

## **Chapter 13: Storm Water Controls Criteria**

### **Section 1: Authority**

The Montgomery County Storm Water Management Resolution (#03-1-5), Section 12, Subsection 2 states:

“The Montgomery County Building Commissioner or Qualified Designee shall develop or approve and adopt written technical requirements and review procedures for grading, drainage and erosion control plans. At a minimum, such plans shall be consistent with the storm water master plan if available for the area in question and shall contain details of storm water drainage systems and erosion control methods.”

This section of the resolution allows the Building Commissioner or his Qualified Designee (the Stormwater Coordinator) to develop and adopt policies and procedures to address technical requirements for grading, drainage and erosion control (GDEC) plans. The technical requirements for GDEC plans may include policies and procedures that are required specifically by Montgomery County Stormwater Program and which are not covered in the Tennessee Erosion and Sediment Control Handbook. The Tennessee Erosion and Sediment Control Handbook, The TDEC Manual for Post Construction and the Montgomery County Storm Water Management Manual are the manuals of regulations, design, performance, and review criteria for storm water management practices that have been adopted for use by the Montgomery County Storm Water Management Program.

No storm water runoff generated by land development or construction shall be discharged untreated directly into the Waters of Montgomery County, Waters of the State, wetlands or other water bodies without adequate treatment.

No land disturbance activities, whether by private or public action, shall be performed in a manner that will negatively impact storm water quantity whether by flow restrictions, increased runoff, or by diminishing channel or floodplain storage capacity.

No land disturbance activities, whether by private or public action, shall be performed in a manner that will negatively impact storm water quality by discharge of erosion materials or sedimentation, or transport or discharge of other pollutants or forms of pollution.

### **Section 2: Storm Water Controls Design Criteria**

1.) Temporary and construction phase site storm water erosion control and sedimentation prevention designs will be based on a 10 year, 24 hour (NRCS type II rainfall distribution) storm event.

2.) Construction phase BMPs must reduce the Total Suspended Solids in storm water runoff by a minimum of 80%. The First Flush (the first 0.5 inch) of storm water runoff from a construction

site must be retained on site a minimum of 24 hours and a maximum of 72 hours, with slow dewatering from the top of the water column, using a skimmer or similar dewatering device.

3.) Post construction BMPs must reduce the Total Suspended Solids in storm water runoff by a minimum of 80%, regardless of the method(s) used.

4.) Individual building lots shall install and maintain storm water erosion control and sedimentation prevention based on a 2 year, 24 hour storm event.

5.) Post construction site storm water erosion control and sedimentation prevention designs will be based on a 25 year, 24 hour storm event.

6.) The outlet control structure for post construction detention/retention facilities or any other flow attenuation methods shall be sized such that the post-development peak discharge rate is less than or equal to the predevelopment peak discharge rate for the 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year, 24-hour design storms.

7.) All detention/retention facilities shall be designed with an additional one foot of freeboard above the design storage volume level. Storm water structures that route storm water into detention/retention facilities shall be sized to handle the runoff from a 100 year, 24 hours storm event.

8.) Detention/retention facilities will have an emergency spillway (overflow device) to allow stormwater discharge without damage to the structure.

9.) Open channel storm water systems and structures will be designed to provide a minimum of 1.0 feet of freeboard.

10.) Discharge velocity shall be controlled to prevent both erosion and siltation immediately downstream from the point of discharge. Energy dissipating structures shall be used if required.

11.) All storm drainage systems shall be designed so as to maintain a minimum velocity of flow of 3 feet per second and a maximum velocity of 10 feet per second when flowing full.

12.) All storm sewers shall be designed and constructed with a minimum slope of 0.5% unless detailed calculations are provided justifying a lesser slope.

13.) All storm drainage lines shall have a minimum cover of 12 inches.

14.) Open channels and drainages shall be sized to carry design rates of flow without significant damage or erosion to the channel. Channels shall be fenced, sloped or otherwise protected to prevent injury to the public.

15.) Channel design shall include lining or treatment of the invert and sides as required in order minimizing erosion. Channel inverts and sides shall be lined to a height 1.0 foot above the

hydraulic grade line produced by a flow rate of 60 percent of the peak design rate of the design storm in accordance with the following table:

<u>Mean Flow Velocity</u>	<u>Minimum Type of Lining</u>
3 FPS or Less	Seeded
3 - 8 FPS	Sod
8 - 15 FPS	Riprap or Concrete
Over 15 FPS	Concrete

Lining materials having equivalent erosion control properties to those shown in the table may be used with the approval of the Storm Water Coordinator.

16.) The minimum slope for any open channel shall be 0.5%. When the slope falls below 1.0%, the invert of the channel shall be concrete with adequate energy dissipation devices to prevent erosion damage to downstream structures and receiving waters.

17.) Check dams may be used to control flow velocity in open channels. Check dams shall be designed to prevent flow bypass by undercutting or erosion around the ends. Adequate paving or riprap shall be provided at the downstream toe of check dams to prevent erosion or loss of foundation supported by undercutting. All check dams must have a geotextile underlayment installed.

18.) Permanent Drainage Easements shall be obtained for:

- Detention/Retention facilities with spillway and release facilities
- Floodage rights for temporary detention/retention facility release and storm water drainage
- All drainage systems downstream from the point where storm water runoff from two or more properties combine

Easements and floodage rights shall include all necessary provisions and provide sufficient land to access facilities for inspection and maintenance.

19.) Appropriate measures will be taken to assure that all sinkholes, cave openings and class V injection wells are protected from sedimentation and pollution during and after construction.

20.) Re-development activities will be required to follow storm water quality requirements.

21.) Detention and retention facilities shall not be located in the right-of-way or in a water quality buffer.

22.) Detention and retention facilities shall only be located on commonly owned areas or parcels, and shall not be located on parcels or lots intended for single-family residential uses. Development homeowners associations are required to maintain these structures.

### Section 3: Intensity-Duration-Frequency Relationships for Clarksville, TN.

Recurrence Interval (Years)	Duration	Rainfall (In)	Intensity (In/Hr)
10	5 min.	0.64	7.64
10	10 min.	0.98	5.88
10	15 min.	1.24	4.96
10	30 min.	1.72	3.44
10	1 hr.	2.17	2.17
10	2 hr.	2.67	1.34
10	3 hr.	2.93	0.98
10	6 hr.	3.77	0.63
10	12 hr.	4.29	0.36
10	24 hr.	4.85	0.20
25	5 min.	0.72	8.64
25	10 min.	1.11	6.66
25	15 min.	1.40	5.60
25	30 min.	1.95	3.90
25	1 hr.	2.50	2.50
25	2 hr.	3.00	1.50
25	3 hr.	3.40	1.13
25	6 hr.	4.00	0.67
25	12 hr.	4.79	0.40
25	24 hr.	5.73	0.24
50	5 min.	0.80	9.60
50	10 min.	1.23	7.83
50	15 min.	1.35	6.20
50	30 min.	2.15	4.30
50	1 hr.	2.75	2.75
25	2 hr.	3.37	1.69
50	3 hr.	3.75	1.25
50	6 hr.	4.58	0.76
50	12 hr.	5.50	0.46
50	24 hr.	6.38	0.27
100	5 min.	0.90	10.80
100	10 min.	1.38	8.28
100	15 min.	1.74	6.96
100	30 min.	2.42	4.84
100	1 hr.	3.00	6.00
100	2 hr.	3.78	1.89
100	3 hr.	4.14	1.38
100	6 hr.	4.39	0.82
100	12 hr.	5.85	0.49
100	24 hr.	6.73	0.28

P.M.P. = 28.50 inches.