



Initial (40%) Civil Engineering Review Checklist

Revised - Friday, November 18, 2022

Please utilize the following checklist as a guide only. The checklist is NOT a substitute for the Unified Development Code (“UDC”) and only intends to summarize the UDC in a clear and cogent manner. To the extent that the checklist is in conflict in any way with the UDC, the UDC takes precedence. It is incumbent upon the engineer of record to meet or exceed applicable UDC requirements, general engineering standards, and all applicable federal, state, and local laws and requirements.

REQUIRED FOR ALL PROJECTS:

- 1.1** Written project narrative/report of the proposed development that discusses all existing and proposed conditions and utilities including conceptual layouts for future phases if the development is planned to be phased. UDC Table 13-3, 13-4, & 17-2.
- 1.2** All plan sheets shall be sealed by the engineer of record. UDC Table 13-3, 13-4, & 17-2.
- 1.3** Provide a narrative of the proposed development. UDC Table 13-3, 13-4, & 17-2.
- 1.4** It is required that a preservation area adjacent to all watercourses two times the water course width, be designated as a water quality buffer zone. UDC 15.9.C.4.
- 1.5** Floodplain encumbered properties will be required to provide a Flood Study including a hydrologic and hydraulic analysis, and a downstream analysis/assessment showing no adverse impacts to adjacent, upstream, and downstream properties and structures including culverts, bridges, and buildings. A LOMR/CLOMR may be required. UDC 7.5 & UDC 15.9.E.
- 1.6** A hydrologic and hydraulic downstream analysis and/or capacity analysis will be required by all developments proposing no detention and/or conveyance to existing storm sewer facility showing no adverse impacts to adjacent, upstream, and downstream properties and structures including culverts, bridges, and buildings. UDC 15.9.E.
- 1.7** Provide Topography of existing conditions with slopes called out throughout the site to confirm the development is not within a hillside preservation area. UDC 7.6.
- 1.8** Fire apparatus access roads must be designed to a minimum of 75,000 pounds, 25 feet minimum width, maximum 10% grade, 25 and 50 feet inside and outside radii, and dead-end criteria. UDC 16.3.G.
- 1.9** Fire apparatus roads must be provided in accordance with the UDC and the IFC: provide turnaround for fire trucks, include hydrant to hydrant spacing, show the building to fire lane spacing (150’), hydrant to FDC spacing, call out the fire lane specifically using a stipple pattern, dead-end fire lanes called out with length dimensions and turnarounds dimensioned if applicable, pavement section, fire lane striping or signage as applicable,



CITY OF SPRING HILL

199 Town Center Parkway • Spring Hill, Tennessee 37174

931-486-2252

www.springhilltn.org



overhead power lines called out and shown, fire lane and radii labeled with a detail of the fire lane striping and signage. UDC 16.3.G.

- 1.10** The fire codes official is authorized to require more than one fire apparatus access road based on the potential for impairment of a single road by vehicle congestion, condition of the terrain, climatic conditions, or other factors that could limit access. IFC 503.1.2.

NOTE: Development is defined as any man-made change to improved or unimproved real estate, including, but not limited to, buildings or other structures, mining, dredging, filling, grading, paving, excavating, drilling operations, or storage of equipment or materials. UDC 7.5.C

REQUIRED FOR TRANSPORTATION RELATED IMPROVEMENTS:

- 2.1** Label all existing and proposed curb returns. The minimum curb radius at the intersection must be as follows: local streets connected to a collector or arterial: 12.5-foot radius, connector streets connected to a connector or arterial streets: 25-foot radius. UDC 16.5. E.4
- 2.2** Sidewalks, multi-use trails, or other pedestrian access improvements must be included as part of any arterial, collector, or local street, and as shown on the Major Thoroughfare Plan, Bicycle and Greenway Plan, or as determined by the Planning Commission during subdivision approval. Sidewalks are not required in the AG, R-A, and R-R Districts. Display all existing and proposed sidewalks and bicycle paths. UDC 16.6.
- 2.3** Show and dimensions turn lanes and deceleration lanes with associated storage and transition areas. UDC 16.5. C.
- 2.4** Display and label all curb and barrier-free ramps. UDC 16.5.
- 2.5** Display and label all existing and proposed guardrails and barricades for staff. UDC 16.5.
- 2.6** Dimension all stacking distances for staff to determine design conforms to and meets the TIS. UDC 10.3. F.
- 2.7** Dimension and label distances between driveways and intersecting streets including stopping sight distance measurements and calculations. Label and dimension the sight triangle and visibility clearances. State the roadway design speed for review purposes. Intersection Sight Distance example being TDOT RD01-SD-1. UDC 16.5.
- 2.8** Label all pavement construction (asphalt, concrete, etc.). UDC 16.5.
- 2.9** Call out pavement markings (one-way arrows, etc.) with paint material and color. Provide Pavement marking details and Signage Plans. UDC 16.



CITY OF SPRING HILL

199 Town Center Parkway • Spring Hill, Tennessee 37174

931-486-2252

www.springhilltn.org



- 2.10** Cul-de-sac to be no greater than 750 feet in length and be a minimum of 96 feet in diameter face of curb to face of curb, with ROW no less than 110 feet. UDC 16.3. F.1.
- 2.11** Crosswalks of paving, brick paver, bituminous brick pattern stamping, or painted striping must connect landscaped areas and parking lot islands to building entrances to improve safe passageways for pedestrians. Curb cuts must be included on landscaped areas or islands where such crosswalks are located. UDC 10.6. K.
- 2.12** Dead-end parking lots are prohibited. A turnaround space is required, and the minimum depth and width of such turnaround space must be ten feet and designated with signs stating, "No Parking" and striped to indicate no parking permitted. UDC 10.6. J.

REQUIRED FOR UTILITY RELATED IMPROVEMENTS:

GENERAL UTILITY IMPROVEMENTS:

- 3.1** Include overall plan views of the water system and the sanitary sewer system layout for the entire development (including future phases). UDC 15.9.
- 3.2** Call out the method of pipe installation (bore or open trench). UDC 15.9. I.10.

WATER IMPROVEMENTS:

- 3.3** Provide a minimum of two water feeds to proposed developments. Dead-end waterlines will not be accepted unless no other option is available. UDC 15.10.
- 3.4** Water mains will be required to be extended for future developments in coordination and as directed by staff. UDC 15.10.
- 3.5** Provide location of water meters. UDC 15.10, UDC 15.10.

SEWER IMPROVEMENTS:

- 3.6** Sanitary sewer systems must be designed for ultimate build-out conditions within the proposed development sanitary sewer basin and projected development served within the basin. UDC 15.11. I
- 3.7** Sewer lines must be located under the pavement in the center of roadways and outside flooding areas when possible and shall not be located within detention basins. Designed for uniform slope with a clear minimum distance of 10 feet separation between water lines. UDC 15.11.J and UDC 15.11. Q.
- 3.8** Provide flow direction arrows on the plan views. UDC Table 17-2.



CITY OF SPRING HILL

199 Town Center Parkway • Spring Hill, Tennessee 37174

931-486-2252

www.springhilltn.org



- 3.9** Show and label all grease traps per the City of Spring Hill’s Fats, Oils & Grease Ordinance and per UDC 15.11. S.
- 3.10** Show and label all oil-water separators per the City of Spring Hill’s specifications. UDC 15.11. S.
- 3.11** Manholes shall be provided at a distance not greater than 350 feet for sewers 15 inches in diameter or less, 400 feet for sewers 18 inches and larger. UDC 15.11. R
- 3.12** Call out if the development proposes a lift station. UDC 15.11.
- 3.13** Sewer lines must be extended to the property boundaries of the development to allow future connections to adjacent property. UDC 15.11. E.

REQUIRED FOR STORM SEWER RELATED IMPROVEMENTS:

- 4.1** Include overall plan view of the stormwater system layout.
- 4.2** Show and label drainage easements onsite and downstream as necessary to convey site drainage. UDC 15.7.C

REQUIRED FOR DRAINAGE ANALYSIS:

- 6.1** Provide a drainage report consisting of the following sections (as necessary): UDC 15.9.
 - a. Executive Summary
 - b. Introduction
 - c. Data Sources (topographic, land cover and land use, soil cover, rainfall, FEMA FIRM reference, Upstream/downstream flood studies)
 - d. Hydrology
 - e. Methodology
 - f. Model domain, platforms, conditions
 - g. Pre-project and Post-project
 - h. Ultimate (full buildout)
 - i. Hydrologic Methods
 - j. Watershed delineation
 - k. Loss rate
 - l. Baseflow
 - m. Watershed lag time
 - n. Rainfall to runoff transformation method
 - o. Meteorological models



CITY OF SPRING HILL

199 Town Center Parkway • Spring Hill, Tennessee 37174

931-486-2252

www.springhilltn.org



- p. Reach routing method
- q. Results
- r. Hydraulics
- s. Methodology
- t. Model domain
- u. Model state and method
- v. Modeling platforms
- w. Topographic data
- x. Manning's roughness coefficients, Expansion and Contraction coefficients
- y. Ineffective flow and Distributive flow
- z. Geometries
- aa. Storm Sewer Design
- bb. Detention Pond Design (including Hydrographs)
- cc. Downstream boundary conditions
- dd. Results
- ee. Conclusions



6.2 All hydrologic analyses shall use NOAA Atlas 14 Point Precipitation Frequency Estimates.



6.3 Streamstats is a great tool for historic ungauged, unregulated stream flow data. The use of StreamStats must be justified as the following limitations preclude it from most design/modeling uses:

- a. "Flood-frequency prediction methods described in this report should not be applied to heavily developed basins or storm-sewer basins having greater than 10-percent impervious cover." Water-Resources Investigations Report 03-4176.
- b. "Annual-peak streamflow records, historical flood information, and selected basin characteristics for stream gages in the study area with 10 or more years of record through the water year 1999 were combined to form a database that was used to develop the prediction methods for use at unregulated sites in Tennessee." Water-Resources Investigations Report 03-4176. Stream stats utilizes 20-year-old flow values. With the development in Spring Hill being required to detain to the 25-year storm event, the 100-year storm event has been left unattenuated, increasing the 100-year storm events' peak discharge in streams and rivers throughout Spring Hill.



CITY OF SPRING HILL

199 Town Center Parkway • Spring Hill, Tennessee 37174

931-486-2252

www.springhilltn.org



- c. Regulated is defined as having attenuating properties/structures (detention ponds, dams, culvert crossings, etc.)
- d. Hydrologic results are not proposed or ultimate flows.
- e. Streamstats is not currently being accepted by TEMA/FEMA, and cannot be used for flood study hydraulic analysis.

- 6.4 Provide separate drainage area maps for existing, proposed, and ultimate (as necessary) conditions. UDC 15.9.
- 6.5 Show and label the Time of Concentration lines (broken down to flow type if using the velocity method). Please note that Sheet Flow length must either be based on engineering judgment with supporting data or use McCuen and Spiess approximate length equation (can be found in USDA NRCS Part 630 Chapter 15 – Time of Concentration manual, page 15-7, equation 15-9). Time of Concentration calculations and equations shall meet the USDA NRCS Part 630 Chapter 15 published in 2010. UDC 15.9. B.1.
- 6.6 Include runoff and routing methods, parameters, and calculations for all areas including flow arrows within each subbasin. UDC 7.6.C.11.d. & UDC 15.9. B.1.
- 6.7 Show and label the effective and proposed floodplain. UDC Table 17-2.
- 6.8 Lots to be configured for positive drainage away from buildings. **No cross-lot drainage is allowed.** UDC 15.4. H.
- 6.9 Where a lot in any flood-prone area must be improved to provide a building site free from flooding, such improvements must be made outside the floodway by elevation or fill to at least two feet above the regulatory flood protection elevation (100-year flood) for a distance extending at least 25 feet beyond the limits of intended structures and, additionally, extending a sufficient distance to include areas for subsurface sewage disposal if the lot is not to be connected to a public sanitary sewer system. Any fill must be protected against erosion by riprap, vegetative cover, or other methods deemed acceptable by the Planning Commission. In non-residential building sites outside a floodway but subject to flooding, the use of the structural floodproofing of these regulations, as an alternative to landfill, may be approved by the Planning Commission. UDC 15.4. J.
- 6.10 For drainage swales, lined channels, and natural channels, the system must be designed to carry the 100-year storm and can convey storm runoff without life hazards or property damage. UDC 15.9. I.3.C



CITY OF SPRING HILL

199 Town Center Parkway • Spring Hill, Tennessee 37174

931-486-2252

www.springhilltn.org



REQUIRED FOR DETENTION OR RETENTION PONDS:

- 7.1** No stormwater management facilities may be located within streamside buffers, nor can they be detrimental to such buffers, unless a plan with appropriate mitigation is authorized by the City Engineer UDC 15.9. I.5.
- 7.2** Stormwater basins must be designed and incorporated into usable open space, accessible and open to the public. UDC 15.9. I.6.
- 7.3** Water level fluctuations between the normal and high-water level cannot exceed 18 inches for the 2-year design event and cannot exceed five feet for the 100-year design event. UDC 15.9. I.6.
- 7.4** Include detention elevation versus storage curves and elevation versus discharge curves. UDC 15.9.
- 7.5** Show and label all fencing, drainage, and access easements for detention ponds from ROW along the accessible route. UDC Table 17-2.
- 7.6** Retention ponds will be required to have the ability to drain out to empty the pond for maintenance. UDC 15.7. B.

REQUIRED FOR GRADING PLANS:

- 8.1** Show and label existing and proposed contours that address lot-to-lot drainage in intervals of not more than two feet. Show and label the proposed limits of land-disturbing activities. UDC Table 13-3.
- 8.2** Show and label proposed fences, required screen walls, gates, and retaining walls. Label maximum heights. Retaining walls over 4 feet must include plans from a licensed Engineer. UCD 9.3.1.J & 9.3.2



CITY OF SPRING HILL

199 Town Center Parkway • Spring Hill, Tennessee 37174

931-486-2252

www.springhilltn.org