

Section 11-615 “Stormwater Control Standards” within the “Zoning Ordinance of the City of Lenoir City, Tennessee”.

11-615. Storm Water Control Standards

- A. **Purpose:** To effectively control the quantity and quality of storm water discharges resulting from urban development and to protect public and private properties from inundation of storm water and receiving waterways from the impact of polluted stormwater runoff.
- B. **Definitions:**
- Ten-year frequency flood** - a flood with a ten percent (10%) chance of being equaled or exceeded in any given year.
- Detention Basin:** A permanent basin constructed to protect downstream facilities by providing temporary storage of peak discharges from surface water runoff on a developed site and releasing the stored water at controlled rates not to exceed pre-development discharges under specified storm frequencies.
- Pre-developed Discharge:** The present or natural peak storm water discharge from a site generally before significant development occurs and within a specified storm duration and frequency.
- Post-development Discharge:** The present or natural peak storm water discharge from a fully developed site within a specified storm duration and frequency.
- Stormwater Control Measure (SCM):** A permanent practice or measures designed to reduce the discharge of pollutants in stormwater runoff from new development projects or redevelopment projects.
- Watercourse:** Any natural or artificial stream, river, creek, channel, ditch, canal, conduit, culvert, drain, waterway, gully, ravine, street, roadway, or wash in which water flows in a definite direction or course, either continuously or intermittently, and which has a definite channel, bed or banks, and shall include any area adjacent thereto subject to inundation by reason of overflow of surface water.
- C. **Watercourse Protection:** Watercourses shall be maintained in order to carry storm water from adjacent properties or public rights-of-way. The filling of any watercourse is prohibited unless the property owner/developer can successfully demonstrate that an alternative approach will meet the intent of this section. The city engineer shall approve any alternative plan and the filling of any existing watercourse, not within a designated floodplain.
- D. **Drainage System Design Criteria:** The following criteria shall be followed in the design and installation of storm water drainage systems.
1. The installation of drainage pipe is required for all driveways which connect into a City Street. This requirement and specifications herein noted, is applicable on any roadway section which does not have curbing.
 2. Driveway side drains shall be a minimum of 16 gauge for corrugated metal pipe (CMP),

or class III concrete for pipe diameters to 18". For pipe 24" in diameter or larger, the CMP shall be 14 gauge or class III concrete. Pipe shall extend beyond the edges of the driveway and shall terminate with a concrete flared headwall. No pipe shall be installed which is less than 15" in diameter. For single-family driveway permits, the Street Department Superintendent shall determine the need for or minimum size pipe for installation. The Superintendent shall also have the authority to approve an alternative headwall design which is suitable for the site.

3. Catch Basins shall be integrated into any new roadway construction where curbing will be installed. Catch basins shall be TDOT 12-32 (standard drawing D-CB-12-32) modified to accept the frame and grate as shown on standard drawing D-CBB-12A or other designs of comparable quality as approved by the county. Total casting weight shall be a minimum of 730 lbs. per catch basin. Castings shall be aligned using plan normal gutter elevations which shall be adjusted to allow for a 2' sump at face of curb.

All catch basins shall be labeled with the following environmental message: "No Dumping: Drains to River" Use of graphic environmental symbol like a fish should be integrated with the message. *(Added 1/28/08 by City Council of Lenoir City)*

4. Enclosed storm drains, which collect and convey drainage on, across, and through public rights-of-way, shall conform to existing subdivision requirements. Pipe shall extend beyond the ROW and shall terminate with a flared concrete headwall (see illustration 1). Rip rap/quarry or field stone 4" to 8" shall be placed a minimum of 6' beyond the headwall and laid over erosion control matting material equal to Erosion Control Fabric 955 by Synthetic Industries, Inc.

5. Standards for enclosed systems: The minimum design criteria used for calculating the size of enclosed drainage systems shall be based on a ten-year (10) flood frequency, 24 hour duration storm. For major system designs, the city engineer and development engineer shall determine other appropriate criteria which is consistent with the intent of this section.

6. All hydrologic and hydraulic computations utilized in the design of storm water appurtenances, detention, and other SCM's must be prepared by a registered engineer proficient in the field of hydrology and hydraulics and licensed in the state of Tennessee. An acceptable method for calculating runoff and detention facilities is outlined in "Urban Hydrology For Watersheds", 2nd Edition, U.S. Soil Conservation Service, Technical Release #55.

E. 1. Permits: No driveway shall be constructed onto a city road until a permit is obtained and approved by the city road engineer or representative. A permit can be obtained at the City Street Department.

F. Storm Water Detention, Channel Protection, and Water Quality Treatment

1. Storm Water Detention and Peak Discharge Control: Storm water detention shall be required for any road construction, commercial, industrial, educational, institutional, and recreational developments of one (1) acre or more. Multi-family residential developments of two (2) acres or more and single-family residential developments of five (5) acres or ten (10) lots shall comply with these standards. The Board of Zoning Appeals may waive these requirements if the applicant can demonstrate that compliance is unnecessary or not feasible.

Standards: The engineer will be required to use generally accepted standards and procedures for calculating the release of storm water from the site before and after development, and institute control measures on site so that downstream peak discharges at post-development are generally reduced to pre-development conditions. The design criteria for the sizing of detention basins is based on a 2-year, 5-year, 10-year, 25-year, and 100-year, 24-hour storm event, which are as follows:

- 2-yr frequency: 3.3”
- 5-yr frequency: 4.0”
- 10-yr frequency: 4.8”
- 25-yr frequency: 5.5”
- 100-yr frequency: 6.6”.

Ponds must be provided with 1-foot minimum freeboard during the 100-year, 24-hour flood. Freeboard is to be measured between the berm elevation and the 100-year maximum water surface elevation.

An emergency spillway shall be included in the stormwater pond design to safely pass the peak flow from the 100-yr design storm. The emergency spillway shall be located so that downstream structures will not be impacted by spillway discharges. The emergency spillway shall be located a minimum 0.1 foot above the 100-year water surface elevation.

The City has the authority to require additional water quantity standards, including restrictions on peak velocity and/or runoff volumes or less frequent design events, in areas where the director has determined, through stormwater master plans, engineering studies, and/or other regulatory water quality requirements, a history of existing or documented flooding or erosion problems, or engineering judgment, that additional restrictions are needed to limit adverse impacts of the proposed development downstream or upstream of the site.

2. Channel Protection: To protect stream channels from degradation, specific channel protection criteria shall be provided as follows:

- (i) The runoff volume from the 1-year frequency, 24-hour storm (2.7”) shall be detained for no less than a 24-hours and no more than 72-hours.
- (ii) The channel protection volume shall be released through a small control orifice (“Channel Protection Orifice”) such that the average flow through the orifice releases the Channel Protection Volume over the required time period.

3. Water Quality Treatment:

- (i) In compliance with Tennessee Rule 0400-40-10.04, which became effective March 19, 2024, and the State of Tennessee’s MS4 (Municipal Separate Storm Sewer System) NPDES (National Pollutant Discharge Elimination System) General Permit (TNS000000) which was issued on March 22, 2024, all new development and redevelopment projects must be designed to reduce pollutants in stormwater runoff to the maximum extent practicable (MEP). Compliance with this MEP standard will be obtained when Stormwater Control Measures (SCM), are designed, installed, and maintained to treat storm water runoff from new development and redevelopment projects in accordance with this subsection. For design purposes, total suspended solids (TSS) may be used as an indicator for the reduction of pollutants.
- (ii) Applicability: This subsection shall apply to all new development and

Commented [SL1]: Replaces prior language:

“The design criteria for the sizing of detention basins and drain pipes is based on a 24-hour storm of a ten-year frequency under the pre-development conditions of the site (4.8 inches), and a 24-hour storm of 25-year frequency under the post-developed condition (5.5 inches).”

This is more consistent with industry standards.

redevelopment projects that disturb one or more acres of land, or less than one acre if part of a larger common plan of development. All applicable new development and redevelopment projects must be designed to treat the Water Quality Treatment Volume (WQTV) in accordance with all requirements of this subsection.

- (iii) SCMs must be designed to provide full treatment capacity within 72 hours following the end of the preceding rain event for the life of the new development or redevelopment project. A list of acceptable SCMs is contained within the "Tennessee Permanent Stormwater Management and Design Guidance Manual".
- (iv) Water Quality Treatment Design Storm: The water quality treatment design storm is the 1-year, 24-hour storm event as defined by Precipitation-Frequency Atlas of the United States, Atlas 14, Volume 2, Version 3.0 published by the US Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), National Weather Service, Hydrometeorological Design Studies Center, Silver Springs, Maryland, or its digital product equivalent.
- (v) The city has adopted, for use in designing water quality SCMs. The 1-year, 24-hour design storm which, for the City of Lenoir City, is 2.7".
- (vi) Water Quality Treatment Volume (WQTV): The WQTV is a portion of the runoff generated from impervious surfaces at a new development or redevelopment project. The quantity of the WQTV depends on the type of treatment provided, as established in the following table:

Water Quality Treatment Volume and the Corresponding SCM Treatment Type for the 1-year, 24-hour design storm		
SCM Treatment Type	WQTV	Notes
infiltration, evaporation, transpiration, and/or reuse	runoff generated from the first 1 inch of the design storm	Examples include, but are not limited to, bioretention, stormwater wetlands, and infiltration systems.
biologically active filtration, with an underdrain	runoff generated from the first 1.25 inches of the design storm	To achieve biologically active filtration, SCMs must provide minimum of 12 inches of internal water storage.
sand or gravel filtration, settling ponds, extended detention ponds, and wet ponds	runoff generated from the first 2.5 inches of the design storm or the first 75% of the design storm, whichever is less	Examples include, but are not limited to, sand filters, permeable pavers, and underground gravel detention systems. Ponds must provide forebays comprising a minimum of 10% of the total design volume. Existing regional detention ponds are not subject to the forebay requirement.
hydrodynamic separation, baffle box settling, other flow-through manufactured treatment devices (MTDs), and treatment trains using MTDs	maximum runoff generated from the entire design storm	Flow-through MTDs must provide an overall treatment efficiency of at least 80% TSS reduction. Refer to subparagraph (v) of this rule.

SCMs must be designed, at a minimum, to achieve an overall treatment efficiency of 80% total suspended solids (TSS) removal from the WQTV.

- (vii) Treatment Train Calculations:
- a. Treatment Trains Using Manufactured Treatment Devices (MTDs): Treatment trains using MTDs must provide an overall treatment efficiency of at least 80% TSS reduction utilizing the following formula:

$$R = A+B-(AxB)/100$$

Where:

R = total TSS percent removal from application of both SCMs,
A = the TSS percent removal rate applicable to the first SCM, and
B = the TSS percent removal rate applicable to the second SCM

- b. Treatment trains not using MTD: Treatment trains using infiltration, evaporation, transpiration, reuse, or biologically active filtration followed by sand or gravel filtration, settling ponds, extended detention ponds or wet ponds may subtract the treated WQTV of the upstream SCMs from the WQTV of the downstream SCMs.
 - c. TSS removal rates for MTD must be evaluated using industry-wide standards. TSS removal rates for other SCMs must be from published reference literature.
- (viii) Allowable Reduction in WQTV: A 20% reduction in the required WQTV is available for each of the following conditions. If both conditions are applicable a total 40% reduction is available. These conditions include:
- a. Redevelopment projects (including, but not limited to, brownfield redevelopment);
 - b. Vertical density (floor to area ratio of at least 2, or at least 18 units per acre).
- (ix) Design plans shall identify the water quality improvement design features included and the expected reduction in pollutants being released from the site. *(Added 1/28/08 by City Council of Lenoir City)*

4. Additional General Performance Criteria:

- (i) Stormwater discharges to critical areas with sensitive resources (i.e., cold water fisheries, shellfish beds, swimming beaches, recharge areas, water supply reservoirs) may be subject to additional performance criteria or may need to utilize or restrict certain stormwater management practices.
- (ii) Stormwater discharges from hot spots may require the application of specific structural BMPs and pollution prevention practices.
- (iii) Prior to or during the site design process, applicants for land disturbance permits shall consult with Lenoir City to determine if they are subject to additional stormwater design requirements.

G. Storm Water Plan

Storm water drainage, detention, channel protection, and water quality treatment plans must be submitted to the City five (5) days prior to the issuance of a permit. The plan can be integrated into the site plan when requesting a building permit, or as part of a subdivision plat.

H. Erosion Control

Effective erosion control measures shall be required during construction to eliminate sedimentation on public rights-of-way or watercourses. The use of straw bales or silt fencing is typically the most prevalent, however other suitable methods will be permitted.

I. Exemptions

The requirement for detention, hydrologic or hydraulic computations, plans and preparation by an engineer are not applicable for single family residences or duplexes on individual lots.