oak	<i>Quercus marilandica</i>	Good	—	Coder
Swamp chestnut oak	<i>Quercus michauxii</i>	Good	—	Coder
Chinquapin oak	<i>Quercus muchienbergii</i>	Good	Tolerant of site disturbance.	Coder, Sydnor

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Water oak	<i>Quercus nigra</i>	Good	Tolerant of saturated soils.	Coder, Sydnor
Pin oak	<i>Quercus palustris</i>	Moderate-good	Intermediate tolerance of root loss and saturated soils.	S. Clark, Hightshoe, Sydnor
Willow oak	<i>Quercus phellos</i>	Moderate-good	Response constrained by soil aeration and water availability.	Coder, Sydnor
Chestnut oak	<i>Quercus prinus</i>	Moderate-good	Response constrained by soil aeration and water availability. Tolerant under good growing conditions.	Coder, Sydnor
Northern red oak	<i>Quercus rubra</i>	Moderate-good	Response constrained by soil aeration and water availability. Limited tolerance to microclimate change. Tolerance greatest within native range. Tolerant of root loss.	Coder, Hightshoe, Sydnor
Shumard oak	<i>Quercus shumardii</i>	Good	—	Coder, Sydnor
Post oak	<i>Quercus stellata</i>	Poor-good	Variation may be geographic in origin; poor in south, good in mideastern U.S. (Ohio).	S. Clark, Coder, Sydnor
Black oak	<i>Quercus velotina</i>	Moderate	Intolerant of root loss and saturated soils.	Hightshoe, Sydnor
Black oak	<i>Quercus velutina</i>	Good	—	Coder
Live oak	<i>Quercus virginiana</i>	Good	High tolerance for various soil types as well as trenching, compaction, and drought. Good compartmentalization response. Limited tolerance to site change. Tolerance greatest within native range.	Coder, Siebenthaler, Sydnor
Carolina buckthorn	<i>Rhamnus caroliniana</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization). Response constrained by soil aeration and water availability.	Coder
Catawba rhododendron	<i>Rhododendron catawbiense</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization).	Coder
Rosebay rhododendron	<i>Rhododendron maximum</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization).	Coder
Shining sumac	<i>Rhus copallina</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization).	Coder
Smooth sumac	<i>Rhus glabra</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization).	Coder
Staghorn sumac	<i>Rhus typhina</i>	Good	Regenerates quickly from root sprouts following disturbance.	Sydnor
Black locust	<i>Robinia pseudoacacia</i>	Good	Tolerant of root loss and fill soil. Intolerant of saturated soils. Sensitive to borers when stressed.	Hightshoe, Sydnor

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Willow	<i>Salix</i> spp.	Moderate-good	Moderately tolerant of root pruning and fill soil. Show considerable resistance to "contractor pressures."	Day, Fraedrich, Gilbert
Weeping willow	<i>Salix babylonica</i>	Moderate-good	Disturbance may lead to cankering. Tolerant of some fill. Increased likelihood of windthrow with saturated soils.	S. Clark, Sydnor
Coastal plain willow	<i>Salix caroliniana</i>	Good	—	Coder
Black willow	<i>Salix nigra</i>	Good	Tolerant of root loss and saturated soils. Tolerant of some fill.	Coder. Hightshoe, Sydnor
Silky willow	<i>Salix sericea</i>	Good	—	Coder
American elder	<i>Sambucus canadensis</i>	Poor	Response is site dependent.	Coder
Sassafras	<i>Sassafras albidum</i>	Good	Regenerates from root suckers following disturbance.	Coder, Sydnor
California peppertree		<i>Schinus molle</i>	Moderate	Ellis
Coast redwood	<i>Sequoia sempervirens</i>	Good	Supplemental irrigation required if located out of native range, as well as during construction and following injury.	Matheny & Clark
Glant redwood	<i>Sequoiadendron giganteum</i>	Moderate	Intolerant of summer irrigation and fill soil.	Matheny & Clark
Mountain ash	<i>Sorbus aucuparia</i>	Moderate	Tolerant of root loss. Intermediate in tolerance to saturated soils.	Hightshoe
American bladdernut	<i>Stophylea trifolia</i>	Good	—	Coder
Virginia stewartia	<i>Stewartia malacodendron</i>	Good	—	Coder
Mountain stewartia	<i>Stewartia ovata</i>	Good	—	Coder
American snowbell	<i>Stytax americana</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization). Response constrained by soil aeration and water availability.	Coder
Bigleaf snowbell	<i>Styrax grandifolia</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization). Response constrained by soil aeration and water availability.	Coder
Common sweetleaf	<i>Symplocos tinctoria</i>	Good	Intolerant of mechanical injury (poor compartmentalization).	Coder
Bald-cypresses	<i>Taxodium distichum</i>	Good	Adapts readily to wide range of soils, wet to dry, sandy to heavy. Tolerant of alkaline soils. Trunk does not disturb pavement but knees may emerge in	S. Clark, Coder, Slebenthale r

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			yards.	
Pond cypress	<i>Taxodium distichum</i> var. <i>nutans</i>	Good	—	Coder
Northern white cedar	<i>Thuja occidentalis</i>	Good	Tolerant of root loss, some fill, and saturated soils.	Hightshoe, Sydnor
Western red cedar				
cedar	<i>Thuja plicata</i>	Good	Relatively windfirm. Intolerant of changes in water table/soil moisture.	Peepre
Western red cedar				
cedar	<i>Thuja plicata</i>	Poor-moderate	Response is very site dependent, probably related to soil moisture. Intolerant of fill.	Beck, Dunster
Linden	<i>Tilia</i> spp.	Moderate-good	Moderately tolerant of root pruning. Considerable resistance to "contractor pressures."	S. Clark, Gilbert, Fraedrich
Basswood	<i>Tilia americana</i>	Poor	Tolerant of root loss. Intolerant of saturated soils. Intolerant of site disturbance and fill.	Hightshoe, Sydnor
Carolina basswood	<i>Tilia caroliniana</i>	Poor	Response is site dependent.	Coder
White basswood	<i>Tilia heterophylla</i>	Poor	Response is site dependent.	Coder
Poison sumac	<i>Toxicodendron venosum</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization).	Coder
Eastern hemlock	<i>Tsuga canadensis</i>	Poor	Intolerant of fill and saturated soils.	Coder, Sydnor
Western hemlock	<i>Tsuga heterophylla</i>	Poor-moderate	Prone to windthrow, decay, and dwarf mistletoe. Intolerant of grade change. Poor compartmentalization.	Beck, Dunster, Peepre
Elm	<i>Ulmus</i> spp.	Good	Tolerant of root pruning.	Fraedrich
Winged elm	<i>Ulmus alata</i>	Good	—	Coder
American elm	<i>Ulmus americana</i>	Good	Tolerant of root loss and site disturbance. Intermediate in tolerance to saturated soils.	Day, Hightshoe, Sydnor
American elm	<i>Ulmus americana</i>	Moderate	Pest problems associated with development impacts (southeastern U.S.).	Coder
Siberian elm	<i>Ulmus pumila</i>	Good	Tolerant of fill soil, root pruning, injury, a wide range of soil moisture conditions, and high-soluble salts.	Day
Slippery elm	<i>Ulmus rubra</i>	Good	Tolerant of root loss. Intermediate in tolerance to saturated soils.	Hightshoe
Slippery elm	<i>Ulmus rubra</i>	Moderate	Pest problems associated with development impacts (southeastern U.S.)	Coder
California bay	<i>Umbellularia californica</i>	Moderate	Intolerant of fill soil.	Matheny & Clark

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Sparkleberry	<i>Vaccinium arboreum</i>	Moderate	Response is site dependent.	Coder
Possumhaw viburnum	<i>Viburnum nudum</i>	Good	—	Coder
Walter's viburnum	<i>Viburnum obovatum</i>	Good	—	Coder
Rusty black haw	<i>Viburnum rufidulum</i>	Good	—	Coder
Hercules club	<i>Zanthoxylum clava-herculis</i>	Moderate	Intolerant of mechanical injury (poor compartmentalization).	Coder

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(Ord. No. 2002-08, § 2, 4-8-02) <?xpp restore?>

APPENDIX D

TREE PROTECTION AREA SIGNAGE

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Tree Protection Area Signage

The sign shall be made of rigid material such as wood, metal or durable plastic. Non-rigid materials such as paper, cardboard, cellophane or foil are not acceptable. The sign shall be two (2) feet wide by three (3) feet long.