

STORMWATER QUANTITY CONTROLS

4.1 OVERVIEW

With the development of the County's Stream Assessment / Watershed Management Program (Chapter 2 of this Manual), the County wanted the new program to apply to road projects as well as land development projects. In order to do so, the County's stormwater programs must be adopted pursuant to and consistent with the Virginia Stormwater Management (SWM) Law (§ 10.1-603.1 et seq. of the Code of Virginia) and Regulations (4VAC3-20 et seq.). One of the requirements of the state SWM Regulations is that local program requirements be adopted by ordinance. Therefore, necessary ordinance revisions were made and compliance with the provisions of this Chapter is required by § 10-35(a)(14)a of the Code of the County of Henrico. These requirements are authorized by the Virginia Stormwater Management Law and satisfy the stream channel erosion and flooding components of the Virginia Stormwater Management Regulations.

Adopting pursuant to the SWM Law and Regulations also provides the mechanism for state agency project (road and land development projects) compliance with the County's programs for dealing with stormwater. Section 4 VAC 3-20-210.B of the SWM Regulations requires that state agency projects comply with local stormwater management programs to the extent practicable as long as the local programs are adopted pursuant to the SWM Law and Regulations.

4.2 GENERAL REQUIREMENTS

- ❑ Determination of flooding and channel erosion impacts to receiving streams due to land development projects shall be measured at each point of discharge from the development project and such determination shall include any runoff from the balance of the watershed which also contributes to that point of discharge.
- ❑ The specified design storms shall be defined as either a 24-hour storm using the rainfall distribution recommended by the U.S. Soil Conservation Service when using U.S. Soil Conservation Service methods or as the storm of critical duration that produces the greatest required storage volume at the site when using a design method such as the Modified Rational Method.
- ❑ For purposes of computing runoff, all pervious lands in the site shall be assumed prior to development to be in good condition (if the lands are pastures, lawns, or parks), with good cover (if the lands are woods), or with conservation treatment (if the lands are cultivated); regardless of conditions existing at the time of computation.
- ❑ Construction of stormwater management facilities or modifications to channels shall

comply with all applicable laws and regulations. Evidence of approval of all necessary permits shall be presented.

- ❑ Impounding structures that are not covered by the Impounding Structure Regulations (4 VAC 50-20-10 et seq.) shall be engineered for structural integrity during the 100-year storm event.
- ❑ Pre-development and post-development runoff rates shall be verified by calculations that are consistent with good engineering practices.
- ❑ Outflows from a stormwater management facility shall be discharged to an adequate channel, and velocity dissipators shall be placed at the outfall of all stormwater management facilities and along the length of any outfall channel as necessary to provide a nonerosive velocity of flow from the basin to a channel.
- ❑ Proposed residential, commercial, or industrial subdivisions shall apply these stormwater management criteria to the land development as a whole. Individual lots in new subdivisions shall not be considered separate land development projects, but rather the entire subdivision shall be considered a single land development project. Hydrologic parameters shall reflect the ultimate land development and shall be used in all engineering calculations.
- ❑ All stormwater management facilities shall have a maintenance plan which identifies the owner and responsible party for carrying out the maintenance plan.
- ❑ Construction of stormwater management impoundment structures within a Federal Emergency Management Agency (FEMA) designated 100-year floodplain shall be avoided to the extent possible. When this is unavoidable, all stormwater management facility construction shall be in compliance with all applicable regulations under the National Flood Insurance Program, 44 CFR Part 59.
- ❑ Natural channel characteristics shall be preserved to the maximum extent practicable.
- ❑ Land development projects shall comply with the Virginia Erosion and Sediment Control Act and attendant regulations.

4.3 FLOODING AND 50 / 10 STORMWATER DETENTION

Stormwater detention facility needs were initially identified during the late 1970's as a part of a comprehensive county-wide stormwater drainage study. Stormwater detention facilities are required to be provided as a part of commercial development in those watersheds where downstream flooding problems are known to occur or if existing

homes are located within the 50-year flood plain. The design of these detention facilities shall be such that the post-developed peak flow from the site for a 50-year storm event does not exceed the pre-developed peak flow rate for a 10-year storm event.

Stormwater detention facilities intended to alleviate downstream channel or system adequacy issues are not permitted in subdivisions unless specifically approved by the Director of Public Works. This restriction also applies to areas designated by the County Comprehensive Drainage Study as 50/10 detention areas.

Public road projects that are constructed by the Virginia Department of Transportation, the Henrico County Department of Public Works, or their subcontractors are not required to control post-developed stormwater runoff for flooding.

Stormwater detention basins should be designed for future ease of maintenance. The developer shall be responsible for all required maintenance of the stormwater detention facility.

50/10 detention areas are identified on Map 4-1.

All stormwater maintenance facilities must have a maintenance agreement on file with the Department of Public Works. A copy of the County approved form can be found in the Appendix.

4.4 ADEQUATE OUTFALL REQUIREMENTS

“Adequate channel” means a watercourse that will convey the designated frequency storm event without overtopping its banks or causing erosive damage to the bed, banks and overbank sections of the same.

Adequacy of all channels and pipes shall be verified in the following manner:

1. The applicant shall demonstrate that the total drainage area to the point of analysis within the channel is one hundred times greater than the contributing drainage area of the project in question; or
2. The channels and pipes will be analyzed as follows:
 - a. Natural channels shall be analyzed by the use of a two-year storm to verify that stormwater will not overtop channel banks nor cause erosion of channel bed or banks; and
 - b. All previously constructed man-made channels shall be analyzed by the use of a ten-year storm to verify that stormwater will not overtop its banks

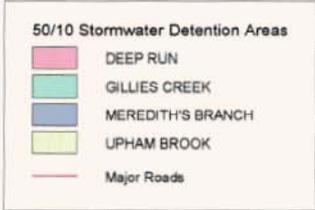
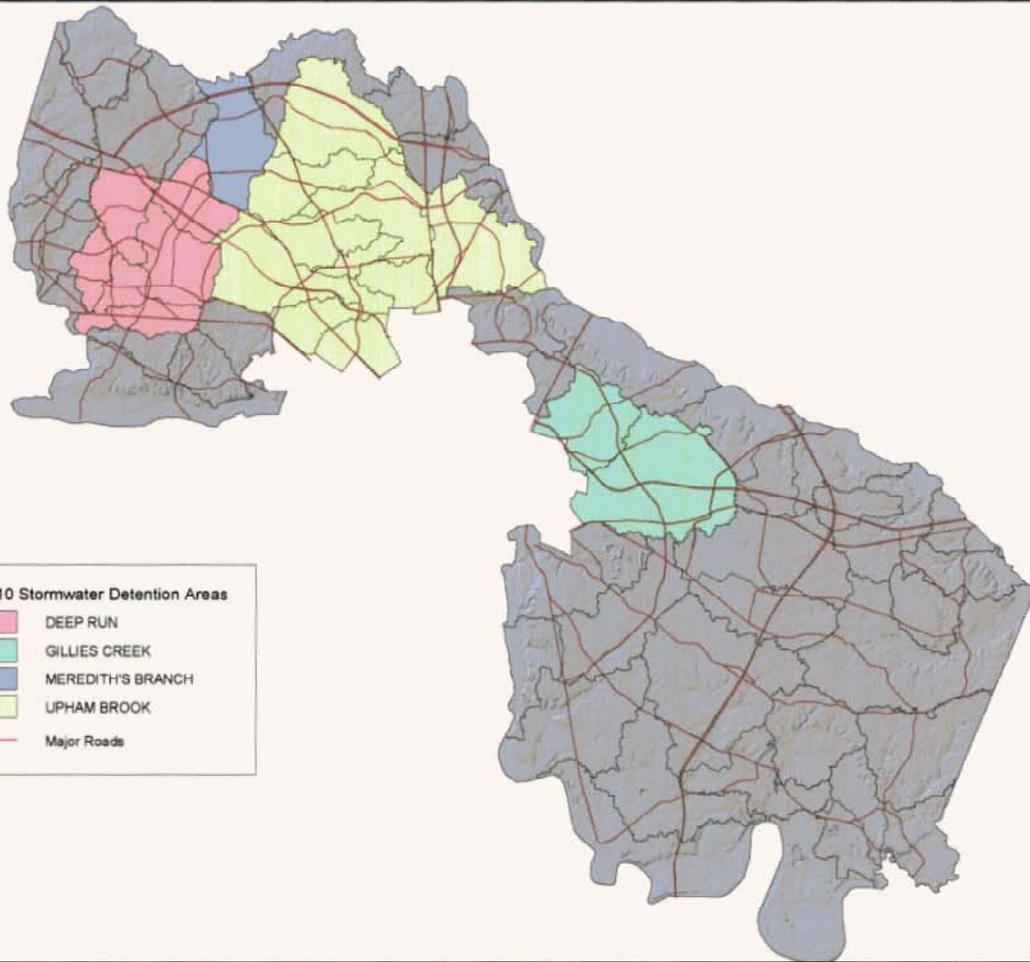
- and by the use of a two-year storm to demonstrate that stormwater will not cause erosion of channel bed or banks; and
- c. Pipes and storm sewer systems shall be analyzed by the use of a ten-year storm to verify that stormwater will be contained within the pipe or system.

Concentrated stormwater runoff leaving a development site must be discharged directly into a well-defined, natural or man-made offsite receiving channel or pipe. If an adequate channel does not exist, one must be constructed to convey stormwater to the nearest adequate channel.

If the receiving channel is found to be inadequate for the post-development peak runoff rate for a 10-year storm, the developer must incorporate measures to improve the receiving channel to an adequate condition and all necessary easements for the outfall must be obtained/acquired.

Where an increase in runoff due to development is likely to cause damage to existing private and/or public facilities downstream, the developer shall be required to make the necessary improvements to obtain an adequate outfall. The improvements shall be to a point where the drainageway can adequately handle the runoff. Improvements may include one or more of the following:

- The developer shall provide facilities within the limits of his property to drain onsite runoff and estimated future upstream runoff based on the current County Land Use Plan.
- Where it becomes necessary to alter the outfall condition from the development to an offsite point by lowering the existing grade or improving the existing drainageway, the offsite improvement required shall be considered "necessary" for onsite development.
- Offsite drainage outfall improvements must be provided to a point where an adequate outfall can be obtained and all necessary easements for the outfall must be obtained/acquired.



Map 4.1
50/10 Stormwater Detention Areas

