STAFF REPORT
Town of Knightdale

To:	Mayor and Town Council	Budget Amendment - #BA
From:	Jeff Triezenberg, Planner II	Planning Director Signature --
Subject:	ZTA-4-08, Tree Protection Amendment	Town Manager Signature –
Date:	March 19, 2008	

REPORT

SEE ATTACHED

REPORT RECOMMENDED ACTION

Motion to adopt statement of plan consistency and reasonableness of action, followed by motion to approve ZTA-4-08 and adopt ORD# 08-03-19-003.

TOWN OF KNIGHTDALE
PLANNING DEPARTMENT
www.ci.knightdale.nc.us
950 Steeple Square Court
Knightdale, NC 27545
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ZONING TEXT AMENDMENT ZTA-4-08

Tree Protection

REPORT TO THE TOWN COUNCIL
PUBLIC HEARING: March 3, 2008
LURB MEETING: March 10, 2008
COUNCIL MEETING: March 19, 2008

Prepared by the Knightdale Planning Department

I. REQUEST AND BACKGROUND

Application requesting a Zoning Text Amendment to amend the Environmental Protection and Landscaping chapters in relation to clearing, grading and tree protection. The applicant is identified as the Town's Land Use Review Board. The specific text amendments as applied for are as follows:

Section 6.1 Purpose and Intent

The purpose of this Chapter is to protect, maintain and enhance public health, safety, environment and general welfare by establishing minimum requirements and procedures to control adverse effects of sediment and erosion control, grading, post construction storm water runoff, illicit discharges and flood damage. Proper management of storm water runoff will minimize damage to public and private property and infrastructure, safeguard the public health, safety and general welfare and protect water and aquatic life.

Section 6.2 Sedimentation and Erosion Control

All new development and redevelopment shall be required to take measures to minimize erosion during construction and after development. All new development and redevelopment shall comply with the provisions of the latest adopted amendment to Wake County Erosion and Sedimentation Control Ordinance. Certification of compliance with or exemption from the plan requirements of such regulations shall be submitted to the Administrator prior to issuance of a Development Permit for a subdivision, or part thereof. Furthermore, no infrastructure or individual lot grading shall commence prior to the completion or exemption from the requirements of the Environmental Survey as stated in Section 16.2(B).

- **Residential Clearing and Grading**
  1. In order to promote land development practices that minimize disturbance to vegetation and soils, limit alteration of the natural topography, minimize surface water and ground water runoff and diversion, minimize the need for additional storm drainage facilities, reduce sedimentation in surrounding waters and promote land development and site planning practices that are responsive to the town's scenic character without preventing the reasonable development of land; the initial clearing and grading of all residential major

subdivisions shall be limited to dedicated public rights-of-way and easements for the installation of streets, utilities, and other infrastructure.

2. Grading for infrastructure improvements (streets, sidewalks, curb, gutter, water, sewer, utilities, stormwater, spoil and borrow areas, etc.) shall be phased according to the Master Plan. Prior to proceeding to another phase, the developer shall stabilize the present phase with adequate ground cover sufficient to restrain erosion and have all infrastructure installed.
3. Grading of individual lots within the major subdivision shall not begin without having first obtained a building permit from the Administrator and shall be limited to those areas comprising the building footprint, driveway and a minimal area surrounding the building footprint to accommodate construction equipment.
4. All grading activities shall be done in accordance with all applicable federal, state and local laws, rules and regulations; including those pertaining to air and water pollution and noise control.
5. **Exemptions**
   a. Residential subdivisions within a Traditional Neighborhood Overlay District (TND) or residential subdivisions with lots less than 60 feet wide.
   b. Grading and clearing in emergency situations involving immediate danger to life or property or substantial fire hazards.

Section 8.2(D) Exemptions

1. Lots less than 2 Acres. Any lot less than two (2) acres shall be exempt from the tree protections provision of this Chapter. *Subdivision of property to circumvent these requirements is not permitted.*

2. Timbering and Silviculture. Normal forestry activity on forestland that is taxed on the basis of its present-use value as forestland under Article 12 of Chapter 105 of the General Statutes or that is conducted in accordance with a forest management plan that is prepared or approved by a forester registered in accordance with Chapter 89B of the General Statutes shall be exempt from the tree protection provisions of this Chapter.

If a forest landowner harvests timber and they believe they will be developing the lot within the next three (3) to five (5) years, it is particularly important to maintain any buffers that might be required under current zoning. The landowner should also be reminded in such instances that protected trees as listed in Section 8.5(A) or any canopy required under Section 8.11 will have to be accounted for. Timbering and silviculture may not be used to circumvent the requirements of this chapter for development. Forest land owners should keep a record of when the tract was harvested since that date may come into question should a development plan be submitted to the Town in the future.

In cases where the harvest results in the removal of all or substantially all of the trees that fall within required buffers, or fails to account for protected trees under Town regulations governing development of the tract of land, the Administrator may deny a building permit or refuse to approve a site or subdivision plan for either a period of up to three (3) years if it was not a willful violation of the Town's regulations, or up to five (5) years if it was a willful violation of the Town's regulations.

Section 8.5(B) Credits for Optional Preservation of Existing Trees in Parking Areas: Trees that are saved in a parking lot area (other than those in Tier 1 or Tier 2 Tree Save Areas in Section A above) can be used towards the interior tree landscape requirement in Section 8.10. Note that each tree preserved will require a minimum pervious area around it equal to ~~its dripline area~~ an area measuring five (5) feet beyond the drip line.

Section 8.6(A) Required Buffer Yards: A buffer yard is intended to give spatial separation and to decrease visual contact between incompatible uses. To further this intent, at least 40%, but no more than 60% each of canopy trees and understory trees and shrubs, and at least 80% of shrubs must be evergreen. Buffer yards shall be required in accordance with the table below when any use is being established on a property that abuts an existing developed lot or less intense zoning district.

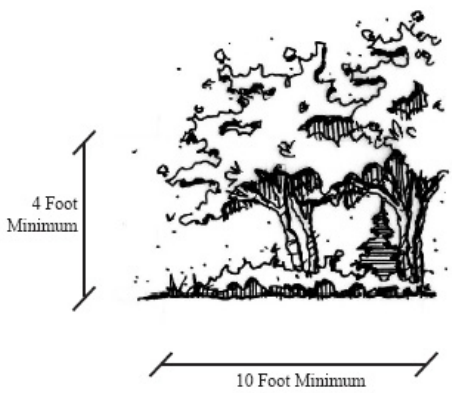
Buffer yards are intended to be constructed along the perimeter of the property; however, when there is irregular topographic conditions such as the perimeter of the property is at a lower grade than the use being screened, the Administrator may require the relocation of the required buffer yard in order to better serve its purpose.

		Adjacent District				
		OSP RR GR3 GR8	**UR12 RMX**	**NMX TC**	**HB**	**MI**
District of Proposed Development	**OSP RR GR3 GR8**					
	UR12 RMX	~~A~~B				
	NMX TC	~~B~~C	A			
	HB	~~C~~D	C	B		
	MI	D	D	D	C	

Note 1: *A Type D Buffer Yard is required for the complete length of all property adjacent to Highways/Freeways ~~as identified on the Town's Arterial Plan~~ in a SHOD District.*

	Buffer Yard not required by Proposed Development

Section 8.6(B)

1. Type A Buffer Yard	
a. Minimum Width	10 feet
b. Minimum Height & Opacity	Ground to ~~6~~ 4 feet – *Semi-Opaque Screen* 4-30 feet – *Intermittent Visual Obstruction*
c. Maximum Horizontal Openings	5 feet – *Semi-Opaque Screen Areas* 20 feet – *Intermittent Visual Obstruction Areas*
d. Performance Standard  	A buffer which is ten (10) feet in width and contains screening materials which at maturity provide ~~intermittent visual obstruction~~ semi-opacity from the ground to a height of four (4) feet as well as intermittent visual obstruction from a height of four (4) feet up to a height of thirty (30) feet. Vegetative screening materials within intermittent visual obstruction areas shall contain horizontal openings no greater than twenty (20) feet in width upon the plants' maturity.
e. Required Plantings	For every 100 linear feet, there shall be at least three (3) Canopy Trees, two (2) Understory Trees and 20 shrubs. Depending on the species chosen, additional trees or shrubs may be necessary to meet the performance standard in subsection "d" above.

2. Type B Buffer Yard	
a. Minimum Width	20 feet
b. Minimum Height & Opacity	Ground to 6 feet – *Semi-Opaque Screen* 6-30 feet – *Intermittent Visual Obstruction*
c. Maximum Horizontal Openings	~~15~~ 5 feet – *Semi-Opaque Screen Areas* 20 feet – *Intermittent Visual Obstruction Areas*
d. Performance Standard	A buffer which is twenty (20) feet in width and contains screening materials which at maturity provide semi-opacity from the ground to a height of six (6) feet, and intermittent visual obstruction from a height of six (6) feet up to a height of thirty (30) feet. Vegetative screening materials within intermittent visual obstruction areas shall contain horizontal openings no greater than twenty (20) feet in width; and vegetative screening materials within semi-opaque areas shall contain horizontal openings no greater than ~~fifteen (15)~~ five (5) feet in width upon the plants' maturity.
e. Required Plantings	For every 100 linear feet, there shall be at least three (3) Canopy Trees, five (5) Understory Trees and 20 shrubs. Depending on the species chosen, additional trees or shrubs may be necessary to meet the performance standard in subsection "d" above.

3. Type C Buffer Yard	
a. Minimum Width	50 feet
b. Minimum Height & Opacity	Ground to 6 feet – *Semi-Opaque Screen* 6-30 feet – *Intermittent Visual Obstruction*
c. Maximum Horizontal Openings	~~15~~ 5 feet – *Semi-Opaque Screen Areas* 20 feet – *Intermittent Visual Obstruction Areas*
d. Performance Standard	A buffer which is fifty (50) feet in width and contains screening materials which at maturity provides semi-opacity from the ground to a height of six (6) feet, and intermittent visual obstruction from a height of six (6) height up to a height of thirty (30) feet. Vegetative screening materials within intermittent visual obstruction areas shall contain horizontal openings no greater than twenty (20) feet in width; Vegetative screening materials within semi-opaque areas shall contain no horizontal openings greater than ~~fifteen (15)~~ five (5) feet in width upon the plants' maturity.
e. Required Plantings	For every 100 linear feet, there shall be at least three (3) Canopy Trees, five (5) Understory Trees and 20 shrubs. Depending on the species chosen, additional trees or shrubs may be necessary to meet the performance standard in subsection "d" above.

4. Type D Buffer Yard	
a. Minimum Width	~~30~~ 50 feet
b. Minimum Height & Opacity	Ground to 30 feet – *Opaque*
c. Maximum Horizontal Openings	None permitted
d. Performance Standard	A buffer which is ~~thirty (30)~~ fifty (50) feet in width and contains screening materials which at maturity provides opacity from the ground to a height of thirty (30) feet. Vegetative screening materials within opaque areas shall contain no horizontal openings upon the plants' maturity.
e. Required Plantings	For every 100 linear feet, there shall be at least five (5) Canopy Trees, eight (8) Understory Trees and 40 shrubs. Depending on the species chosen, additional trees or shrubs may be necessary to meet the performance standard in subsection "d" above.

(Amend graphic to reflect 50 foot minimum width)

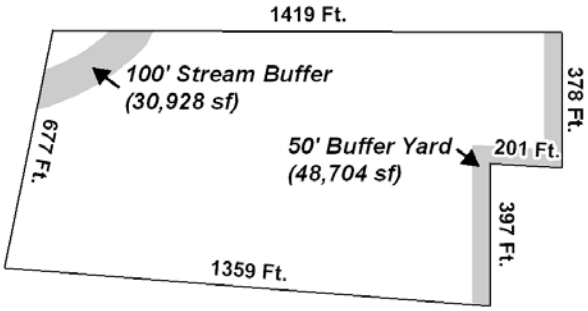
Section 8.6(C) Fences, Walls and Berms: Fences or walls~~, or~~ with earthen berms may be substituted for half of the shrub requirement in all buffer types. In addition, existing vegetation within the buffer shall be maintained and may receive partial or total credit towards screening requirements. All berms, if provided, shall not exceed a slope with maximum rise of one (1) foot to a run of two (2) feet, ~~(a ratio of 1:2), and~~ a maximum height of four (4) feet and a maximum width of 40% of the required buffer width. All berms, regardless of size, shall be stabilized with a ground cover or other suitable vegetation or permanent slope retention

device. Berms taller than four (4) feet shall be approved by the Administrator on a case by case basis, but shall conform to the slope and width restrictions as previously detailed.

(Insert New Section, bump others down) **8.11 Overall Tree Canopy**

A. Applicability: To preserve and maintain appropriate undisturbed tree cover, and where needed, require the provision of replacement tree cover on development sites.

B. Tree Cover Area: All new development on lots or parcels over two (2) acres must meet the following tree cover requirement during the initial master plan process. A tree cover area equal to the perimeter of the development in feet multiplied by 20 shall be maintained on site up to a maximum tree cover area consisting of 10 percent of the entire site. Any required landscape buffer yards and vegetated stream buffer zones may be credited toward this requirement. In the event that the required tree cover area cannot be met with required landscape buffer yards and vegetated stream buffer zones, additional space must be set aside.



Example: 1,419+378+201+397+1,359+677 ft.= 4,431 ft. perimeter

4,431 ft. x 20 ft. = 88,620 square feet of tree cover area

88,620 ft. / 1,044,132 total square feet = **4.3% of total lot area** (< 10% maximum)

88,620 sf – 30,928 sf – 48,704 sf =
8,988 sf additional space required

In this additional space, preference is given to preserving existing trees rather than utilizing new plantings.

C. Performance Standards for Additional Space:

1. **Mature Forest:** *(100% of calculated additional space required)* If not directly adjacent to stream buffer zones or landscape buffer yards, each preserved tree cover area of mature forest must be at least 2,500 square feet with no dimension less than 50 feet wide. To qualify, the average tree canopy height must exceed 25 feet.
2. **Maturing Forest:** *(110% of calculated additional space needed)* If not directly adjacent to stream buffer zones or landscape buffer yards, each preserved tree cover area of maturing forest must be at least 2,500 square feet with no dimension less than 50 feet wide. To qualify, the average tree canopy height must exceed 12 feet.
3. **Re-planted Areas:** *(125% of calculated additional space needed)* If not directly adjacent to stream buffer zones or landscape buffer yards, each re-planted tree cover area must be at least 2,500 square feet with no dimension less than 50 feet wide. To qualify, trees must meet the standards for new plantings as found in Section 8.12(B), and the area must be vegetated with 3 native canopy trees and 5 native understory trees per 500 square feet.

(New Section 8.12) **Section 8.11** *All titles, wording and graphics shall be changed from "Large Shade Tree" to "Canopy Tree" and from "Small Tree" to "Understory Tree".*

(New Section 8.12) **Section 8.11(3) Shrubs:** All shrubs must have a minimum spread of 12 to 15 inches when planted. At least ~~fifty percent (50%)~~ 80% of the required shrubs must be evergreen.

(New Section 8.12) **Section 8.11(C) Preservation of Existing Vegetation During Construction:** Existing vegetation shall be preserved in accordance with Section 8.3(N) and the Town of Knightdale *Standard Specifications and Details Manual.* To prevent unintended compaction of soil, storage of construction materials and equipment shall not be allowed outside areas identified as the limits of construction activity.

II. JUSTIFICATION

These amendments are being proposed to further the interests of maintaining ecological balance and health in Knightdale, and to make Knightdale a beautiful and desirable place to live. These interests are accomplished specifically in these amendments by encouraging development with conservation; maintaining and improving air quality; reducing soil erosion; filtering stormwater; maintaining ground and surface water quality and quantity; maintaining, conserving and growing the urban treescape with healthy, majestic trees; maintaining and increasing the majestic feel of nature; maintaining aesthetically pleasing developments and landscapes; creating shaded neighborhoods and parking lots; creating more "livable" places; and protecting people's privacy from commercial areas. All of these interests and specific means were identified by the Land Use Review Board's Tree Protection Subcommittee as items of importance to the overall welfare of the Town and furthering the goals and objectives of the Comprehensive Plan.

III. LURB WRITTEN STATEMENT REGARDING PLAN CONSISTENCY AND RECOMMENDATION

North Carolina General Statute 160A-383 requires the planning board to provide a written recommendation to the governing board that addresses plan consistency and other matters as deemed appropriate by the planning board.

The LURB unanimously recommended approval of ZTA-4-08 as amended to the Town Council based on the following advisory statement:

The proposed zoning text changes advance the stated objectives of minimizing conflicts between land uses, and influencing and managing the development of the community. They are furthermore consistent with the Comprehensive Plan's stated goal of providing balanced and responsible urban design, planning and development, and protection of the Town's historical, cultural and natural resources.

IV. WRITTEN STATEMENT REGARDING CONSISTENCY WITH THE COMPREHENSIVE PLAN

North Carolina General Statute 160A-383 requires the planning board to provide a written recommendation to the governing board that addresses plan consistency and other matters as deemed appropriate by the planning board.

PROPOSED STATEMENT REGARDING PLAN CONSISTENCY AND REASONABLENESS OF ACTION:
The proposed zoning text changes advance the stated objectives of minimizing conflicts between land uses, and influencing and managing the development of the community. They are furthermore consistent with the Comprehensive Plan's stated goal of providing balanced and responsible urban design, planning and development, and protection of the Town's historical, cultural and natural resources.

V. PLANNING DEPARTMENT RECOMMENDATION

The Planning Department recommends that the Town Council adopt the preceding statement identified in Section IV of this report, approve ZMA-4-08 as amended and adopt ORD# 08-03-19-003.

TOWN OF KNIGHTDALE
PLANNING DEPARTMENT
www.knightdalenc.gov
950 Steeple Square Court
Knightdale, NC 27545
(v) 919.217.2245
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ORD #08-03-19-003
AN ORDINANCE TO AMEND THE UNIFIED DEVELOPMENT ORDINANCE OF THE TOWN OF KNIGHTDALE, REGARDING AMENDMENTS TO TREE CONSERVATION AND RELATED ENVIRONMENTAL PROTECTION REGULATIONS

WHEREAS, the Town of Knightdale has received a petition to amend the Unified Development Ordinance in regard to tree conservation and related environmental protection regulations; and

WHEREAS, the Town of Knightdale Unified Development Ordinance Section 15.15 establishes uniform procedures for amending the text of the Ordinance; and

WHEREAS, the proposed zoning text changes comply with the goals of the Town's Comprehensive Plan because they advance the stated objectives of minimizing conflicts between land uses; influencing and managing the development of the community; providing balanced and responsible urban design, planning and development; and protecting the Town's historical, cultural and natural resources;

NOW, THEREFORE BE IT ORDAINED by the Town Council of the Town of Knightdale, North Carolina:

SECTION 1**.** That the Unified Development Ordinance of the Town of Knightdale Code be amended to read as follows *(explanatory notations in italics)*:

Section 6.1 Purpose and Intent
The purpose of this Chapter is to protect, maintain and enhance public health, safety, environment and general welfare by establishing minimum requirements and procedures to control adverse effects of sediment and erosion control, grading, post construction storm water runoff, illicit discharges and flood damage. Proper management of storm water runoff will minimize damage to public and private property and infrastructure safeguard the public health, safety and general welfare and protect water and aquatic life.

Section 6.2 Sedimentation and Erosion Control
All new development and redevelopment shall be required to take measures to minimize erosion during construction and after development. All new development and redevelopment shall comply with the provisions of the latest adopted amendment to Wake County Erosion and Sedimentation Control Ordinance. Certification of compliance with or exemption from the plan requirements of such regulations shall be submitted to the Administrator prior to issuance of a Development Permit for a subdivision, or part thereof.

Furthermore, no infrastructure or individual lot grading shall commence prior to the completion or exemption from the requirements of the Environmental Survey as stated in Section 16.2(B).

- **Residential Clearing and Grading**
  1. In order to promote land development practices that minimize disturbance to vegetation and soils, limit alteration of the natural topography, minimize surface water and ground water runoff and diversion, minimize the need for additional storm drainage facilities, reduce sedimentation in surrounding waters and promote land development and site planning practices that are responsive to the town's scenic character without preventing the reasonable development of land; the initial clearing and grading of all residential major subdivisions shall be limited to dedicated public rights-of-way and easements for the installation of streets, utilities, and other infrastructure.
  2. Grading for infrastructure improvements (streets, sidewalks, curb, gutter, water, sewer, utilities, stormwater, spoil and borrow areas, etc.) shall be phased according to the Master Plan. Prior to proceeding to another phase, the developer shall stabilize the present phase with adequate ground cover sufficient to restrain erosion and have all infrastructure installed.
  3. Grading of individual lots within the major subdivision shall not begin without having first obtained a building permit from the Administrator and shall be limited to those areas comprising the building footprint, driveway and a minimal area surrounding the building footprint to accommodate construction equipment.
  4. All grading activities shall be done in accordance with all applicable federal, state and local laws, rules and regulations; including those pertaining to air and water pollution and noise control.
  5. **Exemptions**
     a. Residential subdivisions within a Traditional Neighborhood Overlay District (TND) or residential subdivisions with lots less than 60 feet wide.
     b. Grading and clearing in emergency situations involving immediate danger to life or property or substantial fire hazards.

Section 8.2(D) Exemptions

2. Timbering and Silviculture. Normal forestry activity on forestland that is taxed on the basis of its present-use value as forestland under Article 12 of Chapter 105 of the General Statutes or that is conducted in accordance with a forest management plan that is prepared or approved by a forester registered in accordance with Chapter 89B of the General Statutes shall be exempt from the tree protection provisions of this Chapter.

If a forest landowner harvests timber and they believe they will be developing the lot within the next three (3) to five (5) years, it is particularly important to maintain any buffers that might be required under current zoning. The landowner should also be reminded in such instances that protected trees as listed in Section 8.5(A) or any canopy required under Section 8.11 will have to be accounted for. Timbering and silviculture may not be used to circumvent the requirements of this chapter for development. Forest land owners should keep a record of when the tract was harvested since that date may come into question should a development plan be submitted to the Town in the future.

In cases where the harvest results in the removal of all or substantially all of the trees that fall within required buffers, or fails to account for protected trees under Town regulations governing development of the tract of land, the Administrator may deny a building permit or refuse to approve a site or subdivision plan for either a period of up to three (3) years if it was not a willful violation of the Town's regulations, or up to five (5) years if it was a willful violation of the Town's regulations.

Section 8.5(B) Credits for Optional Preservation of Existing Trees in Parking Areas: Trees that are saved in a parking lot area (other than those in Tier 1 or Tier 2 Tree Save Areas in Section A above) can be used towards the interior tree landscape requirement in Section 8.10. Note that each tree preserved will require a minimum pervious area around it equal to an area measuring five (5) feet beyond the drip line.

Section 8.6(A) Required Buffer Yards: A buffer yard is intended to give spatial separation and to decrease visual contact between incompatible uses. To further this intent, at least 40%, but no more than 60% each of canopy trees and understory trees and shrubs, and at least 80% of shrubs must be evergreen. Buffer yards shall be required in accordance with the table below when any use is being established on a property that abuts an existing developed lot or less intense zoning district.

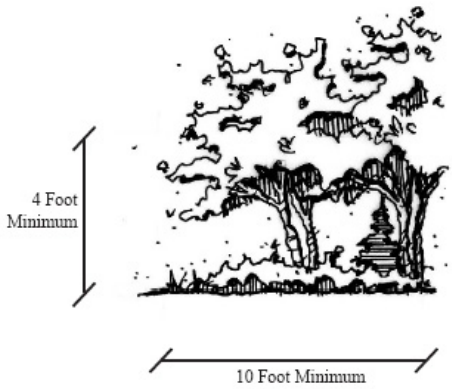
Buffer yards are intended to be constructed along the perimeter of the property; however, when there is irregular topographic conditions such as the perimeter of the property is at a lower grade than the use being screened, the Administrator may require the relocation of the required buffer yard in order to better serve its purpose.

		Adjacent District				
		OSP RR GR3 GR8	**UR12 RMX**	**NMX TC**	**HB**	**MI**
District of Proposed Development	**OSP RR GR3 GR8**					
	UR12 RMX	B				
	NMX TC	C	A			
	HB	D	C	B		
	MI	D	D	D	C	

Note 1: *A Type D Buffer Yard is required for the complete length of all property adjacent to Highways in a SHOD District.*

	Buffer Yard not required by Proposed Development

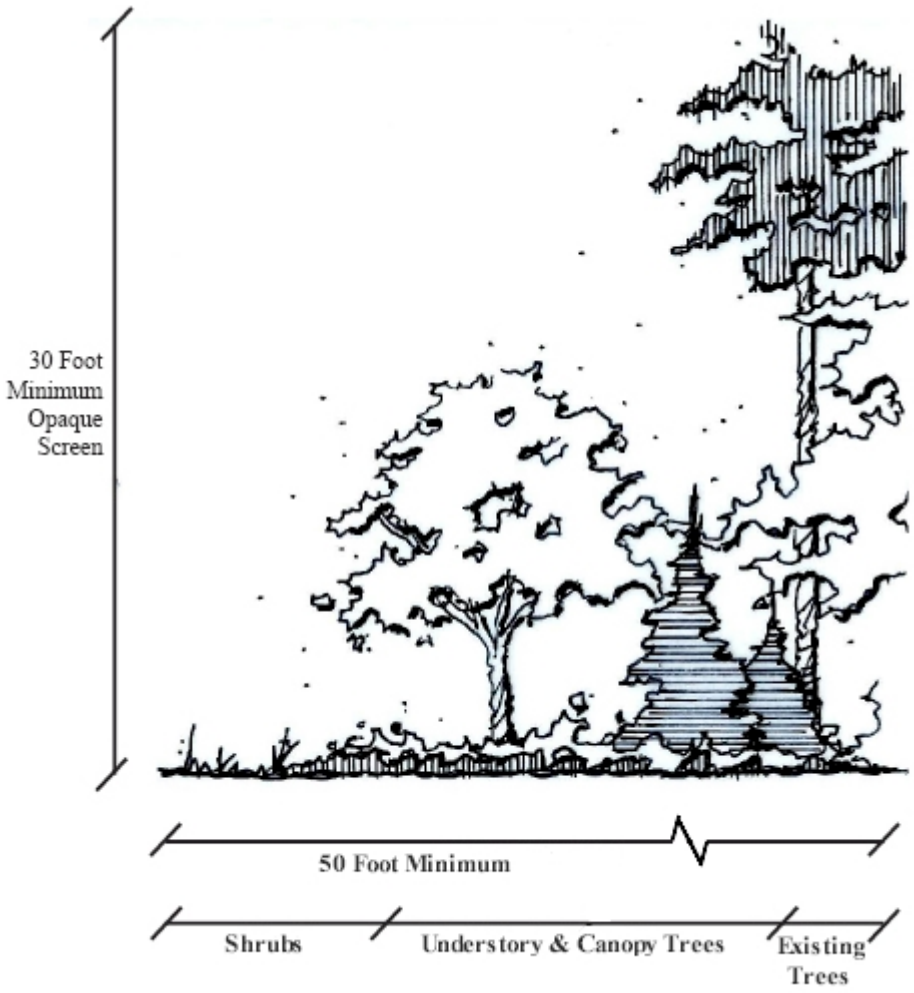
Section 8.6(B)

1. Type A Buffer Yard	
a. Minimum Width	10 feet
b. Minimum Height & Opacity	Ground to 4 feet – *Semi-Opaque Screen* 4-30 feet – *Intermittent Visual Obstruction*
c. Maximum Horizontal Openings	5 feet – *Semi-Opaque Screen Areas* 20 feet – *Intermittent Visual Obstruction Areas*
d. Performance Standard 	A buffer which is ten (10) feet in width and contains screening materials which at maturity provide semi-opacity from the ground to a height of four (4) feet as well as intermittent visual obstruction from a height of four (4) feet up to a height of thirty (30) feet. Vegetative screening materials within intermittent visual obstruction areas shall contain horizontal openings no greater than twenty (20) feet in width upon the plants' maturity.
e. Required Plantings	For every 100 linear feet, there shall be at least three (3) Canopy Trees, two (2) Understory Trees and 20 shrubs. Depending on the species chosen, additional trees or shrubs may be necessary to meet the performance standard in subsection "d" above.

2. Type B Buffer Yard	
a. Minimum Width	20 feet
b. Minimum Height & Opacity	Ground to 6 feet – *Semi-Opaque Screen* 6-30 feet – *Intermittent Visual Obstruction*
c. Maximum Horizontal Openings	5 feet – *Semi-Opaque Screen Areas* 20 feet – *Intermittent Visual Obstruction Areas*
d. Performance Standard	A buffer which is twenty (20) feet in width and contains screening materials which at maturity provide semi-opacity from the ground to a height of six (6) feet, and intermittent visual obstruction from a height of six (6) feet up to a height of thirty (30) feet. Vegetative screening materials within intermittent visual obstruction areas shall contain horizontal openings no greater than twenty (20) feet in width; and vegetative screening materials within semi-opaque areas shall contain horizontal openings no greater than five (5) feet in width upon the plants' maturity.
e. Required Plantings	For every 100 linear feet, there shall be at least three (3) Canopy Trees, five (5) Understory Trees and 20 shrubs. Depending on the species chosen, additional trees or shrubs may be necessary to meet the performance standard in subsection "d" above.

3. Type C Buffer Yard	
a. Minimum Width	50 feet
b. Minimum Height & Opacity	Ground to 6 feet – *Semi-Opaque Screen* 6-30 feet – *Intermittent Visual Obstruction*
c. Maximum Horizontal Openings	5 feet – *Semi-Opaque Screen Areas* 20 feet – *Intermittent Visual Obstruction Areas*
d. Performance Standard	A buffer which is fifty (50) feet in width and contains screening materials which at maturity provides semi-opacity from the ground to a height of six (6) feet, and intermittent visual obstruction from a height of six (6) height up to a height of thirty (30) feet. Vegetative screening materials within intermittent visual obstruction areas shall contain horizontal openings no greater than twenty (20) feet in width; Vegetative screening materials within semi-opaque areas shall contain no horizontal openings greater than five (5) feet in width upon the plants' maturity.
e. Required Plantings	For every 100 linear feet, there shall be at least three (3) Canopy Trees, five (5) Understory Trees and 20 shrubs. Depending on the species chosen, additional trees or shrubs may be necessary to meet the performance standard in subsection "d" above.

4. Type D Buffer Yard	
a. Minimum Width	50 feet
b. Minimum Height & Opacity	Ground to 30 feet – *Opaque*
c. Maximum Horizontal Openings	None permitted
d. Performance Standard	A buffer which is fifty (50) feet in width and contains screening materials which at maturity provides opacity from the ground to a height of thirty (30) feet. Vegetative screening materials within opaque areas shall contain no horizontal openings upon the plants' maturity.
e. Required Plantings	For every 100 linear feet, there shall be at least five (5) Canopy Trees, eight (8) Understory Trees and 40 shrubs. Depending on the species chosen, additional trees or shrubs may be necessary to meet the performance standard in subsection "d" above.



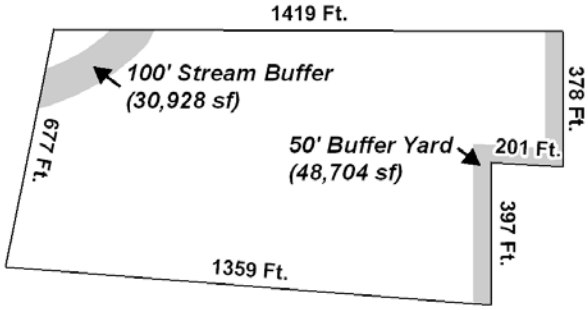
Section 8.6(C) Fences, Walls and Berms: Fences or walls with earthen berms may be substituted for half of the shrub requirement in all buffer types. In addition, existing vegetation within the buffer shall be maintained and may receive partial or total credit towards screening requirements. All berms, if provided, shall not exceed a slope with maximum rise of one (1) foot to a run of two (2) feet, a maximum height of four (4) feet and a maximum width of 40% of the required buffer width. All berms, regardless of size, shall be stabilized with a ground cover or other suitable vegetation or permanent slope retention device. Berms taller than four (4) feet shall be approved by the Administrator on a case by case basis, but shall conform to the slope and width restrictions as previously detailed.

8.11 Overall Tree Canopy

A. **Applicability:** To preserve and maintain appropriate undisturbed tree cover, and where needed, require the provision of replacement tree cover on development sites.

B. **Tree Cover Area:** All new development on lots or parcels over two (2) acres must meet the following tree cover requirement during the initial master plan process. A tree cover area equal to the perimeter of the development in feet multiplied by 20 shall be maintained on site up to a maximum tree cover area consisting of 10 percent of the entire site. Any required landscape buffer yards and vegetated stream buffer

zones may be credited toward this requirement. In the event that the required tree cover area cannot be met with required landscape buffer yards and vegetated stream buffer zones, additional space must be set aside.



Example: 1,419+378+201+397+1,359+677 ft. = 4,431 ft. perimeter

4,431 ft. x 20 ft. = 88,620 square feet of tree cover area

88,620 ft. / 1,044,132 total square feet = **4.3% of total lot area** (< 10% maximum)

88,620 sf – 30,928 sf – 48,704 sf =
8,988 sf additional space required

In this additional space, preference is given to preserving existing trees rather than utilizing new plantings.

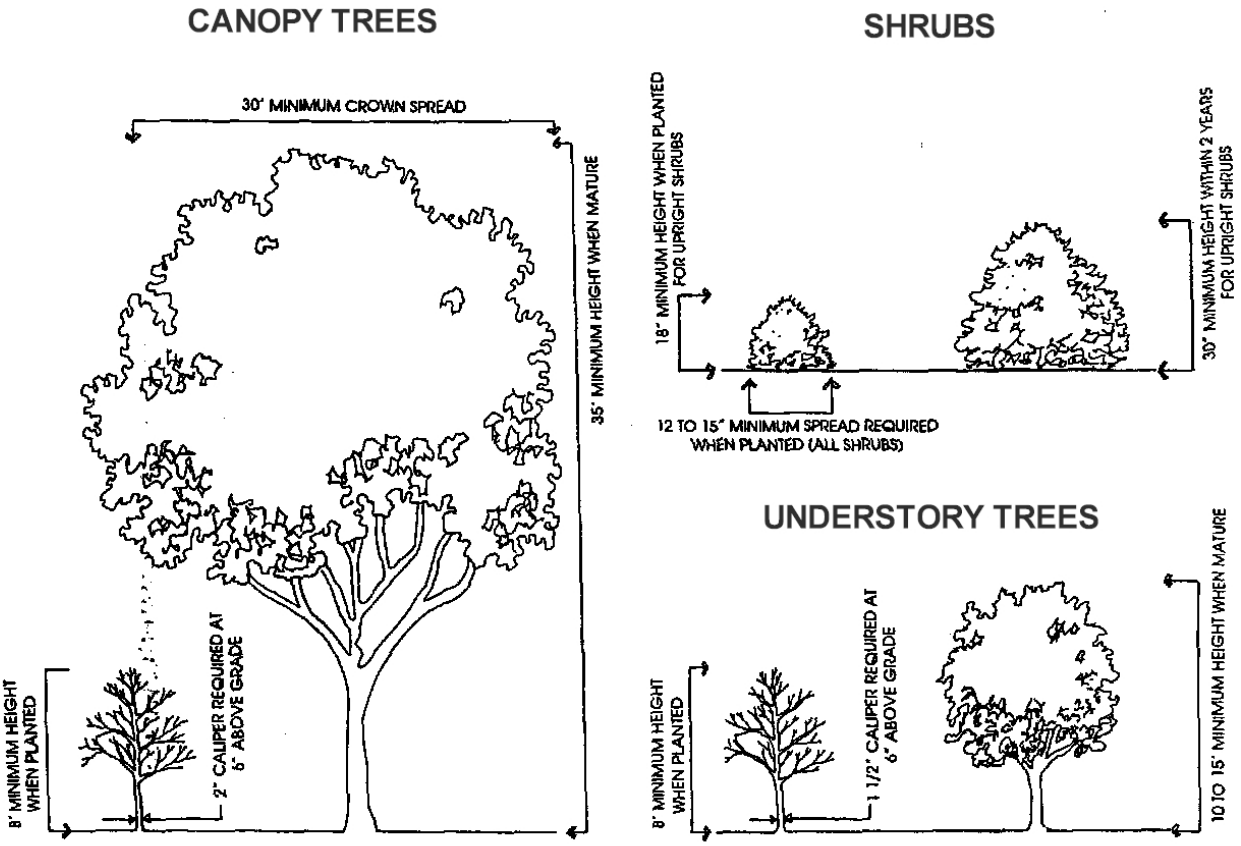
C. Performance Standards for Additional Space:

1. **Mature Forest:** *(100% of calculated additional space required)* If not directly adjacent to stream buffer zones or landscape buffer yards, each preserved tree cover area of mature forest must be at least 2,500 square feet with no dimension less than 50 feet wide. To qualify, the average tree canopy height must exceed 25 feet.
2. **Maturing Forest:** *(110% of calculated additional space needed)* If not directly adjacent to stream buffer zones or landscape buffer yards, each preserved tree cover area of maturing forest must be at least 2,500 square feet with no dimension less than 50 feet wide. To qualify, the average tree canopy height must exceed 12 feet.
3. **Re-planted Areas:** *(125% of calculated additional space needed)* If not directly adjacent to stream buffer zones or landscape buffer yards, each re-planted tree cover area must be at least 2,500 square feet with no dimension less than 50 feet wide. To qualify, trees must meet the standards for new plantings as found in Section 8.12(B), and the area must be vegetated with 3 native canopy trees and 5 native understory trees per 500 square feet.

Section 8.12(A)(1)
Canopy Trees: Canopy trees must be a locally adapted species with an expected mature height of 35 feet or greater and an expected mature crown spread of at least 30 feet or greater. Canopy trees may be deciduous or evergreen. In the case of overhead power lines, relief from the canopy tree requirement, in accordance with Section 8.12.B.8, may be given by the Administrator.

Section 8.12(A)(2)
Understory Trees: When mature, understory trees should be 10 to 15 feet or higher. Understory trees may be deciduous or evergreen.

Section 8.12(A)(3)
Shrubs: All shrubs must have a minimum spread of 12 to 15 inches when planted. At least 80% of the required shrubs must be evergreen.



Section 8.12(B)(7) At installation, canopy trees shall not be less than eight (8) feet in height with a minimum two (2) inch caliper. Understory trees shall be a minimum of 1-1/4 inch caliper and have a minimum height of six (6) feet. Evergreen trees of any type shall not be less than six (6) feet in height with a minimum two (2) inch caliper. Multi-stemmed trees of any type shall have at least three (3) stalks and not be less than eight (8) feet in height. All caliper requirements are as measured six (6) inches above grade. Installation and construction practices shall be utilized which preserve and replace existing topsoil or amend the soil to reduce compaction.

Section 8.12(B)(8) Where canopy trees are required and overhead utility lines exist, understory trees planted one (1) per 20 linear feet shall be substituted with the approval of the Administrator.

Section 8.12(C) Preservation of Existing Vegetation During Construction:
Existing vegetation shall be preserved in accordance with Section 8.3(N) and the Town of Knightdale *Standard Specifications and Details Manual.* To prevent unintended compaction of soil, storage of construction materials and equipment shall not be allowed outside areas identified as the limits of construction activity.

SECTION 2. That all laws and clauses of law in conflict herewith are hereby repealed to the extent of said conflict.

SECTION 3. That if this ordinance or application thereof to any person or circumstance is held invalid, such invalidity shall not affect other provisions of this ordinance which can be given separate effect and to the end the provisions of this ordinance are declared to be severable.

SECTION 4. That this ordinance has been adopted following a duly advertised public hearing of the Town Council and following review and recommendation by the Land Use Review Board.

SECTION 5. That this ordinance shall be enforced as provided in G.S. 160A-175 or as provided for in the Knightdale Town Code.

SECTION 6. That this ordinance shall become effective upon its adoption by Town Council.

Adopted this 19th day of March, 2008.

_____
Russell B. Killen, Mayor

ATTEST:

_____
Suzanne M. Yeatts, Town Clerk

APPROVED AS TO FORM:

_____
Clyde Holt, III; Town Attorney