



## Chapter 7

# LARGE RESIDENTIAL AND COMMERCIAL DEVELOPMENT

### 7.1 Overview of LRCD

Large Residential and Commercial Development (LRCD) is defined as any development that is not specifically Small Single Family Residential (SSFR) development as discussed in Chapter 6. This includes all commercial, office, industrial, multiple single-family lots, or any type of non-residential use. LRCD also includes single residential lots with a disturbed area of 10,000 square feet or more.

A subset of the LRCD category is Condominium Development, which is defined as a development of attached or detached units where the individual units take access from a private drive that is neither a joint permanent easement nor City right-of-way. The fee structure for Condominium Development (includes condominiums, townhouses and apartments) is different for plans review and issuing site development permits; otherwise, the same site development requirements apply.

The plans review fee for Site Development Plans includes the initial submittal and two resubmittals. Beginning with the third resubmittal, an additional plans review fee of \$100.00 is charged for every resubmittal.

### 7.2 City Regulations

Plan submittals must meet the requirements contained in City ordinances and the requirements of the Engineering Department (such as the policies in Appendix C). The City of Knoxville is governed by a City Council with power to enact and approve city ordinances. The city charter and the various city ordinances may be viewed and printed from the city website (<http://www.cityofknoxville.org>) using the drop-down menu. Many city ordinances affect buildings and structures, and thus should be reviewed carefully during design to ensure that all structural requirements will be satisfied. However, for the purposes of obtaining a site development permit, the principal ordinances of interest are:

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|--------------|---|
| Chapter 12   | - Knoxville Flood Damage Prevention and Control Ordinance |
| Chapter 14   | - Knoxville Tree Protection Ordinance                     |
| Chapter 22.5 | - Knoxville Stormwater and Street Ordinance               |
| Chapter 23   | - Knoxville Streets and Sidewalk Ordinance                |

The commonly referenced city ordinances named above (in terms of grading layout and site development) are included in Appendix B for easy reference. The right of interpretation and clarification of the ordinances is retained by the City of Knoxville in all instances.

The Engineering Department has issued policies from time to time in order to clarify design and construction requirements under its control. Some engineering policies have been in effect for many years, and are thus well-known to engineers and developers who have submitted plans on a regular basis. Other engineering policies were created to provide more detail for the requirements

listed in the Knoxville Stormwater and Street Ordinance. See Appendix C for the current engineering policies which are now incorporated into the Land Development Manual.

### 7.3 Site Development Plan

A detailed site development plan is required for all types of LRCD site development. The level of detail required for a site development plan depends principally on these factors:

- Size and complexity of the site development project.
- Safety concerns (slopes, excavations, retaining walls, traffic flow, potential flooding).
- Whether any of the facilities (such as public streets, drainage pipes on public land, or streetlights) will be maintained by the City of Knoxville.
- Potential for the project to impact neighboring properties or public right-of-way during construction.
- Potential for the project to impact drainage, flooding levels, or water quality on neighboring properties or public right-of-way

Site development plans must be stamped and signed by a professional engineer, professional architect, or professional landscape architect actively licensed in the state of Tennessee. The registered design professional must have sufficient education and experience to perform a complete design of each element on the construction plans. A professional designer's stamp is a public guarantee that his design has the highest regard for public health and safety, while protecting the environment (air, soil, water) to the maximum extent possible. If the site plan contains drainage structures or elements (such as pipes, ditches, swales, catch basins, detention basins, etc.) which require drainage computations, then the site plan must be designed and stamped by a professional engineer actively licensed in the state of Tennessee.

A site development permit application form is included in Appendix A, along with a checklist of common design elements. Profile drawings are necessary to construct public streets, and are highly useful in properly constructing driveways and entrances. Profiles are also beneficial for complex drainage systems in order to reduce the potential for utility conflicts. Construction details must be drawn and labeled to show all materials used; nontypical construction methods should be clearly shown.

The specific elements of a site development plan are mandated by Section 22.5-28 of the Knoxville Stormwater and Street Ordinance. The following list is a summary of the minimum standards for a site development plan:

- Name, address and telephone of all persons with a legal interest in the affected properties.
- Tax map number, group, and parcel number of the affected properties.
- Existing 2-foot contours (extending beyond the property limits).
- Proposed 2-foot contours (especially on roadways, parking lots, cut and fill slopes).
- Building pad elevations and dimensions.
- Size, material, location and invert of stormwater drainage pipes and structures.
- Size, location, side slope, bottom slope and outlet structure data for detention basins.

- Spillway size and elevation for detention basins.
- Size, slope and type of surface for drainage swales and ditches.
- Roadway profiles and cross sections (clear zones, utility strip, greenway, cross slopes).
- Signage plan (location and type of basic regulatory traffic signs, using MUTCD).
- Streetlighting plan for subdivisions (indicate the type of pole and lighting fixture).
- Designed and stamped by a professional engineer, professional architect, or professional landscape architect actively licensed in the state of Tennessee. If the site plan contains drainage structures or elements (such as pipes, ditches, swales, catch basins, detention basins, etc.) which require drainage computations, then the site plan must be designed and stamped by a professional engineer actively licensed in the state of Tennessee.

If a drawing is crowded with technical design information, some required elements of a site plan may be shown on a grading plan or drainage plan. In order to facilitate city review, any additional plan drawings that contain site development elements must be drawn at the same scale and north orientation as the site development plan. Basic information for each drawing includes:

- Standardized title block with project name and location, design firm, engineer, drafter, design date, unique drawing number, revision number, etc.
- Stamp of a professional engineer, professional architect, or professional landscape architect, signed and dated per requirements of Tennessee State Board of Architectural and Engineering Examiners, to certify design of all elements within scope of professional.
- North arrow for any plan views on the drawing.
- Scale for any plan views, cross sections, details or other graphic shown on the drawing.
- Uniform use of line weights and patterns, fonts, drawing styles, symbols and terms.
- A standard location on the drawing for either general notes or specific notes (as needed).

The final plat (prepared by a registered land surveyor actively licensed in the state of Tennessee) should agree with the approved site development plans. The site designer should work closely with the final plat preparer to incorporate all changes during the design review process.

#### **7.4 Erosion and Sediment Control Plan**

A detailed erosion and sediment control plan (ESCP) is required for all types of LRCD site development. The ESCP must comply with the requirements of the current Knoxville BMP Manual and the most current version of the Tennessee Erosion and Sediment Control Handbook. The ESCP must be designed and stamped by a design professional (engineer, architect, landscape architect) actively licensed in the state of Tennessee.

A typical checklist for preparing an ESCP is in Chapter 5 of the Knoxville BMP Manual. The critical elements that must be considered are: minimizing disturbed areas, controlling the site perimeter, reducing transport of sediment, protecting entrances to drainage structures, safely conveying offsite drainage, and routine inspection and maintenance. The specific elements of an ESCP are summarized below:

- Narrative: project description, existing site conditions, adjacent properties, types of

critical areas, construction schedule, phasing of BMP installation, inspection and maintenance of BMPs, drainage patterns, proposed ground covers, supporting calculations, expected BMP duration and replacement.

- Site Plan: vicinity map, existing vegetation and trees, limits of clearing and grading, existing contours, proposed contours, buildings, roads, parking lots, access routes, borrow areas, drainage structures, drainage patterns and watersheds, easements, critical areas, placement of BMPs, details.

The ESCP must indicate the general methods of placing BMPs as construction progresses. Prior to the issuance of the site development permit, the erosion control measures will be inspected in the field and approved by a design professional registered in the State of Tennessee (preferably the same design professional who stamped the ESCP). The design professional will send a signed and stamped letter to the Engineering Department stating that erosion and sediment control has been implemented per the approved ESCP.

## 7.5 Landscaping Plan

A landscaping plan must be submitted that shows proposed vegetation, trees, grass, shrubs, and other types of ground cover. A landscaping plan is usually submitted as a separate drawing at the same scale and orientation as the site development plan, but may also be shown on the site development plan as space permits. A major purpose of the landscaping plan (or alternatively called a vegetation plan) is to demonstrate compliance with the Knoxville Tree Protection Ordinance and other city regulations. There are additional restrictions on cutting, pruning, removing or replacing trees on municipal property and public land. See the following locations of the Knoxville BMP Manual:

- AM-03 Preservation of existing trees; tree wells
- Table AM-03-1 Knoxville Tree Protection Ordinance; tree location requirements
- ES-08, ES-09 Contains information with regard to seeding and sodding
- ES-10 Tree/shrub planting details, list of suggested tree species by size

A very brief summary of the tree protection and replacement requirements from the Knoxville Tree Protection Ordinance (in Section 14-34) is:

- A developer can choose to save a minimum of 6 trees per acre, in a manner that ensures survival of a healthy tree. Replacement trees, if necessary, shall be at the rate of 8 trees per acre, with at least one-half of trees selected from Group I (exceeding 50' in height).
- A developer can choose to plant a minimum of 8 trees per acre, at a spacing that ensures tree survival and room for maximum growth for tree maturity. All trees must be selected from the list in Table ES-10-1 of the Knoxville BMP Manual, with at least one-half of trees selected from Group I (exceeding 50' in height).

The Knoxville Tree Protection Ordinance (in Section 14-28) defines an existing tree as being at least 6" diameter when measured at a distance of 12" above the ground surface (or at least 3" diameter for certain horticultural or ornamental trees). Replacement trees (in Section 14-36) are

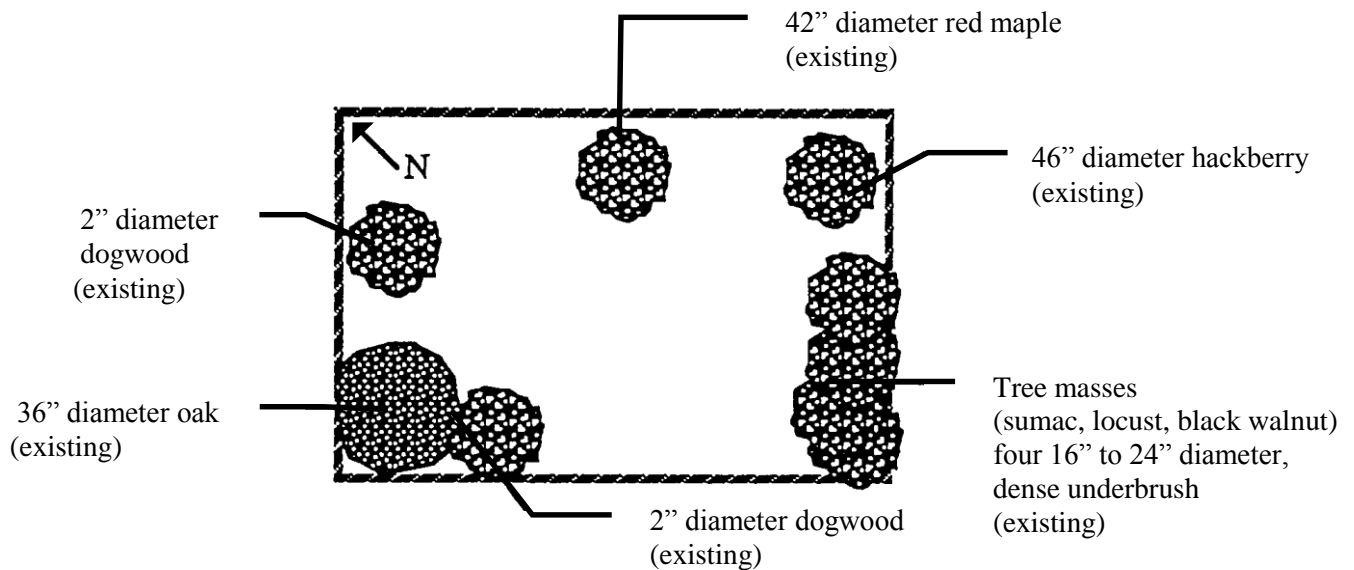
required to be at least 2" diameter when measured at a distance of 6" above the ground surface (or at least 1.25" diameter for certain ornamental trees).

The Knoxville Zoning Ordinance (Article 5, Section 6) has minimum requirements for allowing adequate sight distance on public streets and sidewalks. This takes the form of defining a Visibility Triangle (also shown in Chapter 12), which represents the minimum sight distance at corner lots. These requirements also apply to planting trees, shrubs, hedges, and flowers, in addition to walls, fences, signs and other structures. It is recommended that these guidelines should also be used for private driveways, vehicle entrances, private streets, parking lots and sidewalks on private property.

A plan drawing for the purpose of showing trees must contain the following minimum information:

1. Project title, address, name of owner, date, north arrow and scale.
2. Boundary lines of site with the location of trees to be either removed or retained (according to the type of permit).

When a grading permit or construction right-of-way permit is required, then the site plan shall generally locate groups of existing trees and their predominate species in those areas to be cleared. When a building permit, preliminary subdivision plan, or use on review development plan is required, the site plan shall locate and label existing trees to be retained or proposed trees to be provided. Typical tree locations and labeling are shown in Figure 7-1.



**Figure 7-1**  
**Tree Location Requirements on Drawings**

## 7.6 Work Zone Traffic Control Plan

The requirements for a work zone traffic control plan are included on the Civil Engineering Division website. The necessity of having adequate traffic control when working adjacent to or within streets can not be overemphasized. In general, the Manual on Uniform Traffic Control Devices (MUTCD) is the principal technical reference needed to prepare a work zone traffic control plan. The most recent version of the MUTCD can be downloaded at the FHWA website (<http://mutcd.fhwa.dot.gov/>). Typical design elements include: traffic signs, pavement markings, construction scheduling, temporary devices for delineation or channelization, street lighting, and traffic regulations. Projects which contain lane closures, street closures, street cuts for utility installation, or very busy traffic locations near main arteries are of particular interest.

The work zone traffic control plan must be submitted to the Stormwater Engineering Division along with the site development permit. After being checked by the Stormwater Engineering Division, it is then reviewed by the Knoxville Civil Engineering Division using the guidelines from the Work Zone Traffic Control Policy. The Work Zone Traffic Control Policy contains a list of telephone numbers and contacts for coordinating a work zone traffic control plan with Knox County E-911, Knoxville Police Department, Knoxville Fire Department, and other agencies. It also contains a list of arterial streets and collector streets. Street cuts are allowed only if a Construction Right-Of-Way Permit (or also called a street cut permit) is approved and issued by the Civil Engineering Division in advance.

## 7.7 Roadway Plan

A complete set of roadway plans must be submitted and approved, if the site development project includes a street that will be publicly dedicated to the City of Knoxville. In addition, any reconstruction or realignment of a city street or road must include a complete set of roadway plans for the affected portions of the street right-of-way. See Section 22.5-35 of the Stormwater and Street Ordinance (within Appendix B) for additional information for the public acceptance of constructed streets. See Chapter 12 for additional information concerning street design criteria. The roadway plans must be designed and stamped by a professional engineer actively licensed in the state of Tennessee.

In addition to scaled plan drawings that depict horizontal geometry, the roadway plans must include profiles, grades, and cross sections that depict cross slope, materials used in construction, clear zone, location of utilities, pedestrian/greenway routes, etc. Horizontal and vertical geometry must be described completely using standard TDOT terminology and formulas. Construction methods and materials must agree with City of Knoxville Technical Specifications (available on the Civil Engineering Division website) and the current version of TDOT Standard Specifications for Road and Bridge Construction (available on the TDOT website).

Fixed structures may not be constructed within public right-of-way, since these structures pose a hazard to the driving public. This includes: retaining walls, fences, signs, sign posts, playground equipment, etc. Brick or masonry mailboxes are not allowed within public right-of-way; only wooden posts or other “breakaway” designs may be used for mailboxes located within public right-of-way. Brick mailboxes are a safety hazard if located within 10 feet of the street pavement.