

**AN ORDINANCE AMENDING THE CARRBORO LAND USE ORDINANCE  
PROVISIONS REGULATING THE RETENTION AND PLANTING OF TREES**

\*DRAFT 6-19-2014\*

**THE BOARD OF ALDERMEN OF THE TOWN OF CARRBORO ORDAINS:**

Section 1. Part II of Article XIX of the Carrboro Land Uses Ordinance is rewritten to read as follows:

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**PART II. SHADING AND TREE PROTECTION**

**Section 15-314 Board Findings and Declaration of Policy on ~~Shade-Protecting Trees and Other Plants.~~**

- (a) The Board finds that:
- (1) Trees, shrubs, and other plants are proven producers of oxygen, a necessary element for human survival; and
  - (2) Trees, shrubs, and other plants appreciably reduce carbon emissions by shading buildings and thereby lowering energy use to cool buildings ~~reduce the ever-increasing environmentally dangerous carbon dioxide content of the air and play a vital role in purifying the air we breathe;~~ and
  - (3) Trees, shrubs, and other plants improve air quality by lowering air temperatures and removing air pollutants ~~precipitate dust and other particulate air borne pollutants from the air and create temporary conditions of narcosis allowing air borne pollutants to settle to the ground;~~ and
  - (4) Trees, shrubs, and other plants transpire considerable amounts of water each day and thereby maintain the natural hydrologic cycle ~~purify the air much like the air washer devices used on commercial air conditioning systems;~~ and
  - (5) ~~Trees, shrubs, and other plants have an important role in neutralizing waste water passing through the ground from the surface to ground water tables and lower aquifers;~~
  - (~~5~~6) Trees, shrubs, and other plants through their canopies and root systems intercept precipitation and encourage rain to infiltrate into the soil and maintain soil water for plants and recharge ~~stabilize the~~ ground water

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~~tables~~ and play an important and effective part in soil conservation, erosion control, creek protection, and flood control; ~~and~~

- (~~67~~) Trees, especially large, old trees, provide invaluable beneficial physical, aesthetic, historic, and psychological counterpoint to the urban setting, making urban life more comfortable by providing shade and cooling the air, and land, and built environment, reducing noise levels and glare, shielding people from high winds, and breaking the monotony of human developments on the land, particularly for parking areas and streets; and
- (~~78~~) Trees, shrubs, and other plants help improve soil quality by breaking up heavy soils, mining nutrients, and remediating soils at contaminated sites by absorbing, transforming, and containing a number of contaminants; and
- (8) Tree stands create habitats that support a diversity of plants and animals; and
- (9) Trees, shrubs, and other plants make important contributions to the vitality and character of the Town and its neighborhoods and create a more aesthetic, pleasant, and emotionally satisfying place in which to live, work, and spend leisure time; and
- (10) Trees, shrubs, and other plants provide numerous human health benefits such as shading ultraviolet radiation, reducing rates of respiratory disease and illness, and stress management,; and
- (~~811~~) ~~For the reasons indicated in subdivision (7),~~ Trees, shrubs, and other plants have an important impact on the desirability of land and, consequently, on property values as well as benefitting commercial activity by creating a more enjoyable environment.  
(AMENDED 03/21/89)

(b) Based upon the findings set forth in subsection (a), the Board declares that it is not only desirable but essential to the health, safety, and welfare of all persons living or working within the town's planning jurisdiction, present and future, to protect certain existing trees and tree stands and, under the circumstances set forth in this article, to require the planting of new trees in certain types of developments.

Section 15-315 Definitions.

Unless otherwise specifically provided, or unless clearly the context clearly indicates otherwise, the words and phrases defined below shall have the meaning indicated when used in this Part.

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(1) Canopy tree. A healthy evergreen or deciduous tree species that matures at a height of at least thirty (30) feet.

~~(1)~~ (2) Dripline. Perimeter formed by the points farthest away from the trunk of a tree where precipitation falling from the branches of that tree lands on the ground).

~~(2)~~ (3) Clearcutting: The term “clearcutting” shall refer to the large-scale, indiscriminate removal of trees, shrubs, and undergrowth with the intention of preparing real property for nonagricultural purposes. (AMENDED 05/25/99)

(4) A specimen or rare tree is defined as any healthy tree that:

i. has a trunk diameter at breast height (dbh) of thirty-six (36) inches or more for pine tree species; or

ii. has a trunk dbh of 18” inches or more for any species; or

iii. has a trunk dbh of 12 inches or more in the case of the species from the following list of North Carolina native canopy tree genera; or

*Aesculus* (Ohio Buckeye)

*Chamaecyparis* (Atlantic White Cedar)

*Carya* (Southern Shagbark Hickory)

*Diospyros* (Persimmon)

*Fagus* (Beech)

*Juniperus* (Eastern Red Cedar)

*Magnolia* (Magnolia)

*Pinus* (Longleaf pine)

*Quercus* (Swamp Chestnut Oak)

*Taxodium* (Bald cypress)

*Tsuga* (Hemlock)

*Ulmus* (American Elm)

iv. has a trunk dbh of six (6) inches or more in the case of the species from the following list of North Carolina native understory tree genera: or

*Amelanchier* (Serviceberry)

*Asimina* (Pawpaw)

*Carpinus* (Hornbeam) ~~*Juniperus* (Cedar)~~

*Cercis* (Redbud) ~~*Pinus palustris* (Longleaf pine)~~

*Chionanthus* (Fringetree)

*Cornus* (Dogwood)

*Crataegus* (Hawthorn)

*Halesia* (Silverbell)

*Hamamelis* (Witch-hazel)

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*Art. XIX - SCREENING AND TREES*~~*Ilex* (Holly)~~~~*Carya-Ostrya* (Hophornbeam)~~~~(Southern shagbark hickory)*Oxydendrum* (Sourwood)~~~~*Quercus Michauxii* (Swamp Chestnut Oak)*Sassafras* (Sassafras)~~~~*Taxodium* (Bald cypress)*Tsuga* (Hemlock)*Fagus* (Beech) — *Ulmus*  
(American Elm)~~

v. is listed as a State or National Champion by the North Carolina Forest Service or the American Forestry Association; or

vi. provides unique habitat for any endangered or threatened wildlife species protected by Federal law; or

vii. has been cited by the Board of Aldermen as being historically significant; or

viii. any other tree species listed in the North Carolina Natural Heritage Program as being significantly rare, of special concern, threatened, or endangered.

(5) Tree. A perennial woody plant, single or multiple trunks, with few if any branches on its lower part, which at maturity will obtain a minimum six (6) inch caliper.

(6) Tree canopy. The combined area encompassing the drip zones of all canopy trees.

(7) Tree Protection Perimeter. That area within a circle drawn with the tree's trunk as the center. and a radius is dependent upon site conditions and the relative tolerance of tree species to construction damage. Standard accepted radius is 1-1.5 feet per diameter inch of tree to be retained. fined by the tree's dripline

**Section 15-316 Required Trees Along Dedicated Streets.**

Along both sides of all newly created streets with respect to which an offer of dedication is required to be made by this chapter, the developer shall either plant or retain sufficient trees so that, between the paved portion of the street and a line running parallel to and fifty feet from the center line of the street, there is for every thirty feet of street frontage at least an average of one deciduous tree that has or will have when fully mature a trunk at least twelve inches in diameter. Trees planted to satisfy this section shall not be placed uniformly but in an irregular pattern with a minimum of one twelve inch (12") diameter tree (when fully mature) every one hundred feet (100'). When trees are planted by the developer pursuant to this section, the developer shall choose trees that meet the standards set forth in Appendix E. (AMENDED 11/19/96)

**Section 15-317 Retention and Protection of Large Specimen and Rare Trees.**

(a) Every development shall retain all existing trees eighteen inches in diameter or more, and all very rare trees of any tree diameter, specimen and rare trees unless the retention of

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such trees would unreasonably burden the development. ~~For the purposes of this section, very rare trees include the American Elm, Bald Cypress, Incense Cedar, Ohio Buckeye, Osage Orange, Swamp Chestnut Oak, and Southern Shagbark Hickory, which are either not native to the region, or are native, but occur only in very small numbers in the region, as well as all tree species listed in the North Carolina Natural Heritage Program as being significantly rare, of special concern, threatened, or endangered.~~ When a site would be so unreasonably burdened by the retention of all such trees that a choice must be made as to which trees will be retained, the following criteria shall be used by the applicant, in consultation with the land use administrator and landscape or forestry professional, to evaluate the trees for the purpose of deciding which to retain:

- (1) The rareness of the tree species, both relative to the species representation on the site and relative to the species representation within the region and the state. This shall be the most important criterion in the evaluation;
- (2) The tree's relative size and age, large old trees being considered more valuable than smaller, younger trees of the same species;
- (3) The tree's relative expected longevities, including such factors as the tree's relative health at the time of the evaluation;
- (4) The relative hardiness of the trees in question, including wind firmness, climatic requirements, susceptibility to insects and diseases;
- (5) The tree's relative aesthetic values, including flowers, fruit, form characteristics, potential for autumn coloration;
- (6) The tree's relative sizes at maturity;
- (7) The tree's relative contribution to summertime comfort through their potential to provide shading.

~~(b) Flexible approaches such as adjustments to lot layout, placement of buildings and paved surfaces and location of utilities should be pursued in order to save rare and specimen trees. 3 No rare tree shall be removed unless the Town Manager determines there is no reasonable way the property can be otherwise developed, improved or properly maintained, and the tree saved. (AMENDED 03/21/89)~~

~~(c)~~ No excavation or other subsurface disturbance may be undertaken within the Tree Protection Perimeter around any tree to be retained in accordance with (a) above. ~~For purposes of this Article, the Tree Protection Perimeter is defined as that area within a circle drawn with the tree's trunk as the center and a radius defined by the tree's dripline (which is the perimeter formed by the points farthest away from the trunk of a tree where precipitation falling from the branches of that tree lands on the ground).~~ In addition, no impervious surface (including but not limited to equipment, paving, and structures) may be located within the Tree Protection

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Perimeter, either during construction or after completion of the development. **(AMENDED 03/21/89)**

(de) There shall be no clearcutting in any development within the Transition Area portion of the Carrboro Joint Development Area as identified in the Joint Planning Agreement.

(ed) If space that would otherwise be devoted to parking cannot be so used because of the requirements of subsections (a) or (b), and, as a result, the parking requirements set forth in Article XVIII cannot be satisfied, the number of required spaces may be reduced by the number of spaces "lost" because of the provisions of subsections (a) and (b), up to a maximum of fifteen percent of the required spaces.

**Section 15-318 Shade Trees In Parking Areas.**

(a) Vehicle accommodation areas containing more than four parking spaces that are required ~~to be paved~~ by Section 15-296 must be shaded by deciduous trees (either retained or planted by developer) that have or will have when fully mature a trunk at least twelve inches in diameter. When trees are planted by the developer to satisfy the requirements of this subsection, the developer shall choose trees that meet the standards set forth in Appendix E. **(AMENDED 11/10/81)**

(b) Each tree of the type described in subsection (a) shall be presumed to shade a circular area having a radius of fifteen feet with the trunk of the tree as the center, and there must be sufficient trees so that, using this standard, twenty-three percent of the vehicle accommodation area will be shaded.

(c) No paving may be placed within 15 feet (measured from the trunk) of any tree retained to comply with subsection (a), unless such tree is eighteen inches or greater in diameter or a very rare species as described in Section 15-316, in which case no paving may be placed within the Tree Protection Perimeter for such trees as described in 15-316(b). New trees planted to comply with subsection (a) shall be located so that they are surrounded by at least 200 square feet of unpaved area. **(AMENDED 5/10/83, 03/21/89)**

(d) Vehicle accommodation areas shall be laid out and detailed to prevent vehicles from striking trees. Vehicles will be presumed to have a body overhang of three feet six inches.

(e) The foregoing requirements shall not apply to 19.100 classification uses where such uses do not involve the construction of a permanent structure and are conducted not more than two days per week on the site of a vehicle accommodation area that is used primarily in connection with another use. Furthermore, when a 19.100 classification use meeting the foregoing requirements is installed on a lot that is nonconforming with respect to the shading requirements of this section, the lot shall not be required to comply with these shading requirements solely because of installation of such use, even though a new permit applicable to the entire lot may be required. **(AMENDED 9/2/86)**

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**Section 15-319. Tree Canopy Coverage Standards**

***(a) Minimum Canopy Coverage Standards***

Subject to the remaining provisions of this section, the following minimum tree canopy coverage percentages are required within the boundaries of every lot or tract for which a zoning, special use, or conditional use permit is issued after [date] \_\_\_\_\_; exclusive of required cleared active recreation areas, water bodies, access easements, public and private right-of-way, stormwater and utility easements.

**Table 1: Minimum Tree Canopy Coverage Standards**

<b>Land Use</b>	<b>Minimum Canopy Coverage</b>
<b>Residential</b>	<b>40%</b>
<b>Other than residential excluding districts (B-1(c), (B-1(g), (B-2)</b>	<b>30%</b>
<b>Other than residential in districts (B-1(c), (B-1(g), (B-2)</b>	<b>15%</b>

(1) When a tract is subdivided and pursuant to the provisions of Article XIII the developer sets aside open space areas or recreation areas that contain canopy trees (with a minimum caliper of six inches) or when a developer of a subdivision plants canopy trees to comply with the shading requirements of Article XIII, the total tree canopy area so preserved or established shall be credited against the minimum canopy coverage percentages set forth above. The remaining required tree canopy coverage area shall be allocated by the subdivider among the subdivided lots, and this allocation shall be shown on the recorded plat of such subdivision.

***(b) Modifications to Canopy Coverage Standards***

The permit issuing authority may approve a development application that does not fully comply with the canopy coverage standards when it finds that the application substantially complies with these standards and that such a deviation enables the development to better achieve other Town objectives, such as the promotion of solar access to encourage active and passive solar technology for water and space heating and renewable energy generation, improved stormwater management, and the preservation of established managed landscapes, or established streetscapes.

***(c) Implementation of Standards***

Compliance with the tree canopy standards shall be achieved as follows:

1) Protection of existing tree canopy. The extent of existing tree canopy coverage retained at the time of permit application may be documented by survey or by using current aerial photographs available on the Town’s web page or similar resource. Protection of the existing tree canopy will be demonstrated by the tree protection plan required by Section 15-320;

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2) Replacement of canopy. If the existing protected tree canopy is less than the minimum standard as shown in Table 1, the deficit shall be made up by the planting of additional trees as provided herein:-

- a. One (1) replacement tree per 500 square feet of tree canopy coverage deficit shall be planted in accordance with an approved planting plan.
- b. All canopy trees planted to meet the Town's screening and parking lot shading standards can be counted when calculating replacement canopy trees provided.
- c. Supplemental canopy trees planted to complete the canopy coverage requirements shall be planted no less than twenty (20) feet from any other proposed or existing canopy tree.
- d. Replacement trees that are planted in an adjacent right-of-way may count toward total tree canopy.
- e. Replacement tree caliper shall be two and one-half (2.5) inches at installation. A replacement tree with a caliper of four (4) inches or greater may count for two replacement trees.

**Section 15-320 Protection of Trees During Construction.**

(a) The permit recipient shall be responsible for ensuring that all existing trees specifically shown on approved plans as being retained to comply with this article are protected, during the construction process, from removal, destruction, or injury. As described in Appendix A, a tree protection plan detailing the methods for such protection shall be submitted as part of the land use permit application and construction plan package. Tree protection methods shall meet accepted industry standards in accordance with ANSI A300 and associated Best Practices. (AMENDED 3/12/85; 2/24/87; 03/21/89)

- (1) The permit recipient shall ensure that, before any excavation takes place on the site, a barrier is erected around the Tree Protection Perimeter of all trees to be retained on the site that are within the area to be disturbed by construction activities, and other provisions made such as are necessary and sufficient to put on notice all construction personnel that the area within the Tree Protection Perimeter of all such ~~large and rare~~ trees ~~is~~are to be retained is not be disturbed. During the construction process, the permit recipient shall ensure that all activities are kept outside the Tree Protection Perimeter of all such trees. The barrier required by this subsection shall be installed before the issuance of any grading or construction permits for such site.
- (2) The permit recipient shall ensure that all ~~such large and rare species~~ trees to be retained on the site that are within the area to be disturbed by construction activities, or near roads within the development, shall be further protected from accidental equipment damage by wrapping their trunks with sections of snow fence or boards wired together from the ground to a height six (6) feet above the ground.



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- (3) The permit recipient shall ensure that land disturbing activity shall not occur, and that building materials, construction trailers, vehicles, equipment or machinery, dirt, fill, and/or other debris shall not be stored within the Tree Protection Perimeter of such trees as are to be retained.
- (4) The permit recipient shall ensure that all such trees as are to be preserved shall not be used as supports for roping, cable, signs, or fencing, and that nails shall not be driven into the trunks of trees.
- (5) The permit recipient shall ensure that any damage done during construction to the limbs or trunks of such ~~large or very rare~~ trees as are to be retained shall be properly treated so as to assure the continued health of the trees. The land use administrator shall be consulted, and may suggest that the applicant seek advice from landscape or forestry professionals as to the appropriate method for such treatment.
- (6) Prior to the commencement of any land alteration on a site for which a Tree Protection Plan has been approved, including all clearing or grading activities, the land use administrator shall certify in writing based on an inspection of the site that all tree protection measures required by the approved Tree Protection Plan have been put in place properly and accurately. The land use administrator shall provide this certification in a timely fashion on being notified by the permit recipient that the site is ready for such inspection and certification. **(AMENDED 03/21/89)**

(b) If a violation of subsection (a) occurs, and as a result ~~(b) very rare or specimen species tree(s) or trees greater than eighteen inches in diameter~~ specifically shown on approved plans as being retained dies or otherwise must be removed within four years after a certificate of occupancy is granted for that portion of a development on which the tree(s) is/are or was/were located, then the permit recipient shall be required to replace such tree(s) with an equal number of trees of the same species, if available, or of a similar species. The choice of the replacement species, where necessary, shall be made subject to approval by the Town. Each replacement tree shall be at least of tree diameter equivalent in size to one (1) inch per every four (4) inches of tree diameter of the tree it replaces, up to maximum replacement tree diameter of five inches. In cases where the tree to be replaced had a diameter greater than twenty inches, it shall be replaced by more than one tree, such that the ratio of one inch of replacement tree diameter to four inches of original tree diameter is satisfied, and at least one of the replacement trees is of the maximum replacement tree diameter of five inches. In addition, no replacement tree may be smaller than one inch in diameter. For example, a twenty-eight inch diameter tree would be replaced by one five inch diameter tree and one two-inch diameter tree of the same species. Tree replacement shall be performed by either a landscape contractor or forester licensed to practice in the State of North Carolina, or by an arborist certified by the International Society of Arboriculture or National Arborists Association. Such replacement must take place within one year after the death or removal of the trees occur, and this obligation shall be a continuing condition of the validity of the permit. Violators of the tree protection requirements described in subsection (a)

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shall be subject to the penalties and remedies for all land use ordinance and land use permit condition violations described in Section 15-114. (AMENDED 03/21/89)

**Section 15-319 Performance Security May Be Required (AMENDED 03/21/89; 10/24/06)**

(a) In cases when the land use administrator has reasonable cause to believe that a Tree Protection Plan has been violated, he or she may require that the developer post a security, for the five year period (four years plus one year in which replacement may occur) described in subsections (b) and (c) of section 15-318, to cover the potential replacement of all such large and rare species trees as are called out in the Tree Protection Plan as being protected. The purpose of this security is to ensure that the financial capability will exist, during the full five year period described in subsections (b) and (c) of section 15-318, to replace any large or rare species trees as are called out on a Tree Protection Plan as being protected during construction, and which have died due to construction damage caused by a violation of the Tree Protection Plan.

(b) It is the intent of this section that the removal and replacement of such trees that die due to construction damage shall be arranged by the Town only when the developer cannot be located at the time when the removal and replacement becomes necessary.

(c) The required security shall be in the form of an interest-bearing account or certificate of deposit payable to the Town, in the amount necessary for the removal of all of the large and rare species trees as are called out in the Tree Protection Plan as being preserved, their replacement as described in subsections (b) and (c) of section 15-318, and the one-time violation penalty described in section 15-114 at the time the security is required. At such time as the four year period described in subsections (b) and (c) of section 15-318 is complete, and no deaths of trees called out in the Tree Protection Plan as being preserved have occurred, the security and all interest accrued on it shall revert to the developer. In the event that some but not all of the security amount is used or needed for tree removal and replacement at the end of the four year period described in subsections (b) and (c) of section 15-318, the remaining security amount and the interest it has accrued shall revert to the developer at the end of that four year period.

**Section 15-319.1 Regulation of Forestry Activities.**

(a) The terms “forestry,” “forestry activity,” “forestland,” “forest management plan” and “timber harvest” shall be defined by and used in the same manner as in G.S. 160A-458.5.

(b) Notwithstanding any other provisions of this chapter, this chapter does not regulate either:

(1) Forestry activity on forestland that is taxed on the basis of its present-use value as forestland under G.S. Chpt. 105, Art. 12; or

(2) Forestry activity that is conducted in accordance with a forest management plan that is prepared or approved by a forester registered in accordance with G.S. Chpt. 89B.

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(c) Notwithstanding subsection (b) above, the Town may deny a zoning, special use, conditional use, or building permit for a tract of land for a period of up to three years after the completion of a timber harvest if the harvest results in the removal from that tract of all or substantially all of the trees protected by this chapter. If the removal of such trees was in willful violation of the requirements of this chapter, then such permits may be refused for a period of five years.

Section 2. Appendix A-6 (Proposed changes in existing features or new features), subsection 24 is amended as follows:

A Tree Protection Plan, will be completed and stamped by a Certified Arborist of Landscape Architect, illustrating the methods proposed to be used to protect, during construction, the trees that are required to be protected under the provisions of Chapter XIX including specifications as to how the grade, drainage, and aeration will be maintained around the trees. The location of all rare and specimen trees to be retained on the site that will not be within the area to be disturbed by construction activities near a building site, or near roads within the development shall also be shown on the plan, along with a note stating that these trees will not be within the area to be disturbed by construction activities. The Administrator may recommend that applicants consult with experts in landscape architecture or forestry about appropriate tree protection methods for the particular conditions and species in question, and request that their contractors review two videotapes on tree protection during construction developed by the International Society of Arboriculture, entitled "Effect of Building Construction on Trees in Wooded Lots" and "Avoidance of Construction Damage to Tees on Wooded Lots" that are on file in the Public Works Department.

Section 3. Subsection E-1, of Appendix E is rewritten as follows:

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**E-1 Guide for Protecting Existing Trees**

Section 15-316 provides for the retention and protection of large trees when land is developed. In order to better ensure the survival of existing trees, the developer should heed the following guidelines:

(a) Protect trees with fencing and armoring (if needed) during the entire construction period. The fence should enclose an area 1-1.5 feet x the diameter inches of the tree to be retained. The area inside the fence should be off limits and no work should take place inside the tree preservation zone. ~~The fence should enclose an area ten feet square with the tree at the center.~~

(b) Avoid excavations beneath the crown of the tree as required by Section 15-316(b).

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(c) ~~Avoid compaction of the soil around existing trees due to heavy equipment. In areas where storage or vehicular access must take place within the tree preservation area outlined above, a drivable mulch pad with 1/2" plywood on top may be used to protect the tree's root system, maintaining a minimum distance of 8' from the trunk.. Mulch should be maintained at 12" depth. Preservation fencing should still be placed between the work zone and the tree's trunk. Trunk armoring may be needed when equipment will be used in close proximity to the tree. Do not pile dirt or other materials beneath the crown of the tree.~~

(d) Keep fires or other sources of extreme heat well clear of existing trees.

~~(e) Damaged roots should be cleanly cut and covered with topsoil to prevent drying. If damage to limbs or branches is anticipated in certain locations, pruning prior to beginning work may be considered. Limbs and branches broken during the construction process but still attached should be pruned to prevent further damage. An assessment should be performed and corrective pruning may be necessary after construction has been completed around the tree. Pruning / restoration work should be performed under the supervision of a Certified Arborist. Repair damaged roots and branches immediately. Exposed roots should be covered with topsoil. Severed limbs and roots should be painted. Whenever roots are destroyed, a proportional amount of branches must be pruned so the tree doesn't transpire more water than it takes in. Injured trees must be thoroughly watered during the ensuing growing year.~~

~~(f) All existing trees which will be surrounded by paving should be pruned to prevent dehydration.~~

(f) As is stipulated in Section 15-316(b), no paving or other impermeable ground cover should be placed within the dripline of trees to be retained.

Section 4. Subsection E-3, of Appendix E is rewritten as follows:

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**E-3 Formula for Calculating 35% Shading of Vehicle Accommodation Areas**

Following is an elementary formula for determining the number of shade trees required in and around parking lots in order to presumptively satisfy the shading requirements of Section 15-317.

- 1. Calculate square footage of the vehicle accommodation area. Include parking spaces, driveways, loading areas, sidewalks, and other circulation areas. Do not include building area and any area which will remain completely undeveloped: \_\_\_\_\_ sq. ft.
  - 2. Multiply x .2035
  - 3. Areas to be shaded: \_\_\_\_\_ sq. ft.
- \*\*\*\*\*
- Add:
- 4. Area shaded by existing trees to be retained in and around the vehicle

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- accommodation area:\* \_\_\_\_\_ sq. ft.
- 5. Area shaded by required screening trees, if any:\* \_\_\_\_\_ sq. ft.
- 6. Area shaded by required street trees, if any:\* \_\_\_\_\_ sq. ft.
- 7. Subtotal: \_\_\_\_\_ sq. ft.  
(if line #7 is greater than line #3, then the shading requirement has been met. If not, go on to line #8)
- 8. Enter the difference between line #7 and line #3: \_\_\_\_\_ sq. ft.
- 9. Divide line #8: ÷ 707
- 10. Total number of shade trees required within the vehicle accommodation area: \_\_\_\_\_ trees

\*Existing trees retained in compliance with Section 15-316 will be credited according to their actual crown radius. Shaded area may be calculated as follows:

$$3.14 \times (\text{crown radius})^2 = \text{shaded area}$$

Trees planted within the vehicle accommodation area are credited with shading 707 sq. ft. (Based on a crown radius of 15) New or existing trees on the perimeter of the parking lot are credited for having only half a crown over the vehicle accommodation area (e.g., new perimeter trees will be credited for shading 354 sq. ft.). Generally, all trees planted in compliance with the screening requirements of Article XIX, Part I and the street tree requirements of Section 15-315 will be considered perimeter trees. When smaller trees such as Dogwoods are planted, the credited shading area will be adjusted downward to 314 sq. ft. for interior trees and 157 sq. ft. for perimeter trees. (Based on a crown radius of 10 ft.)

Section 5. Subsection E-5, of Appendix E is rewritten as follows:

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**E-5 Guide for Planting Trees**

The trees recommended in Section E-10 have minimal maintenance requirements. However, all trees must receive a certain degree of care, especially during and immediately after planting. In order to protect an investment in new trees, the developer and his or her agents should follow these guidelines, in accordance with International Society of Arboriculture (ISA) Best Practices, when planting: ~~The trees recommended in Section E-10 have minimal maintenance requirements. However, all trees must receive a certain degree of care, especially during and immediately after planting. In order to protect an investment in new trees, the developer and his or her agents should follow these guidelines when planting:~~

(a) All plant material shall conform to the current American Standards for Nursery Stock and must be free from injury, insect infestations and disease. Tree caliper at time of planting should be 2-3". The best times for planting are early spring and early fall. Trees planted in the summer run the risk of dehydration.

(b) The best times for planting are early spring and early fall, but may vary depending upon tree species and site conditions. These factors must be considered when selecting species and

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planting schedule. Trees planted in the summer run the risk of dehydration and precautions must be taken to ensure establishment. Plant all trees at least three and a half feet from the end of head-in parking spaces in order to prevent damage from car overhang.

(c) Plant all trees at least three-and-a-half feet from the end of head-in parking spaces in order to prevent damage from car overhang. Dig the tree pit at least one foot wider than the root ball and at least six inches deeper than the ball's vertical dimension.

(d) Planting hole should be at least 2x the diameter of the root ball and not deeper than the distance from the bottom of the root ball to the root flair, which may be hidden beneath root ball soil. Excess soil above the root flair should be removed once the tree is in place. The tree should be planted so that its root flair just above existing grade. Especially in areas where construction activity has compacted the soil, the bottom of the pit should be scarified or loosened with a pick ax or shovel.

(e) Especially in areas where construction activity has compacted the soil, the sides of the planting hole should be scarified or loosened with a pick ax or shovel. After the pit is dug, observe sub-surface drainage conditions. Most soils in the Carrboro area are poorly drained. Where poor drainage exists, the tree pit should be dug at least an additional twelve inches and the bottom should be filled with coarse gravel.

(f) After the pit is dug, observe sub-surface drainage conditions. Most soils in the Carrboro area are poorly drained. Planting depth where poor drainage exists should be dependent upon the water needs of the tree species. If the species is more sensitive to poor drainage, the tree should be planted higher than existing grade, not to exceed ¼ root of the ball above grade. Back fill should then be sloped gradually from top of root ball to existing grade. Gravel placed at the bottom of the hole will not improve drainage. Backfill should include a proper mix of soil, peat moss and nutrients. All roots must be completely covered. Backfill should be thoroughly watered as it is placed around the roots.

(g) Backfill should include a proper mix of soil, peat moss and nutrients. All roots must be completely covered. Backfill should be thoroughly watered as it is placed around the roots. Immediately after it is planted, the tree should be supported with stakes and guy wires to firmly hold it in place as its root system begins to develop. Staked trees will become stronger more quickly. Remove stakes and ties after one year.

(h) Staking the tree is not recommended unless necessary to stabilize the tree e.g., a loose root ball, unstable bare root transplant, or large evergreen w/ higher wind resistance. Staking a tree unnecessarily can reduce the development of structural roots and proper trunk taper. If tree is to be staked, it should be done so loosely and staking should be removed after the first year. Guying materials should not girdle or cut into the bark. Spread at least three inches of mulch over the entire excavation in order to retain moisture and keep down weeds. An additional three-inch saucer of mulch should be provided to form a basin around the trunk of the tree. This saucer helps catch and retain moisture.

*Art. XIX - SCREENING AND TREES*

(i) Mulch should be spread at a depth of 2-3 inches maximum, ideally extending to the drip line. At a minimum, it should cover the entire excavation area in order to retain moisture and help to prevent weeds. Mulch should not be allowed to touch the trunk, as this will cause moisture build up, increasing the chance of trunk decay. If necessary, on sloped locations, create a raised ring on the downhill side of the slope to catch rain runoff. ~~The lower trunks of new trees should be wrapped with burlap or paper to prevent evaporation and sun scald. The wrapping should remain on the tree for at least a year.~~

(j) Trunk wrapping is not required but may be considered for certain species with thin bark in certain locations. If wrap is to be used it should be light colored, biodegradable (paper), and be wrapped from the bottom up. This will help to prevent moisture build up along the trunk.

(k) ~~Conscientious post-planting care, especially watering, pruning and fertilizing, is a must for street and parking lot trees. Minimal pruning should be performed during the first year, if at all. Watering and fertilization rates are dependent upon site conditions. Conscientious post-planting care, especially watering, pruning and fertilizing, is a must for street and parking lot trees. Branches of new trees may be reduced by as much as a third to prevent excessive evaporation.~~

Section 6. All provisions of any town ordinance in conflict with this ordinance are repealed.

Section 7. This ordinance shall become effective upon adoption.