



TOWN OF KNIGHTDALE

PLANNING DEPARTMENT

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ORD #12-09-19-001

AN ORDINANCE TO AMEND THE UNIFIED DEVELOPMENT ORDINANCE OF THE TOWN OF KNIGHTDALE, REGARDING TECHNICAL EDITS AND CLARIFICATIONS OF INTENT FOR CHAPTERS 16 & 17

WHEREAS, the Town of Knightdale has received a petition to comprehensively amend Chapter 16 (Development Plan Requirements) and Chapter 17 (Infrastructure Improvement Requirements) of the Unified Development Ordinance with technical edits for consistency of language and referencing, clarifications of intent and interpretation, further definition of broad terms, addition of exemplary graphics and photos, and the removal of redundant text; and

WHEREAS, the application includes the amendment of other remaining chapters of the Unified Development Ordinance affected by the proposed amendments to chapters 16 and 17, such as updating code section references and locations as well as adding/amending definitions (Chapter 19) for consistency; and

WHEREAS, the Town of Knightdale Unified Development Ordinance Section 15.6B 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 are reasonable in that they advance the stated objective of providing an open, accessible, responsive and fiscally responsible government whose structure creates the functional framework to meet the goals of the Comprehensive Plan by clarifying processes and procedures for the applicant and clarifying the structure, powers and responsibilities of citizen boards and Town officials; and

WHEREAS, the proposed zoning text changes are furthermore consistent with the Comprehensive Plan's stated goal of providing responsible urban design, planning and development;

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 (*editing notes in parenthetical italics*):

(See Attachments for Chapters 16 & 17)

2.13A(3)b(iii)e: Streets within the Mobile Home Park shall be private and constructed to the standards that would be required of a new Local Street inside the RR District (*Section 17.3A(2) and Section 2.2*), except that the total width of pavement with binder curb may be reduced to 20 feet.

3.3N Any internal road system shall be circuitous and at a minimum meet the design standards for alleys as specified in Section 17.3A(1).

6.3 Neuse River Basin Riparian Buffers (NRBs)

Both the corporate limits and the ETJ of the Town of Knightdale fall completely within the Neuse River basin and are therefore subject to the riparian buffer rules as governed by North Carolina Administrative Code (NCAC), Title 15A, Chapter 2, SubChapter B as may be amended from time to time.

NRBs are a form of open space, and as such, may only be retained in private ownership if the necessary conservation easements are recorded with the Wake County Register of Deeds in a form approved by the Town. Otherwise, NRBs shall be separately deeded to a homeowner's association, a non-profit land trust or conservancy, Wake County, or the Town of Knightdale (upon approval by the Town Council). NRBs cannot be located on any single-family residential building lot (detached or attached) within a major subdivision as defined in Section 15.4F(6). In general terms, NRBs in major subdivisions must be platted as separate lots where the responsibility of maintaining (in a natural state) said riparian buffers in perpetuity is typically designated to a homeowners association or non-profit land conservation agency. Lots that have received Construction Document approval (*Section 16.6*) prior to March 1, 2010 shall be exempt from this requirement.

6.4E Stormwater Management Plan: A stormwater management plan is required for all development and redevelopment unless exempt pursuant to the provisions of 6.4C(2): Exemptions. Please refer to Section 16.8E for stormwater management plan requirements.

6.4F(7) Performance Security for BMP Installation

The Town of Knightdale may, at its discretion, require the submittal of a performance security or bond with surety, cash escrow, letter of credit or other acceptable legal arrangement prior to issuance of a permit in order to ensure that the structural BMPs are installed by the permit holder as required by the approved stormwater management plan.

- a. Amount:** The amount of an installation performance security shall be the total estimated construction cost of the BMPs approved under the permit, plus 25%.
- b. Forfeiture Provisions:** The performance security shall contain forfeiture provisions for failure, after proper notice, to:
 - complete work within the time specified, or
 - to initiate or maintain any actions which may be required of the applicant or owner in accordance with this ordinance or approvals issued pursuant to this ordinance.
- c. Default:** Upon default of the owner to construct any structural BMP in accordance with the applicable permit, the Administrator shall obtain and use all or any portion of the security to make necessary improvements based on an engineering estimate. Such expenditure of funds shall only be made after requesting the owner to comply with the permit. In the event of a default triggering the use of installation performance security, the Town of Knightdale shall not return any of the unused deposited cash funds or other security, which shall be retained for maintenance (*Section 6.4G*).
- d. Costs in Excess of Performance Security:** If the Town of Knightdale takes action upon such failure by the applicant or owner, the Town of Knightdale may collect from the applicant or owner for the difference, should the amount of the reasonable cost of such action exceed the amount of the security held.

- e. **Refund:** Within 60 days of receiving a Certificate of Occupancy, the installation performance security shall be refunded to the applicant or terminated, with the exception of any amount attributable to the cost (plus 25%) of landscaping installation covered by the security. Any such landscaping shall be inspected one (1) year after installation with replacement for compliance with the approved plans and specifications and, if in compliance, the portion of the financial security attributable to landscaping shall be released.

6.4G(8) Performance Security for BMP Maintenance

The Town of Knightdale may, at its discretion, require the submittal of a performance security or bond with surety, cash escrow, letter of credit or other acceptable legal arrangement prior to issuance of a permit in order to ensure that the structural BMPs are maintained by the owner as required by the operation and maintenance agreement.

- a. **Amount:** The amount of a maintenance performance security shall be the present value of an annuity of perpetual duration based on a reasonable estimate of the annual cost of inspection, operation and maintenance of the BMPs approved under the permit, at a discount rate that reflects the jurisdiction's cost of borrowing minus a reasonable estimate of long term inflation.
- b. **Forfeiture Provisions:** The performance security shall contain forfeiture provisions for failure, after proper notice, to:
- complete work within the time specified, or
 - to initiate or maintain any actions which may be required of the applicant or owner in accordance with this ordinance, or an operation and maintenance agreement established pursuant to the UDO.
- c. **Default:** Upon default of the owner to maintain, repair and, if necessary, reconstruct any structural BMP in accordance with the operation and maintenance agreement, the Administrator shall obtain and use all or any portion of the security to make necessary improvements based on an engineering estimate. Such expenditure of funds shall only be made after requesting the owner to comply with the maintenance agreement.
- d. **Costs in Excess of Performance Security:** If the Town of Knightdale takes action upon such failure by the applicant or owner, the Town of Knightdale may collect from the applicant or owner for the difference, should the amount of the reasonable cost of such action exceed the amount of the security held.

8.4A Landscape Plan: Prior to any site disturbance, a Landscape Plan meeting the requirements of Section 16.8A shall be submitted and approved.

8.4B Pre-Construction Conference: Prior to the commencement of any activities requiring a building or zoning permit, an on-site pre-construction conference shall take place with the developer and the Administrator to review procedures for the protection and management of all landscape elements that are to remain as identified on the Landscape Plan (see Section 16.8A).

9.3 Conformity to Adopted Plans

All site and subdivision plans shall conform to the arrangement, width and location of public transportation elements indicated in appendices A through C as approved by the LURB and adopted by the Town Council as well as meet the requirements of the Long-Range Transportation Plan for the Capital Area Metropolitan Planning Organization (CAMPO) as adopted by the CAMPO Transportation Advisory Committee and the North Carolina Department of Transportation.

Whenever a tract of land included within any proposed development plan embraces any part of the arterial or collector systems as designated on the Town Arterial or Collector plans (*appendices A and B*), the development shall be required to dedicate and plat the arterial or collector right-of-

way, and shall be responsible for the cost and the installation of the improvements in accordance with the Town's standards for streets.

Developments which embrace only one (1) side of an existing or planned arterial or collector right-of-way will only be required to dedicate and plat additional right-of-way for that portion of street with which the development has frontage, and shall be responsible for the cost and the installation of the improvements in accordance with the Town's standards for streets.

9.3B Threshold: A TIA, meeting the requirements of Section 16.9, is necessary in the following instances:

...

9.4 Vehicular Connectivity

Traffic studies have shown that highly connected street networks provide much greater traffic throughput and mobility for a community, at less cost. A high degree of connectivity should occur not only at the level of arterials, but also on collector, local and other secondary roads. Such connectivity vastly improves a street network's performance. The street pattern should not force short trips of one (1) or two (2) miles onto arterials; it should be possible to make trips of this sort by using collector or other secondary streets. With a highly connected street network, cross-town trips should be possible using fairly direct secondary roads.

A. General Street Layout

In general, streets should be designed and located so that they relate to the topography, preserve natural features such as streams and tree growth and provide for adequate public safety and convenience for motorists, cyclists and pedestrians alike. To accomplish this, local public and private streets may incorporate traffic calming devices in conformance with the Town's "Traffic Calming Policy" as most recently adopted by the Town Council.

The proposed street layout shall also be coordinated with the existing street system of the surrounding area. Where a through street or a series of streets establishes a connection between two (2) public streets, such street shall be a public street.

B. Street Classification: The Town shall make the final determination of the classification of streets in a proposed development based on guidance from the Comprehensive Plan. Street classifications are defined in Section 17.3.

C. Street Stubs

1. Continuation of Adjoining Street Systems: Vehicular connections from adjacent property (*street stub-outs*) must be utilized unless the Administrator deems the connection impractical due to topographic conditions, environmental constraints, property shape or property accessibility.

2. New Street Stubs

- a. Development Perimeter and Surrounding Parcels:** New developments are required to stub streets to the outer perimeter boundaries of the development so as to ensure access of surrounding properties to a public right-of-way and in accordance with appendices A and B.
 - i.** Whenever connections to existing or proposed streets on adjoining property are required, the street right-of-way shall be extended and the street developed to the property line of the subdivided property (*or to the edge of the remaining undeveloped portion of a single tract*) at the point where the connection to the existing or proposed street is expected.

- ii. Where land is subdivided into parcels and tracts larger than ordinary building lots, such parcels and tracts shall be arranged in a phasing plan so as to allow for the opening of future streets and logical further subdivision.
 - iii. The Town may require temporary turnarounds to be constructed at the end of such streets pending their extension.
 - iv. The Town may require extension of a stub or connection where necessary to permit the convenient movement of traffic between residential neighborhoods or to facilitate access to neighborhoods by emergency service vehicles or for other sufficient reasons.
- b. If the street being stubbed meets at least two (2) of the following criteria, then the street must be built to an appropriate collector street standard:
- i. The street intersects directly with an arterial street and provides access to an area with an overall density of ten (10) dwelling units per acre, or provides access to more than 150 dwelling units.
 - ii. The street by its general configuration, in relationship to the existing development of the area, in effect serves a collector function.
 - iii. The street extends into an undeveloped area in such a manner as to serve a future collector function.
 - iv. The street serves as primary access to a significant nonresidential, institutional, or recreational land, as well as an access to a residential area of 20 or more acres.

...

(Re-number remaining current subsections B through G to subsection D through I.)

9.4F Second and Additional Points of Access Required for Residential Developments

At a minimum, a second point of open and functioning vehicular access from the existing public street system (*not a stub-out*) is required for developments that exceed 100 residential units, and a third shall be required for developments that exceed 500 residential units. These second and third points shall be open and functioning prior to the issuance of the 101st and 501st Certificate of Occupancy respectively for the development. The number of further open and functioning vehicular access points shall be controlled and determined by the development's Town-approved TIA (Section 16.9). If a TIA should establish a higher standard for the number of open and functioning vehicular access points from the existing public street system, the requirement of the TIA shall prevail. The requirements herein shall not preclude a development from also meeting the following connectivity index required in Section 9.4(E). For purposes of this section, a median-divided vehicular access point counts as a single vehicular access point. This section does not preclude developments from connecting to existing street stubs and/or street stub right-of-ways abutting their property.

9.4I(1) Except for Main Street cross-sections with on-street parking (see Section 17.3A(3)), bicycle amenities in the form of bike lanes—four (4) feet in width (*excluding curb and gutter*) and five (5) feet when adjacent to on-street parking—or wide outside lanes (*15-foot minimum*) with sharrow pavement markings shall be incorporated in the design of all arterials, collector streets and roads with bicycle routes identified on *Appendix C: Town of Knightdale Bike Route and Greenway Plan*; and

...

11.2B Outdoor lighting shall be designed in coordination with the landscaping plan (Section 16.8A), located outside of landscaping islands, located as far from large shade trees as the landscaping plan will allow, and mounted at heights no greater than 18 feet above grade for pedestrian lights or 37 feet above grade for street or parking area lights.

11.6B Lighting Plan

Any person submitting a site plan or applying for a building, electrical, or sign permit to install outdoor lighting fixtures shall submit evidence that the proposed work will comply with this Chapter. Please refer to Section 16.8B for lighting plan requirements.

15.3G As-Built Drawings

Prior to the issuance of a Certificate of Occupancy associated with a Site Development Approval or prior to the acceptance of public infrastructure for maintenance in Major Subdivisions, as-built drawings of all water, sewer and stormwater management facilities illustrating their layouts and connections to existing systems. Such plans shall show all easements and rights-of-way to demonstrate that the facilities are properly placed and shall indicate the locations of all fire hydrants, blow-off valves, manholes, pumps, force mains and gate valves. They shall also show the field location, size, depth and planted vegetation of all stormwater measures, controls and devices. A copy of all as-built pages must be submitted at the same time using the open Portable Document Format (pdf) standard on a Compact Disc (CD) or Digital Versatile Disc (DVD).

15.4A(4) Certificate of Occupancy

No structure shall be erected, moved, structurally altered, used or occupied until a Certificate of Occupancy (CO) has been issued by the Town of Knightdale. Any CO issued shall state that the structure or portion of a structure has:

- a. Complied with the information stated on the permit;
- b. Complied with all applicable provisions of this Ordinance; and
- c. Received final inspections approval for compliance with the N.C. Building Code, as applicable.

Where certain infrastructure elements have not been installed (*i.e. landscaping due to time of year*), a Temporary CO may be issued by the Administrator (*Section 17.5*).

15.4F(3)b(iv) Infrastructure Required within One (1) Year: All required infrastructure improvements within the Construction Documents shall be in place within one (1) year of issuance of a CIP unless the improvement has been guaranteed in accordance with Section 17.4. If circumstances beyond the control of the developer do not allow for the commencement of the required work within the 1-year period, or the size of the phase is such that one (1) year is insufficient time to commence all required work, then the developer may file a written request for an extension with the Administrator no later than 45 days prior to the 1-year anniversary of CIP approval by the Town as provided above. If infrastructure work is not commenced within one (1) year and/or no extension request is filed with the Administrator and approved, CIP approval becomes null and void on the day of the one (1) year anniversary and a new application will be required.

15.4F(3)c(i) Review Period: The developer shall initiate the final subdivision plat approval process by submitting the Final Plat and copies of any required surety or improvement guarantees (*as specified in Section 17.4*) to the Administrator or other departments as required. The Administrator will then have 45 calendar days to approve or deny the Final Plat. During the review period, the Administrator will confirm the accuracy of the Final Plat. If substantial errors are found, including inconsistencies with the approved Construction Documents, the Final Plat shall not be approved and the review period suspended until the applicant has corrected such errors. A list of the needed corrections and/or conditions shall be provided to the applicant. Any corrections and/or conditions placed by the Town on the approval of the Final Plat shall be addressed by the developer within 45 days. Failure of the developer to meet the 45 day response period shall cause the conditional approval of the Town to be null and void. Once complete, the Final Plat shall be approved or denied by the Administrator within 30 calendar days of the date of final completed submission.

15.4F(3)c(ii) Improvements Required: The Final Plat shall constitute all portions of the approved Construction Documents. No Final Plat shall be approved unless and until the developer has installed in that area all improvements required by this Ordinance or has posted any required improvement guarantees approved by the Town Council and prescribed by this Ordinance in Section 17.4.

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 September, 2012.

Russell B. Killen, Mayor

ATTEST:

Suzanne M. Yeatts, Town Clerk

APPROVED AS TO FORM:

Clyde Holt, III; Town Attorney

Chapter 16. DEVELOPMENT PLAN REQUIREMENTS

16.1 Purpose and Intent

This Chapter describes the information required for all development activity to ensure compliance with the standards found in this Ordinance. The submission of a complete application in accordance with this Chapter is necessary prior to any review being undertaken as described in Chapter 15 by the Administrator, TRC, LURB and/or Town Council.

16.2 Environmental Survey

An environmental survey is intended to identify historic buildings, areas and landscapes; to identify forest stands or trees of a uniform size and species; specimen trees of varying sizes and species, particularly free standing or open-grown or field grown trees; a distinctive tree line or forest edge; existing watercourses and previously documented endangered species' habitats. Identification of existing trees, understory vegetation, endangered species and their supporting habitat, wetlands, perennial streams, floodplains, topographical features such as steep slopes and unique geologic features, and historic resources on a site prior to the advanced preparation of development plans enables the reasonable and practical planned preservation of environmentally sensitive areas. This requirement provides the Town and the applicant the ability to:

- evaluate the proposed development in order to preserve vegetation;
- improve the appearance of the proposed development;
- encourage the use of the existing forest and tree canopy, specimen trees and significant vegetation; and
- encourage the preservation of cultural resources.

Elements of this requirement may be waived by the Administrator if the site lacks qualifying natural features.

- A. Sketch Plan and Master Plan Submittal:** The use of digital geographic data obtained from the Town of Knightdale or Wake County is deemed to be sufficient for the Sketch Plan and Master Plan phases of submittal requirements.
- B. Construction Document Submittal:** For Construction Documents, the Environmental Survey requirements are as follows:
1. Provide a general written description of the significant vegetation, which includes specimen trees as well as any tree stand containing canopy trees 12 inches DBH or greater and/or understory species two (2) inches or greater in caliper (*e.g. dogwood, holly, redbud, etc.*). For this significant vegetation, identify the species or general species composition, the general size and height, the average spacing (*in tree stands*) and the overall health and vigor of the tree(s).
 2. Denote the dripline of any existing tree stand, as measured between existing tree trunks six (6) inches or greater located at the edge of the stand.
 3. Identify all open grown or field-grown specimen trees *see Chapter 19*) standing alone in a field or on the edge of a tree stand that are located on the site 12" or greater DBH.
 4. Identify any tree on the site 24" DBH or greater.

5. Denote the presence of any historic resources identified for preservation under Section 7.6.
6. Show all other important natural features influencing site design such as the location of wetlands, rock outcroppings, site topography at two-foot (2') contour intervals, slopes steeper than 15%, perennial streams, natural drainage ways, lakes, other water bodies and floodplains indicating both the flood fringe and the flood way. USGS and FEMA data shall be used to determine the location of perennial streams unless stream data determination has already been obtained from the North Carolina Division of Water Quality or from a licensed engineering firm.
7. Denote the presence of any known endangered species' habitats indicated in any surveys completed by Wake County, the State of North Carolina, or other governmental agency.
8. Show all NRB delineations as follows:
 - a. NRB boundaries including all undisturbed buffer zones must be clearly delineated on all Development Plans submitted for approval by the Town, including all Construction Documents sets and specifically on grading and clearing sheets, erosion and sediment control plan sheets, and site plan sheets.
 - b. NRB boundaries for all required undisturbed buffer zones must be clearly delineated on-site in the field prior to any land disturbing activities. Where existing trees are to be preserved in a buffer zone, limits of grading shall maintain a minimum 20-foot separation from the base of each tree on the upland side of the buffer or to the dripline, whichever is greater.
 - c. NRB boundaries including all buffer zones as well as all buffer requirements must be specified on the final plat of record, on individual deeds, and in property association documents for lands held in common.

16.3 Floodplain Development Permit Requirements

Whenever a FEMA designated floodplain crosses a development site, a Floodplain Development Permit is required. Application for a Floodplain Development Permit shall be made to the Administrator on furnished forms prior to any development activities proposed on site. All plans shall be submitted at a scale not less than 1 inch = 60 feet unless otherwise authorized by the Administrator. The following items/information shall be presented to the Administrator to apply for a floodplain development permit:

- A.** A plot plan drawn to scale which shall include, but shall not be limited to, the following specific details of the proposed floodplain development:
 - 1. The nature, location, dimensions, and elevations of the area of development/disturbance; existing and proposed structures, the location of utility systems, proposed grading/pavement areas, fill materials, storage areas, drainage facilities, and other proposed development;
 - 2. The boundary of the Special Flood Hazard Area as delineated on the FIRM or other flood map as determined in Section 6.6C(1) or a statement that the entire lot is within the Special Flood Hazard Area;
 - 3. Flood zone(s) designation of the proposed development area as determined on the FIRM or other flood map as determined in Section 6.6C(1);
 - 4. The boundary of the floodway(s) or non-encroachment area(s) as determined in Section 6.6C(1);
 - 5. The Base Flood Elevation (BFE) where provided as set forth in Section 6.6C(1); or 6.6E subsections 3e, 4, and 5;
 - 6. The old and new location of any watercourse that will be altered or relocated as a result of proposed development; and
 - 7. Preparation of the plot plan for the original development of property by or under the direct supervision of a registered land surveyor or professional engineer and certified by same. Additions to an existing structure such as a deck are exempt.
- B.** Proposed elevation, and method thereof, of all development within a Special Flood Hazard Area including but not limited to:
 - 1. Elevation in relation to mean sea level of the proposed reference level (including basement) of all structures;
 - 2. Elevation in relation to mean sea level to which any non-residential structure will be flood-proofed;
 - 3. Elevation in relation to mean sea level to which any proposed utility systems will be elevated or flood-proofed;
- C.** If flood-proofing, a flood-proofing certificate and back-up plans from a registered professional engineer or architect certifying that the non-residential flood-proofed development will meet the flood-proofing criteria in sections 6.6E(3)b and 6.6E(5).
- D.** A foundation plan drawn to scale, which shall include details of the proposed foundation system to ensure all provisions of this ordinance are met. These details include but are not limited to:
 - 1. Proposed method of elevation, if applicable (*i.e., fill, solid foundation perimeter wall, solid backfilled foundation, open foundation on columns/piers*); and

- 2.** Should solid foundation perimeter walls be used in floodplains, details of sufficient openings to facilitate the unimpeded movements of floodwaters in accordance with 6.6E, Subsection 3d;
- E.** Usage details of any enclosed space below the regulatory flood protection elevation.
- F.** Plans and/or details for the protection of public utilities and facilities such as sewer, gas, electrical, and water systems to be located and constructed to minimize flood damage;
- G.** If floodplain development permit is issued for placement of recreational vehicles and/or temporary structures, documentation to ensure sections 6.6E(3)f and 6.6E(3)g of this code are met.
- H.** If a watercourse is proposed to be altered and/or relocated, a description of the extent of watercourse alteration or relocation; an engineering report on the effects of the proposed project on the flood-carrying capacity of the watercourse and the effects to properties located both upstream and downstream; and a map (if not shown on plot plan) showing the location of the proposed watercourse alteration or relocation.

16.4 Sketch Plan Requirements

Prior to submitting a Sketch Plan for Administrative review, the applicant shall schedule a pre-application submittal (“*pre-app*”) meeting with the Administrator. In addition to information required by the Environmental Survey (*Section 16.2*), the Sketch Plan shall show the proposed layout of streets, lots, buildings, public open spaces and other features in relation to existing conditions based upon the size of the tract proposed for development.

The size and number of completed applications shall be set by the Administrator. All plans shall be submitted at a scale not less than 1 inch = 60 feet unless otherwise authorized by the Administrator.

Generally, a Sketch Plan will include the following information:

- A sketch vicinity map, including north arrow, showing the location of the subdivision or site in relation to neighboring tracts, subdivisions, roads, and waterways;
- The name, address, and telephone number of the property owner;
- The name of the proposed subdivision;
- The boundary lines of the property;
- The total acreage;
- The existing and proposed land uses and the existing land uses of adjacent properties;
- The existing topographic and planimetric conditions of the property and a surrounding 300-foot buffer area around the property including contours not exceeding five-foot (5') intervals (*Wake County or Town of Knightdale topographic information may be used to fulfill this requirement*);
- The location, names, and right-of-way width of any existing streets on or within 300 feet of the land to be subdivided;
- Lots of adjacent developed or platted properties;
- Zoning classification of the land and adjacent properties;
- Illustrative building elevations denoting general design elements and materials;
- Watershed classification, if any;
- A general graphic inventory of the natural resources (*wetlands, lakes, ponds, forest cover, stream buffers, geologic features, native vegetative areas, etc.*) at the site and surrounding area out to a radius of 300 feet around the subject subdivision or site as they exist prior to the commencement of development activities; and
- A graphic concept plan of the proposed post-development stormwater management system including but not limited to swales, low-impact designs elements, structural stormwater controls, flow paths, stream channel modifications, bridges and culvert crossings.
- A statement and any supporting documentation regarding how the proposed development will meet the Town of Knightdale Water Allocation Policy; thereby securing connection to the public water and sewer infrastructure.

Additional information may be required by the Administrator prior to formal submittal of further development applications.

16.5 Master Plan Requirements

All plans shall be submitted at a scale not less than 1 inch = 60 feet unless otherwise authorized by the Administrator. The size and number of completed applications shall be set by the Administrator. In addition, a copy of all plan pages must be submitted at the same time using the open Portable Document Format (pdf) standard on a Compact Disc (CD) or Digital Versatile Disc (DVD).

No processing or review of a Master Plan will proceed without all of the following information:

- A. Boundary & Significant Feature Survey:** The boundary, as determined by survey, of the area to be developed with all bearings and distances shown and the location within the area, or contiguous to it, of any existing streets, railroad lines, perennial streams, wetlands, easements or other significant features of the tract;
- B. Scale & North Arrow:** Scale denoted both graphically and numerically with north arrow;
- C. Vicinity Map:** A vicinity map at a scale no smaller than 1 inch equals 1,200 feet showing the location of the subdivision with respect to adjacent streets and properties;
- D. Site Data Table:** Site calculations shall include total acreage of tract, acreage in parks and other non-residential uses, total number and acreage of parcels, and the total number of housing units.
- E. General Site Information:** The proposed name of the development, street names, the owner's name and address, the names of adjoining subdivisions or property owners, the name of the Township, county, and state in which the development is located, the date of plan preparation, and the zoning classification of the tract to be developed, and of adjoining properties.
- F. Environmental Survey:** See Section 16.2.
- G. Topography:** Original contours at intervals of not greater than 2 feet for the entire area to be subdivided and extending into adjoining property for a distance of 300 feet at all points where street rights-of-way connect to the adjoining property and 50 feet at all other points of common project boundaries. Wake County or Town of Knightdale digital topography may be used to satisfy this requirement but should be field-verified to ensure accuracy. This requirement may be waived for developments smaller than one (1) acre or where insufficient topographic changes warrant such information.
- H. Natural Development Constraints:** The location of any building restriction areas such as flood hazard areas, buffer locations, watershed protection districts and/or jurisdictional wetlands;
- I. Municipal & ETJ Boundaries:** Corporate limits and extra-territorial jurisdiction boundaries where applicable.
- J. Site Improvements & Dimensions:** The location of proposed buildings, parking and loading areas, streets, alleys, easements, lots, parks or other open spaces, site reservations (*i.e. school sites*), property lines, street dimensions and tentative lot dimensions;
- K. Recreational Open Space Calculations:** Calculations for required and proposed recreational open space.
- L. Street Cross-Sections:** Typical cross-sections of proposed streets. Where a proposed street is an extension of an existing street, the profile of the street shall include 300 feet

of the existing roadway, with a cross section of the existing street. Where a proposed street within the development abuts a tract of land that adjoins the development and where said street may be expected to extend into said adjoining tract of land, the profile shall be extended to include 300 feet of the said adjoining tract.

- M. Two-Dimensional (2-D) Utility Plans:** Two-dimensional (2-D) utility plan showing location of sanitary sewer lines, water distribution lines, storm sewer lines, manholes, clean-outs, fire hydrants, fire lines, valves, underground private utilities, backflow prevention devices showing make and model, meters and pipe sizes. If applicable, also show well and septic locations, force mains and pump stations.
- N. Construction Limits:** The proposed limits of construction for all proposed development activity.
- O. Phasing Plan & Timetable:** A phasing plan, including a timetable for estimated project completion for each phase proposed.
- P. Water Allocation Policy:** A statement and any supporting documentation regarding how the proposed development will meet the Town of Knightdale Water Allocation Policy; thereby securing connection to the public water and sewer infrastructure.
- Q. Specific Plan Sheets:** Unless otherwise exempted by the Administrator, the following specific plan sheets are also required:
 1. **Landscape Plan** in accordance with Section 16.8A;
 2. **Lighting Plan** in accordance with Section 16.8B;
 3. **Signs & Markings Plan** in accordance with Section 16.8C;
 4. **Architectural Plans** in accordance with Section 16.8D; and
 5. **Stormwater Management Plan** in accordance with Section 16.8E.

In addition to the above required information, the following additional information may be required by the Administrator, the Land Use Review Board, or the Town Council on a site-specific basis:

- R. Traffic Impact Analysis** (if required) in accordance with Section 16.9.
- S. Environmental Impact Statement:** An Environmental Impact Statement, pursuant to Article 113A of the North Carolina General Statutes, may be required if: the development exceeds two (2) acres in area, and; if the Town Council deems it necessary due to the nature of the land or peculiarities in the proposed design.
- T. Floodplain Development Permit:** FDP application with supporting documentation as may be required by the Knightdale Flood Damage Prevention Ordinance in Section 6.6.

16.6 Construction Drawing Requirements

All plans shall be submitted at a scale not less than one (1) inch = 60 feet unless otherwise authorized by the Administrator. The size and number of complete application submittal copies required shall be set by the Administrator. In addition, a copy of all plan pages must be submitted at the same time using the open Portable Document Format (pdf) standard on a Compact Disc (CD) or Digital Versatile Disc (DVD).

No processing or review of Construction Documents/Preliminary Plats will proceed without all of the following information:

- A. Boundary & Significant Feature Survey:** The boundary, as determined by survey, of the area to be subdivided or built upon with all bearings and distances shown and the location and the location within the area, or contiguous to it, of any existing streets, railroad lines, water courses, easements, bridges or other significant features of the tract. One corner of the tract shall be tied to the NC State Plane 1983 Coordinate System.
- B. Scale & North Arrow:** Scale in feet denoted both graphically and numerically with north arrow and declination.
- C. Vicinity Map:** A sketch vicinity map at a scale no smaller than one (1) inch equals 1,200 feet showing the relationship between the proposed subdivision or building site and surrounding area.
- D. Site Data Table:** Site calculations shall include total acreage of tract, acreage in parks and other non-residential uses, total number and acreage of parcels, the total number of housing units, area of all mixed-use and non-residential buildings, gross project density per acre, linear feet of streets and the accurate locations and descriptions of all monuments, markers and control points.
- E. General Site Information:** The proposed names of the Development and streets, the owner's name and address, signature of the owner or owner's duly authorized agent, the surveyor's name, the names of existing and proposed adjoining subdivisions or property owners, the names of the township, county, and state in which the development is located, the date of preparation, and the zoning classification of the tract to be developed and of adjoining properties, and the names, widths, right-of-way dimensions, pavement design, utility and storm drainage locations of adjoining streets.
- F. Environmental Survey:** See Section 16.2.
- G. Topography:** Existing topography and finish grading with contours drawn at two (2) foot intervals. This requirement may be waived for developments smaller than one (1) acre or where insufficient topographic changes warrant such information. Elevations to be based on North American Vertical Datum of 1988 (NAVD 88) with benchmark indicated.
- H. Natural Development Constraints:** The location of any building restriction areas such as flood hazard areas, watershed protection districts, and/or jurisdictional wetlands.
- I. Municipal & ETJ Boundaries:** Corporate limits and extra-territorial jurisdiction boundaries where applicable.
- J. Lots & Numbering:** Proposed lot lines, lot dimensions, lot and block numbers and exact dimensions (*for Major Subdivisions only*).
- K. Dedications & Reservations:** The future ownership and location of common and public areas (*dedication or reservation for public use to a governmental body; for owners to duly*

constituted home owners' associated, for tenant's remaining in subdivider's ownership of recreation and open space lands).

- L. **Water Allocation Policy:** A statement including an estimated calculation of sewer capacity requested in gallons per day along with the methodology for how such calculation was derived, and any supporting documentation regarding how the proposed development will meet the Town of Knightdale Water Allocation Policy; thereby securing connection to the public water and sewer infrastructure.
- M. **Three-Dimensional (3-D) Utility Plans:** The plans and profiles for utility layouts including sanitary sewers, storm sewers and water lines, illustrating connections to existing systems. Specific data includes, but is not limited to:
 - pipe material, size, length and slope;
 - drainage areas and run-off for each storm drain pipe;
 - invert elevations and top elevations for structures;
 - water meter locations and size;
 - sewer service lateral locations and size;
 - detailed pump station plans;
 - volume and cycle time calculations, total discharge head calculations, pump selection curve, and hydrostatic uplift calculations for pump stations and force mains;
 - easements;
 - fire hydrant locations;
 - valve, fittings and blow-off locations;
 - details for borings;
 - temporary and permanent sampling station locations; etc.

All systems shall conform to current Town standards and the *Knightdale Standards Specifications and Construction Details Manual*.

- N. **Easements:** Easements shall be provided on all Construction Documents as follows:
 1. **Utility Easements:** Easements for underground or above ground utilities shall be provided for and centered along rear or side lot lines, and shall be a minimum of 10 feet in width. Easements for water lines, sanitary sewers, and storm drains shall be centered on the pipe and a minimum of 20 feet in width or as required by the *Knightdale Standard Specifications and Construction Details Manual*.
 2. **Drainage Easements:** Where a development is crossed by a stream or drainage way, an easement shall be provided conforming to the lines of such stream and of sufficient width as shall be adequate to maintain the overall integrity of the drainage area and provide for its periodic maintenance.
 3. **Public Access Easements:** Public Access Easements shall be provided for sidewalks, trails, greenways, and other pedestrian and bicycle facilities that provide connections other than within public rights-of-way.
- O. **Off-Street Parking & Loading Areas:** The number, location and dimensions of all off-street parking and loading spaces and the location and dimensions of all walkways indicating the type of surfacing, size, angle of stalls and width of aisles.

- P. Recreational Open Space Amenities:** The location and dimensions of proposed recreation areas, parks, open space, and required amenities and improvements including the calculated area of all required open space dedications in accordance with Chapter 7.
- Q. Street Improvements:** The location and dimensions of any sidewalks, curb and gutters to be installed along public street frontages, and other required street improvements designated in chapters 9 and 17 of this Ordinance. Required right-of-way shall be drawn in the location shown on any official plan at the width specified in this Ordinance.
- R. Street Cross-Sections:** Typical cross sections of proposed streets showing rights-of-way, pavement widths, grades, and design engineering data for all corners and curves. Where a proposed street is an extension of an existing street the profile of the street shall include 300 feet of the existing roadway, with a cross section of the existing street. Where a proposed street within the subdivision abuts a tract of land that adjoins the subdivision and where said street may be expected to extend into said adjoining tract of land, the profile shall be extended to include 300 feet of the said adjoining tract.
- S. Demolition Landfills:** The location of any existing or proposed demolition landfills in the site. Such sites shall not be used for building.
- T. Erosion & Sedimentation Control Permit:** A copy of the full soil erosion and sedimentation permit application including forms, plans and calculations to be submitted to the NCDENR-Erosion Control Office along with copies of all other local, State and Federal floodplain development permits required (*i.e. Wetlands, Riparian Buffers, Mining, etc.*); and a copy of all approval letters prior to Site Plan or Construction Drawing approval.
- U. Specific Plan Sheets:** Unless otherwise exempted by the Administrator, the following specific plan sheets are also required:
1. **Landscape Plan** in accordance with Section 16.8A
 2. **Lighting Plan** in accordance with Section 16.8B
 3. **Signs & Markings Plan** in accordance with Section 16.8C
 4. **Architectural Plans** in accordance with Section 16.8D
 5. **Stormwater Management Plan** in accordance with Section 16.8E
- V. Additional Information:** In addition to the preceding required information, the following additional information may be necessary for specific sites as determined by the Administrator or the TRC:
1. **Traffic Impact Analysis** (if required) in accordance with Section 16.9.
 2. **Private Community Utilities:** Where a proposed water and sewer system does not contemplate the use of publicly owned and operated facilities, the proposed facility plans as approved by the appropriate agency shall be submitted with the Constructions Documents.
 3. **Individual Well & Septic:** Where public or community water supply and/or sewerage systems are not available or to be provided, a written statement from the Wake County Health Department shall be submitted with the Construction Documents indicating that each lot has adequate land area and soil conditions suitable to accommodate the proposed methods of water supply and sewage disposal.

W. Certification Statements

1. **Cover Sheet:** The following certifications must appear on the **cover sheet** for Construction Drawings for Site Plans and Major Subdivisions:

a. Town Approved Standards Shall Control. In the event of a conflict or inconsistency between these construction drawings and the Town of Knightdale's Approved Standards for this project, the Approved Standards shall control. Town of Knightdale Approved Standards shall mean all development documents necessary for approval for the Property including, but not limited to, any special use permit, subdivision plan, site plan, subdivision plat(s), phasing schedule, Development Agreement, Utility Allocation Agreement, Annexation Agreement, the Town of Knightdale Standard Specification and Details Manual and applicable provisions of the North Carolina State Building Code.

b. Professional Design Engineer Certification. These improvements shall be constructed in accordance with the following drawings and with the Standard Specifications of the Town of Knightdale.

I, _____, PE, certify that the Standard Specifications of the Town of Knightdale have been thoroughly checked and found to be applicable to this project. All exceptions to the applicable Town standards have been previously approved by the Town of Knightdale and said exceptions are shown on Sheet(s) _____ of these drawings.

Seal By: _____, PE
 Date: _____

2. **Each Sheet:** The following certification must appear on **each sheet** containing drawings for Construction Drawings for Site Plans and Major Subdivisions:

a. Town Certification. This design has been reviewed by the Engineer for the Town of Knightdale, and to the best of my knowledge and belief, it conforms to the requirements established in the Standard Specifications of the Town of Knightdale.

By: _____ Date: _____
 Town Engineer

These plans are approved by the Town of Knightdale and serve as construction plans for this project.

By: _____ Date: _____
 Administrator

3. **Landscape Plan Sheet(s):** The Administrator may allow the following Certificate to be placed on the Landscape Plan sheets for Construction Drawings for Site Plans and Major Subdivisions if a reasonable amount of time has passed, and a Lighting Plan has not yet been able to be procured from the lighting utility provider:

a. **Lighting Plan Certification:** I hereby certify I am the applicant and that a Lighting Plan shall be submitted by the utility provider to the Knightdale Planning Department for approval prior to the installation of all required lighting. The lighting plan shall designate the proposed location of all light poles and shall be in compliance with sections 8.10 and 16.8B as well as Chapter 11 of the Town of Knightdale UDO. If a proposed light pole location should present a conflict with existing or proposed vegetation according to the approved construction drawings, the Landscaping Plan shall be revised to comply with the Town of Knightdale UDO requirements. All revisions are subject to Town of Knightdale approval.

Date

Applicant

I (officer authorized to take acknowledgments) do hereby certify that _____ personally appeared before me this day and acknowledged the due execution of this certificate. Witness my hand and (where an official seal is required by law) official seal this ___ day of _____, A.D., ____ (year).

Official Seal

Notary

Commission Expires

16.7 Final Plat Requirements

The final plat shall be prepared by a registered land surveyor, licensed to practice in the State of North Carolina and shall constitute all portions of the site, which the subdivider proposes to record, and develop at the time. Final Plats must be drawn to a scale of not more than 1 inch = 60 feet unless otherwise authorized by the Administrator, and shall meet the requirements of the Wake County Register of Deeds Office. The size and number of completed applications shall be set by the Administrator. In addition, a copy of all plan pages must be submitted at the same time using the open Portable Document Format (pdf) standard on a Compact Disc (CD) or Digital Versatile Disc (DVD).

No Final Plat shall be approved unless and until the subdivider has installed in the platted area all improvements required by this Ordinance and has submitted As-Built Drawings in accordance with Section 15.3G or has posted Improvement Guarantees in accordance with Chapter 17. Furthermore, submittal of any payment in lieu of dedicated recreational open space shall also be made prior to the approval of any Final Plat.

The Final Plat shall be drawn in black ink on mylar and shall contain the following:

- A. **Title Block Information:** The name of the township in which the subdivision is located, the name of the subdivision, the name of the owner, the name, registration number, and seal of the registered surveyor under whose supervision the plat was prepared, the date of the plat, and the words "Final Plat."
- B. **Boundary Survey:** The exact boundary of the tract of land being subdivided showing clearly the disposition of all portions of the tract. One corner of the tract shall be tied to the NAD83 State Plane Coordinate System.
- C. **Scale & North Arrow:** Scale denoted both graphically and numerically with north arrow and declination.
- D. **Vicinity Map:** A vicinity map showing the location of the subdivision with respect to adjacent streets and properties.
- E. **Survey Points:** The accurate locations and descriptions of all monuments, markers, and control points.
- F. **Adequate Data & Dimensions:** Sufficient data to determine readily and reproduce accurately on the ground the location, bearing, and length of every street, alley line, lot line, building footprint, easement line, and setback line. All dimensions shall be measured to the nearest one-hundredth of a foot and all angles to the nearest second.
- G. **Street and Lot Information:** The centerlines and names of all streets, alley lines, lot lines, lot and block numbers, lot addresses.
- H. **Delineated Public Purpose Areas:** Easements, reservations, on-site demolition landfills, and areas dedicated to public purpose with notes stating their purposes.
- I. **Utility Easements:** Underground and aerial utility easements shall be shown and indicated with dimensions and widths.
- J. **Environmental Protection Boundaries:** The exact location of stream corridor buffer boundaries including all buffer zones as well as all buffer requirements and required tree cover areas must be specified on the record plat, on individual deeds, and in property association documents for land held in common.
- K. **Residential Landscaping Notes:** All residential landscaping notes as required in Section 8.9.

- L. Finished Floor Elevations:** Minimum floor finish elevations shall be shown for each lot which wholly or partly lies within any floodplain boundary. All lots subject to flooding shall be noted with the following statement:

"Any construction or use within the areas delineated as floodway are subject to the restrictions imposed by the Knightdale Flood Damage Prevention Ordinance."

M. Certification Statements

1. All Final Plats:

a. Certificate of Survey and Accuracy. I, _____, certify that this map was (drawn by me)(drawn under my supervision) from (an actual survey made by me)(an actual survey under my supervision)(deed description recorded in Book____, Page____, Book____, Page____, etc)(other); that the error of closure as calculated by latitudes and departures is 1:____, that the boundaries not surveyed are shown as broken lines plotted from information found in Book____, Page____; that this map was prepared in accordance with G.S. 47- 30 as amended. Witness my hand and seal this ___ day of _____, A.D., _____ (year).

Surveyor

Official Seal

License or Registration Number

b. Certificate of Ownership and Dedication. I hereby certify that I am the owner of the property shown and described, which is located in the subdivision jurisdiction of the Town of Knightdale and that I hereby adopt this plan of subdivision with my free consent, establish minimum building setback lines, preserve and protect all soils and vegetation in the tree protection areas as required in Section 8.5 of the Town of Knightdale Unified Development Ordinance, plant supplementary or replacement trees as required, and dedicate all streets, alleys, walks, parks, and other sites and easements, to public or private uses as noted. Furthermore, I hereby dedicate all sanitary sewer and water lines that are located in public utility easements or rights-of-way to the City of Raleigh, and I hereby dedicate all storm sewer lines that are located in public utility easements or rights-of-way to the Town of Knightdale

Date

Owner(s)

I (officer authorized to take acknowledgments) do hereby certify that _____ personally appeared before me this day and acknowledged the due execution of this certificate. Witness my hand and (where an official seal is required by law) official seal this ___ day of _____, A.D., _____ (year).

Official Seal

Notary

Commission Expires

c. Certificate of Approval of the Design and Installation of Streets and Other Required Improvements. I hereby certify that all streets and other required improvements have been installed in an acceptable manner and according to the Town of Knightdale's *Standard Specifications and Details Manual* or that guarantees of the installation of the required improvements in an amount and manner satisfactory to the Town of Knightdale has been received.

Date

Town Engineer, Town of Knightdale

d1. Certificate of Approval for Recording. I hereby certify that the subdivision plat shown hereon has been found to comply with the Unified Development Ordinance for the Town of Knightdale, North Carolina, and that this plat has been approved by the Town of Knightdale for recording in the Office of the Register of Deeds of Wake County.

Date

Administrator, Town of Knightdale

OR

(The following certificate shall appear on all plats which do not meet the definition of subdivision as defined in this Ordinance, but which need approval from the Town for recording at the Wake County Register of Deeds Office. This Certificate is to be used in lieu of d1. above.)

d2. Certificate of Approval for Recording. I hereby certify that the subdivision plat shown is exempt from the subdivision provisions of the Unified Development Ordinance for the Town of Knightdale, North Carolina, and is therefore exempt from its provisions. The plat has been found to comply with the zoning regulations of the Unified Development Ordinance for the Town of Knightdale, North Carolina, and has been approved by the Town of Knightdale for recording in the Office of the Register of Deeds of Wake County.

Date

Administrator, Town of Knightdale

e. Review Officer Certification. State of North Carolina, County of Wake I, _____, Review Officer of Wake County, certify that the map or plat to which this certification is affixed meets all the statutory requirements for recording.

Date

Review Officer
Town of Knightdale, Wake County

16.8 Specific Plan Sheet Requirements

A. Landscape Plan

Prior to any site disturbance, a landscaping plan sheet(s) shall be required on all non-residential and multi-family uses in a residential district. The plan sheet(s) shall at a minimum contain the following information:

1. **Title Block:** Name of the project, name and address of owner, name and address of engineer, scale, date, legend, and north arrow;
2. **Boundary Survey:** An accurate drawing of property boundaries;
3. **Building & Vehicle Accommodation Area Locations:** The location of proposed buildings, driveways, parking areas, required parking spaces, and traffic patterns;
4. **Utility Locations:** The location of all overhead and underground utilities, including utility easements;
5. **Existing Conditions:** See Section 16.2 “Environmental Survey”;
6. **Undisturbed Areas:** Identify existing plant materials and areas to be left in natural state such as qualifying buffers and tree cover areas;
7. **Tree Protection Devices:** Methods and details for protecting the critical root zone of existing plant materials during construction such as tree protections fences, etc.;
8. **New Plant Material:** Locations, size and labels for all proposed plants;
9. **Plant List Table:** Plant lists with common name, botanical name, quantity, and spacing and size of all proposed landscape material at the time of planting;
10. **Other Landscape Improvements:** Location and description of other landscape improvements, such as earth berms (*with two-foot [2'] topography*), walls, fences, screens, sculptures, fountains, lights, courtyards, walks or paved areas; and
11. **Planting Details:** Planting and installation details as necessary to ensure conformance with all required standards as referenced in chapters 8, 10 and 17.

B. Lighting Plan

Any person submitting an application that involves the installation of outdoor lighting fixtures shall submit evidence that the proposed work will comply with Chapter 11 in the form of a lighting plan sheet(s). The lighting plan sheet(s) shall at a minimum contain the following information:

1. **Title Block:** Name of the project, name and address of owner, name and address of engineer, scale, date, legend, and north arrow;
2. **Boundary Survey:** An accurate drawing of property boundaries;
3. **Building & Vehicle Accommodation Area Locations:** A site plan drawn to scale showing the building(s), driveways, parking areas, required parking spaces and traffic patterns;
4. **Landscaping Plan Elements:** The location of all undisturbed areas (*Section 16.8A[6]*), new plant material (*Section 16.8A[8]*), and other landscape improvements (*Section 16.8A[10]*);

5. **Exterior Lighting Fixtures:** Locations of all pole-mounted and building-mounted exterior lighting fixtures;
6. One (1) of the following:
 - a. **Footcandle Grid:** A numerical point-by-point FC grid (*photometric report*) maximum of 10 feet by 10 feet for small and medium size projects (*less than two [2] acres*) and 25 foot by 25 foot grid for large projects that indicates the minimum, maximum and average FC levels within the lighted area of the site and the average to minimum ratio* for the determination of uniformity;

OR
 - b. **Isolux Diagram:** An isolux lighting plan is also permitted in fulfillment of this Section, provided that it indicated the FCs at grade by contour diagram or grid points that cover the site and indicates the minimum, maximum and average FCs as well as the average to minimum uniformity ratio*; and
 - * *The minimum (lowest number) is usually at the outer edges of the illuminated area or between two fixtures. The average light level is determined by adding the FC values of all points in the grid and dividing by the total number of points. This information is usually calculated by a computer program and is available from the manufacturer of the specified fixture.*
7. **Lighting Details:** Specifications that may include, but are not limited to: manufacturers catalog cuts enlarged or reduced to the correct scale of the site plan, and drawings including sections where required; of the illuminating devices, lamps, supports and other devices, including the IESNA cut-off classification of the fixture(s) used.

C. Traffic Signs and Markings Plan

A traffic signs and markings plan shall depict traffic sign and marking details of the proposed development and shall at a minimum contain the following information:

1. **Title Block:** Name of the project, name and address of owner, name and address of engineer, scale, date, legend, and north arrow;
2. **Boundary Survey:** An accurate drawing of property boundaries;
3. **Sign Location & Details:** Location of all traffic and directional signs within the public right-of-way as well as private parking lots and drives, including sign and pole materials, text and dimensions; and
4. **Pavement Marking Locations & Details:** Location of all pavement markings and striping within the public right-of-way as well as private parking lots and drives, including materials and dimensions.

D. Architectural Plans

Architectural plans do not include full construction drawings and interior arrangements are not considered as part of this review. Architectural plans shall depict architectural details of the proposed development and shall at a minimum contain the following information:

1. **Title Block:** Name of the project, name and address of owner, name and address of architect, scale, date and legend;

2. **Building Elevations:** At Master Plan - preliminary color renderings of building elevations plus typical cross sections to clearly define the character of the project as required by the Administrator, and at Construction Drawings - final proposed elevations of all non-single-family and duplex buildings ;
3. **Cross-Sections:** A cross-section elevation plan depicting all buildings, structures, monuments, and other significant natural and man-made features of the proposed development; and
4. **Materials Board:** An exterior building materials board.

E. Stormwater Management Plan

Prior to the issuance of a CIP, a stormwater management plan for all development and redevelopment must be properly submitted and reviewed, pursuant to this Section, unless otherwise exempted according to Section 6.3C(2).

1. **Purpose:** The stormwater management plan shall govern the design, installation and construction of stormwater management and control practices on the site, including structural BMPs and elements of site design for stormwater management other than structural BMPs. The plan is intended to provide a mechanism for the review, approval and inspection of the approach to be used for the management and control of stormwater for the development or redevelopment site consistent with the requirements of this ordinance, whether the approach consists of structural BMPs or other techniques such as low-impact or low-density design.
2. **Preparer:** A qualified registered North Carolina professional engineer, surveyor or landscape architect shall prepare the stormwater management plan. The engineer, surveyor or landscape architect shall perform service only in their area of competence, and shall verify that the design of all stormwater management facilities and practices meets the submittal requirements for complete plans, that the designs and plans are sufficient to comply with applicable standards and policies found in the *Manual*, and that the designs and plans ensure compliance with this ordinance.
3. **Authority to File Stormwater Management Plans:** All stormwater management plans required pursuant to the Knightdale UDO shall be submitted to the Administrator by the land owner or the land owner’s duly authorized agent.
4. **Establishment of Plan Requirements and Fees**
 - a. **Plan Contents and Form**

The Administrator shall establish requirements for the content and form of all stormwater management plans and shall amend and update those requirements from time to time. At a minimum, the stormwater management plan shall describe in detail how post-development stormwater runoff will be controlled and managed, the design of all storm water facilities and practices, and how the proposed project will meet the requirements of this ordinance, including Section 6.3F, Development Standards. Incomplete submittals shall be treated pursuant to Section 15.3B: Completeness Review.

b. Approval

If the Administrator finds that the stormwater management plan complies with the standards of this ordinance, the Administrator shall approve the plan. The Administrator may impose conditions of approval as needed to ensure compliance with this ordinance. The conditions shall be included as part of the approval.

c. Fails to Comply

If the Administrator finds that the stormwater management plan fails to comply with the standards of this ordinance, the Administrator shall notify the applicant and shall indicate how the plan fails to comply. The applicant shall have an opportunity to submit a revised application.

d. Revision and Subsequent Review

A complete revised stormwater management plan shall be reviewed by the Administrator after its re-submittal and shall be approved, approved with conditions or disapproved. Any re-submittal shall be made in accordance with the adopted Fee Schedule.

16.9 Traffic Impact Analysis (TIA)

A Traffic Impact Analysis (TIA) is required for any proposed Zoning Map Amendment (*Section 15.6C*) or Master Plan submittal (*Section 16.5*), if the nature of the proposed re-zoning or development is such that the number of trips it can be expected to generate equals or exceed 150 new peak hour trips. Trips are those occurring on peak days on the adjacent roadway(s).

- A. Preparer:** A traffic-engineering consultant licensed as a professional engineer shall prepare the TIA.
- B. Procedure:**
- 1. Pre-Submittal Conference:** The applicant shall arrange for a Pre-Submittal Conference to discuss the project with the Town and the developer's traffic-engineering consultant. The applicant shall supply the following information for consideration and discussion at the Conference: traffic analysis base information, site location map, site layout, data on existing and proposed land uses, projected timing of construction and build-out year, and description of project. The Pre-Submittal Conference will determine the appropriateness and extent of the individual TIA requirements as outlined in Subsection E below.
 - 2. Submittal of TIA:** Three (3) copies of the study shall be submitted to the Administrator who shall notify the applicant if additional studies or analyses are necessary. In addition, a copy of the document must be submitted at the same time using the open Portable Document Format (pdf) standard on a Compact Disc (CD) or Digital Versatile Disc (DVD). Once a report is determined to be complete, a finding of such completion shall be made by the Administrator on the TIA and proceedings on any application that were stayed pending completion of the TIA may resume.
 - 3. Post-Submittal Conference:** After the completion of the study, the town and/or consultant may arrange a time to meet with the Applicant to discuss the study's findings and recommendations.
- C. Study Area Boundaries:** The extent of the study for the TIA depends upon the location and size of the proposed project and the prevailing conditions of the surrounding area as determined by the Administrator. The study area should include an analysis of all major intersections, site drives and adjacent roadways, plus off-site intersections where site traffic will constitute 10% or more of any intersection approaching volume during the peak hour. Controlled access roadways are not included in the study area or analysis; however, controlled access ramp intersections with non-controlled access roadways are subject to analysis.
- D. Contents:** The following is a general outline of issues to be addressed by the TIA. Specific components will be determined for each project during the Pre-Submittal Conference:
- 1. Site Description:** A detailed report, containing illustrations and narrative, shall describe the site's characteristics, adjacent land uses, as well as any anticipated development within the site's vicinity influencing future traffic conditions.
 - 2. Study Area:** The report shall indicate the geographic location of the study area, roadway segments, critical intersections, and access points to be analyzed.
 - 3. Existing Traffic Conditions:** An analysis of the existing traffic conditions, including all data used for the analysis shall be provided in the report, including:

- a. Traffic count and turning movement information, including the date and source from which this information was obtained;
- b. Correction factors used to convert collected traffic data into representative average daily traffic volumes; and
- c. Roadway characteristics, including:
 - i. Design configuration of existing or proposed roadways;
 - ii. Existing traffic control measures;
 - iii. Existing driveways and turning movement conflicts in the vicinity of the site; and
 - iv. Existing Level of Service (LOS) for roadways and intersections without project development traffic (*LOS shall be calculated for the weekday peak hour, and in the case of uses generating high levels of weekend traffic, the Saturday peak hour*).

4. **Horizon Year(s) and Background Traffic:** The report shall identify the horizon year(s) that were analyzed in the study, the background traffic growth factors for each horizon year, and the method and assumptions used to develop the background traffic growth. Unless otherwise approved, development impacts shall be examined for the first and tenth years after the development is completed.

5. **Trip Generation, Trip Reduction, and Trip Distribution**

A summary of projected a.m. and p.m. peak hour and average daily trip generation for the proposed development shall be provided in addition to projected trip distribution to and from the site. The factors used to determine trip generation, reduction, and distribution are also to be included in the summary.

Trip generation shall be measured based on the current edition of the Institute for Transportation Engineers (ITE) *Trip Generation Manual*. In the case of a rezoning where the uses are not known, trip generation calculations shall assume the permitted use that generates the highest number of peak hour trips or a likely mix of uses agreed upon by the Administrator.

6. **Traffic Assignment:** The report shall identify the projected roadway segment, intersection or driveway traffic volumes, with and without the proposed development, for the horizon year(s) of the study.

7. **Impact Analysis:** The report shall address the impact of projected horizon year(s) traffic volumes. It shall identify the methodology used to evaluate the impact. The weekday peak hour impact shall be evaluated as well as the Saturday peak hour for those uses exhibiting high levels of weekend traffic generation.

8. **LOS Standards, Mitigation and Alternatives:** The study shall clearly indicate those recommended improvements and associated costs that are necessary to achieve a LOS “C” along new/planned roadway segments and LOS “D” along existing roadway segments. In addition, where the existing roadway segment LOS is currently below LOS “D”, improvements must also be recommended that, at a minimum, attain or maintain the associated existing at-grade intersection levels of service as measured at each intersection approach along and adjacent to said

roadway segment. Only the Town Council may grant exceptions to the LOS standards. If the recommended improvements do not meet the applicable LOS standards, one (1) or more of the following actions may be necessary:

- Reduce the size, scale, scope, or density of the development to decrease traffic generation.
- Divide the project into phases, allowing for only one phase at a time until traffic capacity is adequate for the next phase of development;
- Dedicate right-of-way for street improvements;
- Construct new streets;
- Expand the capacity of existing streets;
- Redesign ingress and egress to the project to reduce traffic conflicts;
- Alter the use and type of development to reduce peak hour traffic;
- Reduce existing traffic;
- Eliminate the potential for additional traffic generation from undeveloped properties in the vicinity of the proposed development;
- Integrate non-vehicular design components (i.e. pedestrian and bicycle and transit improvements) to reduce trip generation;
- Recommend denial of the application for which the TIA is submitted.

9. Other Factors to Include in Study: In each case, the issue as to whether adequate service levels will be maintained will be resolved by evaluating the projected impact of the proposed development on the public facilities in question at the time occupancy is expected to occur. This analysis will take into account, not only the status of existing facilities and the impact of the proposed development, but also the project impact of the following on the capacity of those facilities:

- a. Projected capital improvements either by the Town or NCDOT that will increase the capacity of the facilities in question;
- b. Traffic from other nearby approved developments shall be included in the analysis; and
- c. Those improvements related to other approved development projects.

E. Revisions: If the Administrator determines that a significant change (*including, but not limited to: new connectivity patterns or higher-intensity uses*) in the project proposal has occurred that will possibly lead to different findings and mitigation measures, a revised TIA shall be required.

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Chapter 17. INFRASTRUCTURE IMPROVEMENT REQUIREMENTS

17.1 Purpose and Intent

It is hereby declared to be the policy of the Town that the subdivision and development of land shall be guided and regulated in such a manner as to meet the following requirements for orderly and harmonious growth:

- Land to be subdivided shall be of such character that it can be used safely without danger to health, or peril from fire, flood, erosion, excessive noise, air and/or water pollution, or other menace, and in accordance with a Town approved phasing plan (*Section 16.50*);
- Proper provisions shall be made for drainage, water supply, sewerage, and other appropriate utility services;
- The proposed streets shall provide a safe, convenient and functional system for vehicular circulation and shall be properly related to the land use plan of the area;
- Streets shall be of such width, grade, and location as to accommodate prospective traffic, as determined by existing and probable future land uses;
- Streets shall be detailed to compliment neighborhoods and commercial centers and shall be pedestrian in scale;
- Buildings, lots, blocks, and streets shall be so arranged as to afford adequate light, view, and air, and to facilitate fire protection; and
- Land shall be subdivided and developed with due regard to topography so that the natural beauty of the land and vegetation shall be protected and enhanced.

17.2 Required Improvements for all Development Plans

- | | |
|--|--|
| A. Water Supply Distribution System | H. Street Lights |
| B. Sanitary Sewer Collection System | I. Underground Wiring |
| C. Stormwater Collection System | J. Dedicated Open Space |
| D. Public Streets (Paved) and other Public Rights-of-Way | K. Landscaping |
| E. Utility Easements | L. Traffic Control Signs & Pavement Markings |
| F. Sidewalks and Greenways | M. Street Signs |
| G. Curb and Gutter | |

17.3 General Infrastructure Design Guidelines

A. Street Classification & Design

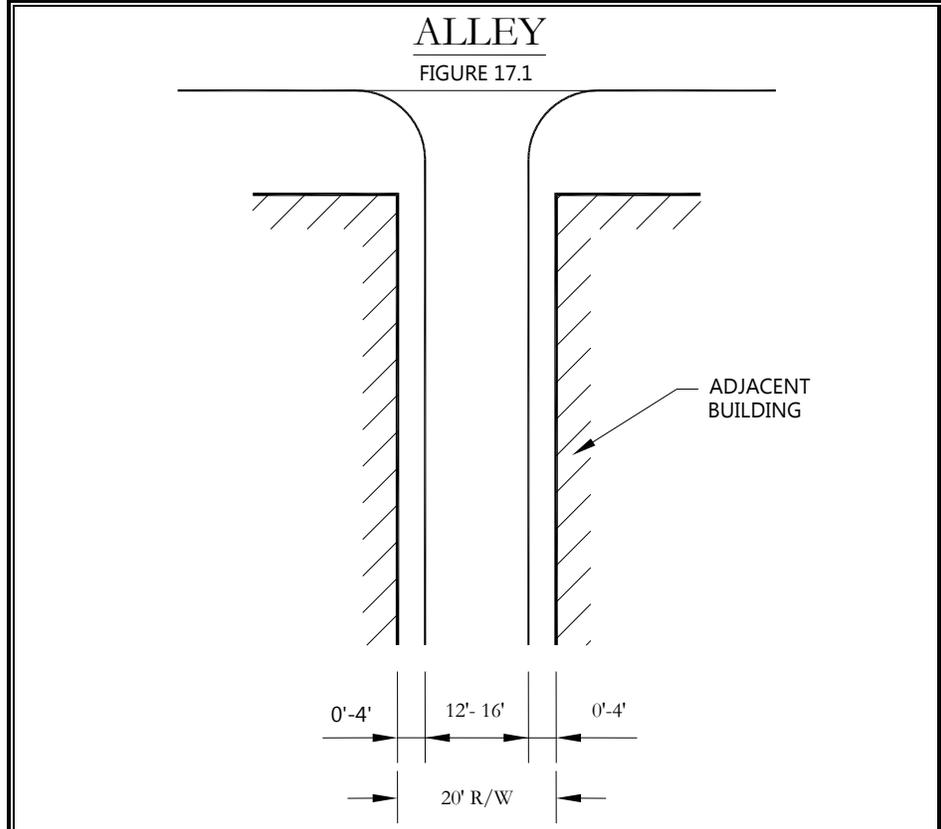
In an effort to protect this investment, the Town views streets as the most important public space and therefore has developed a set of principles which permit this space to be used by automobiles, pedestrians and bicyclists. New development with frontages on existing and new publicly maintained streets shall be required to upgrade all their frontages to meet the standards of this Chapter.

Healthy, traditional streets are categorized by the work they perform for the neighborhood. For simplicity, street types can be broken down into three (3) groups.

- **Category One - Alleys and Local Streets:** Category One connectors, which form the heart of quiet neighborhood streets, function primarily to provide access to neighborhood destinations and make numerous connections within neighborhoods. These connectors – alleys and streets- provide access, utility and walking infrastructure. Traffic speeds of 10-25 mph are appropriate to such functions. Neighborhoods work best with many connections from the edges. Connections to the centers of neighborhoods are appropriate too, but they should not move significant amounts of traffic, nor move that traffic too quickly. People entering neighborhoods should feel rewarded by ease of access to specific locations, but also encouraged to travel by foot or bicycle.
- **Category Two – Avenues and Main Streets:** Category Two roadways connect neighborhoods to commercial centers. Avenues and Main Streets are “transitional” roadways: in addition to providing access, they carry large and more diverse amounts of traffic. Avenues and Main Streets host deliveries and efficient emergency responses. They anchor neighborhood commerce, serve pedestrians and bicyclist, and improve transit operations. Category Two streets must operate at low to moderate speeds, since many people live, work, shop, and play within these street environments. Parking is found on many, but not all avenues and main streets.
- **Category Three – Boulevards and Freeways:** Category Three boulevards and freeways connect town centers to the greater region. On these streets, car traffic, delivery trucks, emergency responders, and transit must operate with high levels of efficiency. Freeways are generally Interstate or US Highway Routes maintained by NCDOT where the main purpose of the roadway is to provide mobility. Access is generally controlled and speeds are high (45-65 mph). Three roadways are classified as Freeways in the town – Interstate 540, and US Highway 64/264.

General illustrations of each street type (*except freeways*) are shown in sections 17.3A(1) thru 17.3A(7). For internal streets in MI Districts, please refer also to Section 2.12.B.4. Although the general illustrations have been designed with NCDOT planting guidelines in mind; whenever a street is to be maintained by NCDOT, NCDOT’s *Guidelines for Planting within Highway Right-of-Way* shall supersede the general illustrations provide herein in the case of a conflict between the two (2) sets of guidelines. Where private streets are allowed, all private streets shall be constructed to the same standards as stated in Chapter 9 and as depicted in the following illustrations.

1. **Alley:** Alleys are low speed (10-mph) service easements running behind and sometimes between rows of houses. Alleys provide public service workers easy access to utilities and sanitation, and resident’s easy access to garages, backyards, and accessory units. Alleys also offer second or third approaches for fire response.



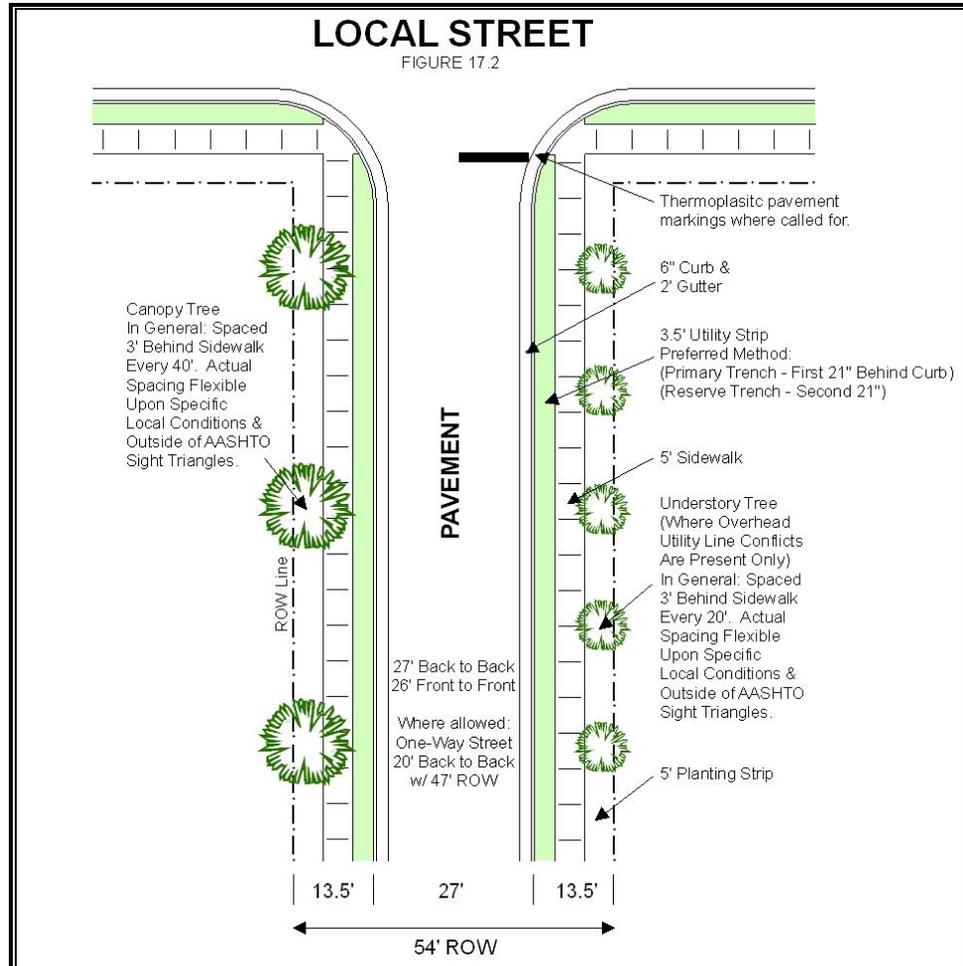
Street Features:

- Street width of 12 ft. minimum, 16 ft. desirable
- Requires 20 ft. of right-of-way
- Utility location underground
- Two to Six blocks long
- Average speed of 10 mph

Buildings & Land Use:

- Residential – primarily single family
- Commercial

2. **Local Street:** Local streets are the most common type of access road in healthy neighborhoods. Streets provide access to single- or multi-family housing and should be low speeds (20-25 mph). Parking is allowed on both sides of the street. Streets are short, terminating in two to six blocks. They can also encircle a square or other public space. On-street parking should be encouraged. If on-street parking is light or non-existent, or limited to one side, streets fail to properly slow traffic. Landscaping and sidewalks should fill the remainder of the public right-of-way. In some special circumstances, streets may be narrowed (typically 20 feet wide) if parking is allowed on one side only, and the street can operate one-way around parks or nature preserves.



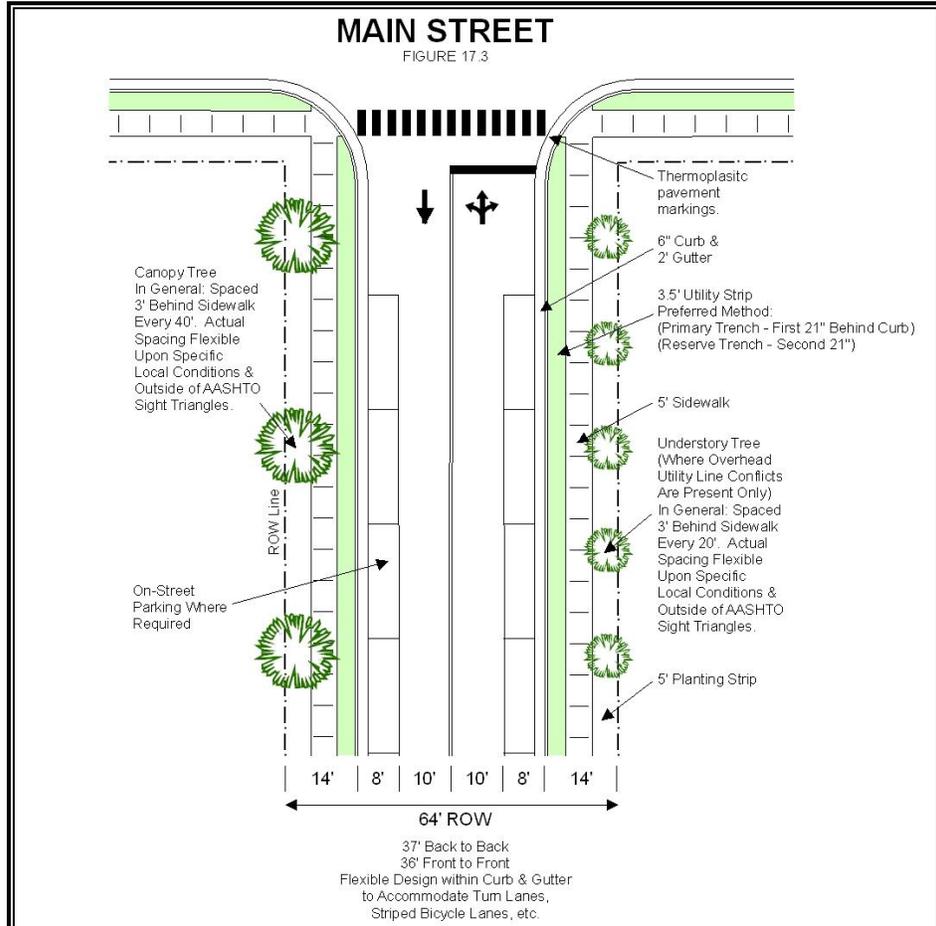
Common Street Features (Section 2.2):

- Curb & Gutter and Informal Parking
- Street Tree Planting strips – 5 ft. (see introduction of Section 17.3.A for further notes about NCDOT maintained streets)
- Sidewalks – 5 ft. on each side

Buildings & Land Use:

- Residential Land Use
- Many residential types brought close to sidewalk with a consistent building line recommended and front porches encouraged.

3. **Main Street:** Main streets are “transitional” roadways that provide access to neighborhoods, as well as, places for neighborhood commercial and mixed-use buildings. On street parking is very desirable, so a low speed environment is preferred (20-25 mph). Main streets usually do not have medians, but medians with low shrubs are acceptable if they do not detract from terminating vista and attractive storefronts. To help pedestrians across the street and calm traffic, “bulbouts” – wider sidewalks that extend into the roadway – should be provided at intersections and, if blocks are long, at mid-block crossings.



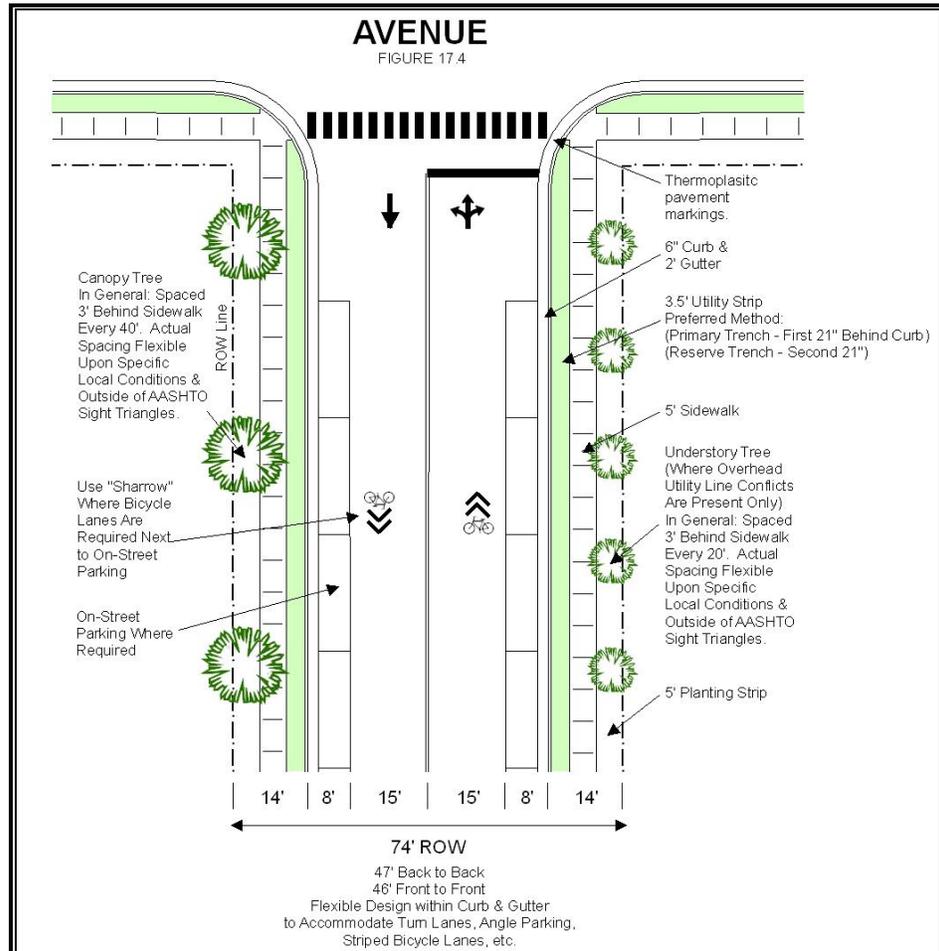
Common Street Features (Section 2.2):

- Curb & gutter with striped parking in mixed use and commercial areas
- Street Tree Planting strips – 5 ft. minimum on each side (see introduction of Section 17.3.A for further notes about NCDOT maintained streets)
- Sidewalks – 5 to 13.5 ft. on each side (Where sidewalk, utility and planting strips combined in commercial use areas, approved tree grates must be used and trees planted according to standard specification location.)
- Bicycle Markings: (If no on-street parking is required and this section is identified for use with a designated bikeway, a minimum 4-foot striped outside bicycle lane excluding gutter shall be provided – see Appendix C)

Buildings & Land Use:

- Commercial and mixed use street or a major roadway in neighborhoods
- Consistent building line recommended with buildings next to sidewalk
- Pedestrian awnings and arcades recommended except in MI District

4. **Avenue:** Avenues connect neighborhoods to town centers, and as such can extend up to one mile. Two-lane roadways contain sufficient pavement for bicyclists and motorists. On-street parking is available. Avenues are richly landscaped, since they are civic spaces that serve as gateways to the town center. Avenues should have the tallest tree canopies. Since avenues serve as the transition between the town and the neighborhoods, speeds should be kept low, typically 30-35 mph. Avenues may also serve as major transit routes.



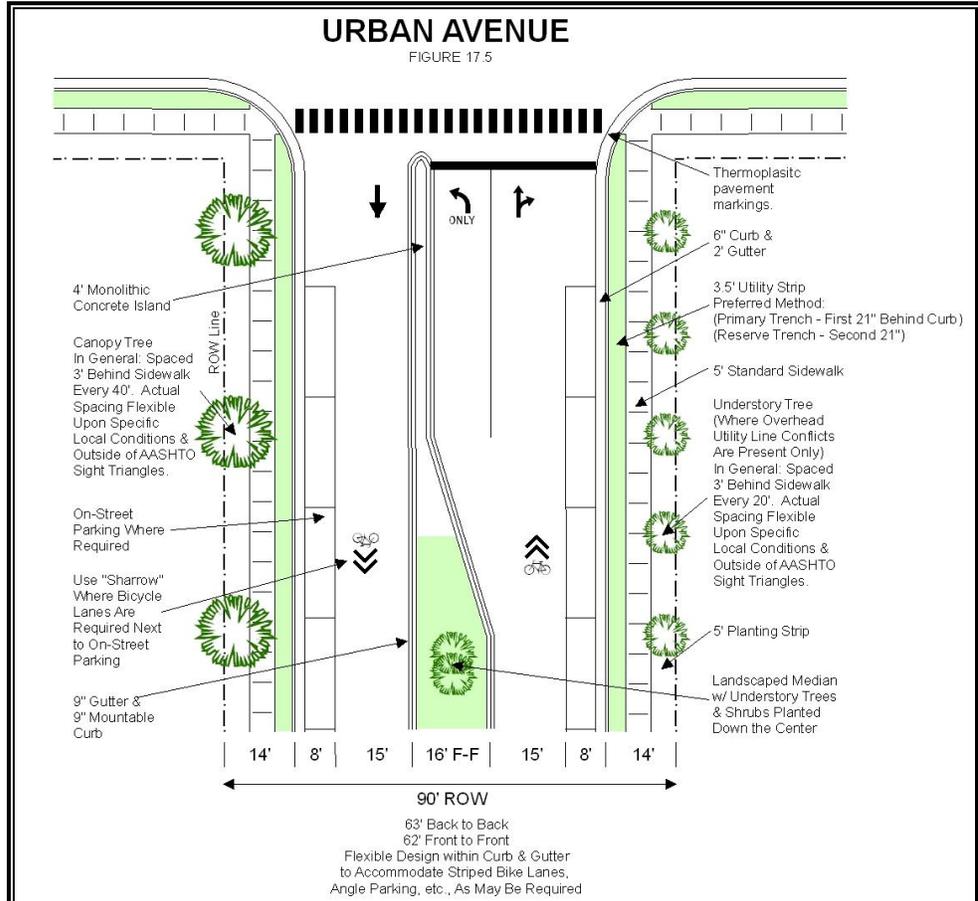
Common Street Features (Section 2.2):

- Bicycle Markings – (*Sharrow pavement markings to be included on designated bikeways where on-street parking is provided – see Appendix C; otherwise if on-street parking is not required, a minimum 4-foot striped outside bike lane on designated bikeways excluding gutter shall be provided*)
- Curb & gutter with striped parking in commercial and mixed use areas
- Street Tree Planting strips – 5 ft. minimum on each side (*see introduction of Section 17.3.A for further notes about NCDOT maintained streets*)
- Sidewalks – 5 to 13.5 ft. on each side (*Where sidewalk, utility and planting strips combined in commercial use areas, approved tree grates must be used and trees planted according to standard specification location.*)

Buildings & Land Use:

- Residential, Industrial, and Commercial areas
- Consistent building line recommended with buildings next to sidewalk
- Place prominent public buildings and plazas at end of vista

5. **Urban Avenue:** Avenues connect neighborhoods to town centers, and as such can extend up to one (1) mile. Two-lane roadways contain sufficient pavement for bicyclists and motorists – with raised medians in the center. On-street parking is available. Canopy landscaping, bike lanes and sidewalks are provided. Avenues are richly landscaped, since they serve as civic spaces and gateways to the town center, and they should have the tallest tree canopies. Since avenues serve as the transition between the town and the neighborhoods, speeds should be kept low, typically 30-35 mph. Avenues may also serve as major transit routes.



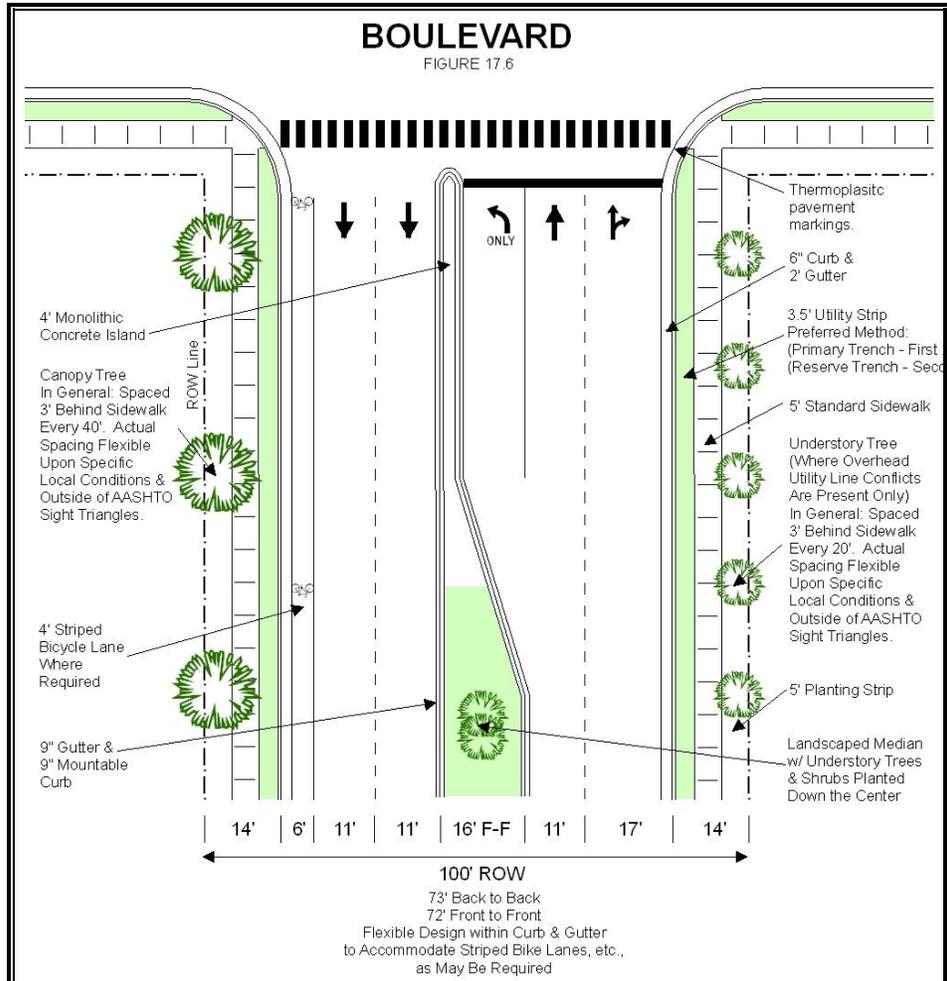
Common Street Features (Section 2.2):

- Travel lanes of 15 ft. to accommodate bicyclists (*Sharrow pavement markings to be included on designated bikeways where on-street parking is provided – see Appendix C; otherwise if on-street parking is not required, a minimum 4-foot striped outside bike lane on designated bikeways excluding gutter shall be provided*)
- Curb & gutter with on-Street parking in commercial use areas
- Landscaped Medians– 16 ft. minimum in width
- Street Tree Planting strips – 5 ft. minimum on each side (*see introduction of Section 17.3.A for further notes about NCDOT maintained streets*)
- Sidewalks – 5 to 13.5 ft. on each side (*Where sidewalk, utility and planting strips combined in commercial use areas, approved tree grates must be used and trees planted according to standard specification location.*)

Buildings & Land Use:

- Residential and commercial use areas
- Consistent building line recommended with commercial buildings close to the sidewalk
- Place prominent public buildings and plazas at the end of vistas

6. **Boulevard:** Boulevards also bring people into Town, or they carry traffic through natural areas. They are not designed to accommodate adjoining development. Roadway speeds are usually 45 mph. When boulevards enter the town, they become urban boulevards, and speeds are reduced to 30-35 mph. Bike facilities are found on the edge of boulevards.



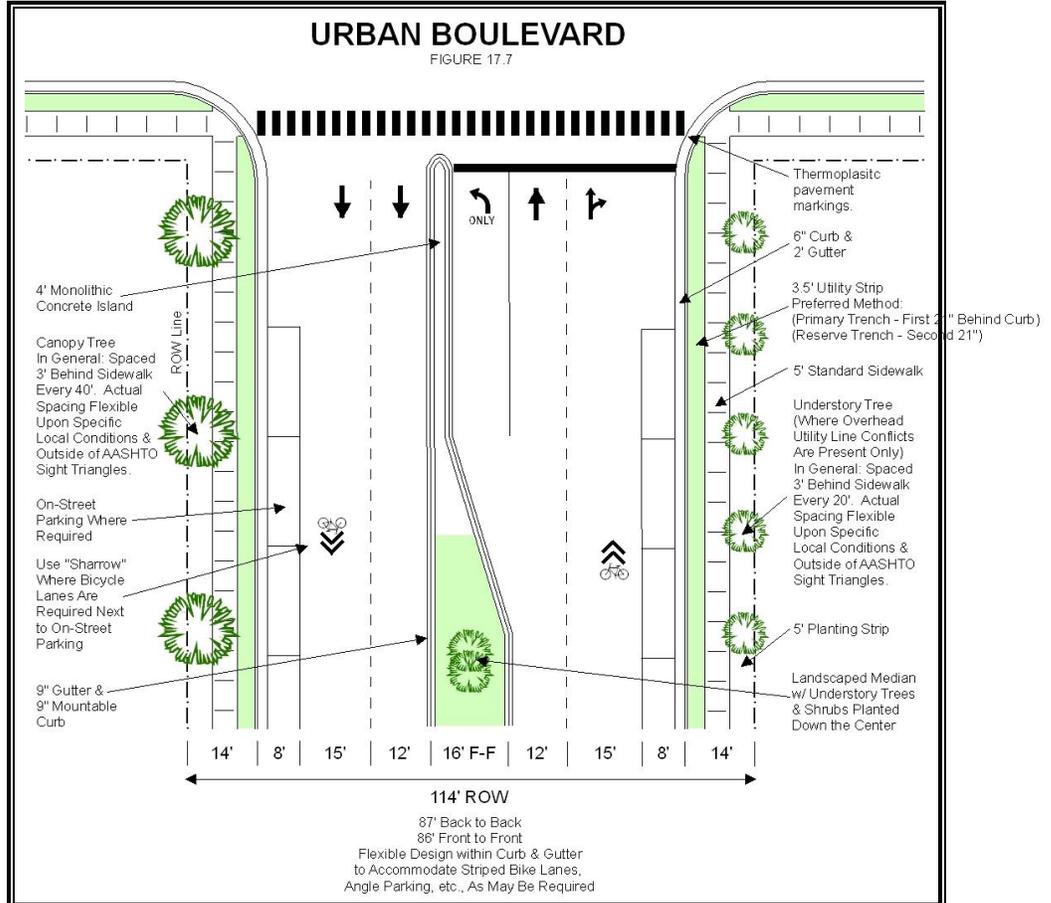
Common Street Features (Section 2.2):

- Wide outside travel lanes of 15 ft. to accommodate bicyclists (*otherwise, on designated bikeways, a minimum 4-foot striped outside bicycle lane excluding gutter shall be provided – see Appendix C*)
- Curb & gutter
- Landscaped Medians– 16 ft. minimum in width
- Street Tree Planting strips – 5 ft. minimum on each side (see introduction of Section 17.4A for further notes about NCDOT maintained streets)
- Sidewalks – 5 ft. on each side

Buildings and Land Use:

- Mixed residential and commercial use areas

7. **Urban Boulevard:** Urban Boulevards can provide multi-lane access to commercial and mixed-use buildings, and they carry regional traffic. For these reasons, speeds on these streets are generally 30-35 mph. In these commercial or mixed-use areas, boulevards have bike lanes, sidewalk, and provide sections of parking to support commerce, parks, schools, and other attractors along their routes.



Common Street Features (Section 2.2):

- Wide outside travel lanes of 15 ft. to accommodate bicyclists (*Sharrow pavement markings to be included on designated bikeways where on-street parking is provided – see Appendix C; otherwise, a minimum 4-foot striped outside bike lane on designated bikeways excluding gutter shall be provided*)
- Curb & gutter with striped parking in mixed use and commercial areas
- Landscaped Medians– 16 ft. minimum in width
- Street Tree Planting strips – 5 ft. minimum on each side (*see introduction of Section 17.3.A for further notes about NCDOT maintained streets*)
- Sidewalks – 5 to 13.5 ft. on each side (*Where sidewalk, utility and planting strips combined in commercial use areas, approved tree grates must be used and trees planted according to standard specification location.*)

Buildings & Land Use:

- Mixed residential and commercial uses
- Consistent building line recommended with buildings next to sidewalk
- Place prominent public buildings and plazas at end of vista

B. General Roadway Design Criteria

1. Horizontal Curve Street Design Criteria

Design Criteria for design speed centerline radius, reverse curve tangent distance and maximum rate of superelevation rates for streets are summarized in Table 17.1. Superelevation rates, minimum runoff lengths and methods of distribution should be in accordance with AASHTO guidelines.

The minimum tangent length approach an intersection should be at least 50 feet for alleys and streets. All other streets shall have a tangent section no less than 100 feet approaching an intersection.

Table 17.1

Street Type	Design Speed (mph)	Minimum Centerline Radius (feet)	Maximum Rate of Superelevation for Minimum Centerline Radius (foot per foot)	Minimum Tangent Distance Between Reverse Curves (feet)
Alley	10	50	N/A	0
Street	25	150	N/A	0
Main Street	30	300	N/A	0
Avenue	40	533	0.04	250
Boulevard	50	833	0.06	350
Freeway	Shall Meet NCDOT Roadway Standards & Specifications			

2. Vertical Curve Street Design Criteria

Whenever practical, streets should follow the existing contours of a site so as to avoid excessive grading and removal of vegetation. Street grades shall not be less than 0.75%. Standards for vertical street design are listed in Table 17.2.

At signalized intersections, the maximum grade approaching the intersection should not exceed two percent (2%) and extend a minimum distance of 100 feet in each direction. For intersections not controlled by a traffic signal, the maximum grade approaching the intersection should not exceed five percent (5%) and extend a minimum distance of 50 feet in each direction.

Table 17.2

Street Type	Design Speed (mph)	Maximum Gradient (%)	Minimum Vertical Curve Length, L (feet)	Minimum Rate of Vertical Curvature, K	
				Crest	Sag
Alley	10	12	25	10	10
Street	25	12	50	12	26
Main Street	30	9	50	19	37
Avenue	40	8	125	44	64
Boulevard	50	7	150	84	96
Freeway	Shall Meet NCDOT Roadway Standards & Specifications				

Note: The rate of vertical curvature, K, is the length of curve (feet) per percent algebraic difference in intersecting grades (A). $K = L/A$

3. Roadway Sight Distance

All sight distance lengths and methods of measuring sight distance along a roadway shall be in accordance with AASHTO guidelines. Sight distance is the length of roadway visible to the driver. The minimum sight distance available on the roadway shall be sufficiently long to enable a vehicle traveling at or near the design speed to stop before reaching a stationary object in its path.

Minimum stopping sight distances shall be provided in both the horizontal and vertical planes for planned roadways as related to assumed driver's eye height and position. Where there are sight obstructions (*such as walls, cut slopes, buildings, and other hazards*) on the inside of curves, changes in roadway alignment may be required to obtain adequate stopping sight distance if the sight obstruction cannot be removed.

C. Intersection Design Criteria

1. Corner Radii

- a. **Curbs:** Curb radii shall be designed to reduce pedestrian crossing times along all streets requiring sidewalks. In general, curb radii should be approximately 20 feet except along NCDOT-maintained roads, where larger radii may be required. In all cases, curb radii shall be sufficiently large to accommodate large commercial or fire trucks.
- b. **Property Lines:** Property lines at street intersections shall be rounded with a minimum radius of 20 feet. At an angle of intersection of less than 90 degrees, a greater radius may be necessary.

2. Angles and Offsets

- a. All streets shall intersect at right angles as nearly as possible and no street shall intersect at less than 75 degrees.
- b. Offset intersections for Category 1 streets (*Alleys and Local Streets*) should be at least 125 feet apart measured from centerline to centerline. A larger spacing in accordance with AASHTO standards may be required for other street categories.

3. Intersection Sight Distance

- a. **Measurements:** Sight distance lengths and methods of measuring intersection sight distance along a roadway shall be in accordance with AASHTO guidelines. Intersections should be planned and located to provide as much sight distance as possible. A basic requirement for all controlled intersections is that drivers must be able to see the control device well in advance of performing the required action. Stopping sight distance on all approaches is needed as a minimum.
- b. **Sight Triangles:** Obstruction-free sight triangles shall be provided in both the horizontal and vertical planes, as related to assumed driver's eye height and position. Within the area of a defined sight triangle, there shall be no sight obstructing or partly obstructing wall, fence, sign, foliage, berming, or parked vehicles between the heights of twenty-four (24) inches and eight (8) feet above the curb line elevation or the nearest traveled way if no curbing exists. Objects, which may be located in the sight distance triangle,

are items such as: hydrants, utility poles, utility junction boxes, and traffic control devices provided these objects are located to minimize visual obstruction.

- D. Other Design Criteria:** Design standards not specifically addressed in this ordinance must comply with the minimum design and construction criteria of the NCDOT.
- 1. Turning Lanes:** Lanes for right and left turning movements into a driveway or cross-street shall be constructed by the developer as required by the Town of Knightdale, North Carolina Department of Transportation and/or a TIA. Such requirements may be necessary for safety and capacity reasons, where roadway speeds and traffic volumes are high, or where there are any substantial turning volumes.
 - 2. Traffic Calming Devices:** The use of traffic calming devices such as raised intersections, landscaping bulb-outs, and traffic circles are encouraged as alternatives to conventional traffic control measures.
 - 3. Street Markers and Traffic Control Signs:** All street markers and traffic control signs posted in accordance with the *Manual of Uniform Traffic Control Devices* shall be installed by the developer prior to the issuance of any certificates of occupancy for any building on that street.
- E. Street Names:** Street names shall be assigned by the developer subject to the approval of the Town of Knightdale and Wake County. Proposed streets which are continuations of existing streets shall be given the same name. In assigning new street names, names shall not duplicate or be phonetically similar to existing street names in Wake County. Upon Final Plat approval, the Town shall cause the developer to erect the street name signs.
- F. Lights & Utilities**
- 1. Street Lights:** The developer shall install street lights on all streets in accordance with the requirements of Chapter 11.
 - 2. Underground Location:** All utilities, other than lines used only to transmit electricity between generating stations or substations and three-phase electric power distribution lines shall be placed underground, and all ground or surface disruptions required for installation shall be rehabilitated to the original or an improved condition. Underground utilities except water and sewer should be located in alleys preferably. If no alley is provided, then those utilities shall be located along the roadway in accordance with the street classification drawings in Section 17.3A.
 - 3. Public Water and Sewer**
 - a. Water Allocation:** In order to preserve and enhance property values, manage its limited water supply as a vital natural resource, promote economic development and incentivize smart growth practices, the allocation of Knightdale's potable water capacity shall be granted in accordance with the *Town of Knightdale Municipal Water Allocation Policy* (the "Policy") as amended from time to time. The goals and procedures contained in the policy are reviewed in May of each year and when appropriate readjusted by the Town Council. The Town's overall progress

on policy goals are considered and the multipliers and/or point thresholds readjusted accordingly.

- b. **Connection to Public System:** Every lot proposed for subdivision within the Knightdale corporate limits or ETJ shall have connection to the public water and sewer systems if the subdivision of which it is a part, or any part thereof, is (*without resorting to crossing a ridge line such that the pumping of wastes would be necessary*) within the distances set out for the size of the entire subdivision as provided below:

Max. # of Dwellings	Distance from System
Up to 5 units	300 feet
6 to 14 units	450 feet
15 to 24 units	600 feet
25 or more units	1000 feet

All non-residential development within the Town’s Urban Service Area, as designated by Wake County, shall connect to the public water system whenever it is practicable in terms of distance and in accordance with Town Council policy on water and sewer extensions. In the case of family subdivisions, extensions of water shall be in accordance with the standards in Section 15.4F(4).

- c. **Water and Sewer Mains:** All water and sewer main extensions and distribution/collection facilities which connect to the water distribution/sewerage collection systems of the Town shall be designed, constructed and installed in accordance with the *City of Raleigh Public Utilities Handbook*.
 - i. **Distribution and Collection Plans:** A water distribution plan shall be designed to create a complete circuit without dead-ends. Water mains shall be extended to the termination of the street right-of-way or where the street right-of-way intersects the boundaries of another phase of the same subdivision or another tract for subdivision. A sewerage collection plan shall be designed to extend sewer mains to the termination of the street right-of-way or natural drainage way where the street right-of-way intersects the boundaries of another phase of the same subdivision or another tract for subdivision.
 - ii. **Sizing:** In determining line sizes, the engineer for the public system and the Project Engineer shall consider the zoning classification of adjacent tracts which could also be served by the mains if extended, the potential type and density of development which might be served, and the Town’s water distribution/sewer collection network plans.
 - iii. **Avoiding Street Tree Conflicts:** Water and sewer utilities should not be located near required street tree planting areas, and service lines must be laid perpendicular to those planting areas.
- d. **Fire Hydrants:** Fire hydrants shall deliver sufficient water to provide adequate fire protection. Hydrants shall be located in accordance with the Town of Knightdale Standard Specifications and Construction Details.

G. Payment in Lieu of Median Construction: As noted in Section 17.4(A), new developments with frontage on existing public maintained street are required to upgrade said frontage to meet the standards of the Chapter. Some streets prescribe a center median for which a development that only embraces one side of an existing publicly maintained street would be responsible for half of said median. Therefore, the Town Council has determined that it is in the best interest of the citizenry for the Town to accept a payment in lieu of median construction when all of the following findings have been made by the Administrator:

- The street classification has been made and involves a street cross-section that includes a median; and
- The full right-of-way dedication will not be obtained through the approval process of the subject development application; and
- The construction of the median is deemed impractical at the time.

The fee shall be equal to half of the present cost estimate for full median construction with said estimate having been found acceptable by the Town Engineer. All fee payments in lieu of median construction shall be made to the Town before the final approval of Construction Documents. Failure to submit the required payment will delay the issuance of a CIP until payment is rendered. All funds received for payment in lieu of median construction shall be used for public street improvements around the Town as prioritized within the Town's Capital Improvement Program.

17.4 Acceptance of Public Infrastructure

If the developer submits an application to the Town for Final Plat approval prior to the completion of the required improvements, the developer shall provide security for said improvements in an amount not less than 125% of the cost of construction, engineering, and installation for the improvements of the approved Construction Drawings which have not been completed by the developer nor approved by the Town at the time of Final Plat submission.

- A. Surety Performance Bond(s):** The Administrator shall determine which improvements shall be covered by the security. The developer shall provide the Town Engineer with a list and description including unit cost and total cost for improvements to be covered, and engineering services. The amount of security shall be approved by the Town Engineer.
- 1. Cash or Equivalent Security:** The security shall be in a form acceptable to the Town and may include, (a) U.S. currency deposited with the Town, (b) a certified check deposited with the Town, or (c) a money order deposited with the Town.
 - 2. Guarantee Period:** The performance security guarantee shall remain in effect for a period of one (1) year, and may be renewed only one time for a period up to, but no more than, one (1) year.
 - 3. Release of Security:** Upon completion of the improvements and other actions guaranteed by the security arrangement, and the acceptance and approval of the same, the Town shall release the security to the developer with written confirmation from the Administrator.
- B. Warranty Period**
- 1. Security for Completed Improvements:** Whenever all improvements intended for dedication are completely installed, the developer shall provide security in one of the forms set out in Section 17.4A(1), guaranteeing to the Town, against defects for one (1) year, all utility taps, curbs, gutters, street pavement, sidewalks, drainage facilities, water and sewer lines and other improvements. The amount of security shall be approved by the Town Engineer and shall be not less than 25% of the cost for construction or installation of the improvements based upon unit costs and total costs provided by the Project Engineer. If the developer shall correct and rectify all defects arising within one (1) year, then the security shall be released; otherwise the Administrator shall notify the Town Council, the developer and surety that a default has occurred, and the Administrator shall proceed in accordance with defaults in security arrangements as set forth in subsection 2 below.
 - 2. Defaults for Incomplete Improvements and Warranty Period:** If any portion of the required improvements for which security was given as set out in the above section shall fail to be completed, repaired, accepted or dedicated in accordance with the Preliminary and Final Plat and the terms and conditions for allowing the improvements to be completed subsequent to Final Plat approval and pursuant to a surety arrangement, then the Town shall notify the developer and the surety of the default and seek a formal explanation of the reason for the default. Except as noted in subsection 3 below, the Administrator shall report to the Town Council that the security is in default, and the Administrator may take such actions as it deems necessary to enforce and collect the security, and shall use the proceeds to finance the completion of the improvements or the rebuilding and repairing of

such improvements to proper specifications, and the completion of such other actions as may have been contemplated under said surety arrangements. Unused portions of the proceeds, if any, shall be returned to the surety.

3. **Modification of Terms for Good Cause:** If the Administrator finds that there is good cause for the improvements not being made on time, or that only a small delay in completing the improvements appears likely, then, upon a showing that the existing surety arrangement is still in effect or has been extended, the terms for the completion of the improvements may be modified.

C. Final Acceptance of Improvements

1. **Developer Responsibilities:** The developer shall be responsible for:
 - a. Providing all engineering services (including the cost of testing materials and performance of soil compaction tests) and furnishing plans and specifications consistent with those in this chapter and the *Standard Specifications and Construction Details Manual*;
 - b. Paying the entire initial cost of all improvements required under this chapter; and
 - c. Payment to the Town of all fees and charges required by the Town including, but not limited to, the costs of permits, inspections, utility taps and acreage fees, at such times as payments are specified under the various codes, fee schedules or resolutions of the Town.
2. **Town Responsibilities:** The Town or its designee shall be responsible for the inspection and approval of all construction work.

D. Maintenance of Dedicated Areas until Acceptance

All facilities and improvements with respect to which the developer makes an offer of dedication to public use, shall be maintained by the developer, his successors and assigns, until such offer of dedication is accepted by the Town Council or other appropriate authority.

No street shall be maintained by the Town, no street dedication shall be accepted for ownership and maintenance, no CIP shall be issued, nor shall water, sewer or other Town facilities or services be extended to or connected with any development for which a Final Plat is required to be approved unless and until such Final Plat has been approved by the Town of Knightdale.

17.5 Incomplete Improvements Guarantee

In cases when weather conditions would make it unreasonable for the developer to comply with all of the non-life/safety requirements of the UDO prior to commencing the intended use(s) or occupying any buildings, the developer shall provide security for such improvements in an amount not less than 125% of the cost to construct or install the improvements.

- A. Surety Performance Bond(s):** The specific improvements requested to be covered and the amount of security shall be approved by the Administrator. The developer shall provide the Administrator with a list and description including unit cost and total cost for improvements to be covered.
- B. Cash or Equivalent Security:** The security shall be in a form acceptable to the Town and may include:
- a deposit of U.S. currency with the Town; or
 - a deposit of a certified check with the Town; or
 - a deposit of a money order with the Town.
- C. Guarantee Period:** The performance security guarantee shall remain in effect for a period determined by the Administrator. The time period may range from a few days up to, but no more than, one (1) year. Such performance security guarantees shall not be renewable under any circumstance.

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