

Letter To Industry
LTI#. 00000012

Date: June 27, 2014

DCSM Reference : Article 8 Section 8-500

Summary of Issue/Topic: Virginia Stormwater Management Program
The Stormwater Management Ordinance (Ordinance), Section 58 of the Code of the City of Manassas, Virginia, becomes effective July 1, 2014. Land-disturbing activities that are not exempt from the Ordinance and that either do not have coverage under the state General Permit for Discharges of Stormwater from Construction Activities prior to the effective date, or do not meet the criteria for grandfathering, must comply with the new technical requirements contained in this document. This document provides minimum requirements, procedures, and acceptable practices for implementing the Ordinance provisions for grandfathering and for land-disturbing activities with state general permit coverage.

Effective Date: July 1, 2014

Policy/ Requirements/ Guidelines: (New) Section and paragraphs to define the minimum requirements, procedures and or acceptable practices of the land disturbing activities

Background: (New) Article Number Section and paragraphs outlines land disturbing activities minimum requirement standards not previously covered as a part of the DCSM. Insert new section as first item of technical criteria.

(NEW) 8-530 TECHNICAL CRITERIA FOR REGULATED LAND DISTURBING ACTIVITIES

8-530.1 APPLICABILITY

In accordance with the State Water Control Board's authority and except as provided in [9VAC25-870-48](#), this part establishes the minimum technical criteria that shall be employed by a state agency in accordance with an implementation schedule set by the State Water Control board, or by the city that has been approved by the State Water Control Board, to protect the quality and quantity of state waters from the potential harm of unmanaged stormwater runoff resulting from land-disturbing activities.

8-530.2 WATER QUALITY DESIGN CRITERIA REQUIREMENTS

(a) In order to protect the quality of state waters and to control the discharge of stormwater pollutants from regulated activities, the following minimum design criteria and statewide standards for stormwater management shall be applied to the site.

(1) New development. The total phosphorus load of new development projects shall not exceed 0.41 pounds per acre per year, as calculated pursuant to Section 8-530.3.

(2) Development on prior developed lands.

- (i) For land-disturbing activities disturbing greater than or equal to one acre that result in no net increase in impervious cover from the predevelopment condition, the total phosphorus load shall be reduced at least 20% below the predevelopment total phosphorus load.
- (ii) For regulated land-disturbing activities disturbing less than one acre that result in no net increase in impervious cover from the predevelopment condition, the total phosphorus load shall be reduced at least 10% below the predevelopment total phosphorus load.
- (iii) For land-disturbing activities that result in a net increase in impervious cover over the predevelopment condition, the design criteria for new development shall be applied to the increased impervious area. Depending on the area of disturbance, the criteria of subdivisions (i) or (ii) above, shall be applied to the remainder of the site.
- (iv) In lieu of subdivision (iii) of this subsection, the total phosphorus load of a linear development project occurring on prior developed lands shall be reduced 20% below the predevelopment total phosphorus load.
- (v) The total phosphorus load shall not be required to be reduced to below the applicable standard for new development unless a more stringent standard has been established by the Director of Public Works and Utilities.

(b) Compliance with subsection (a) of this section shall be determined in accordance with Section 8-530.3.

(c) Nothing in this section shall prohibit the Director of Public Works and Utilities from establishing more stringent requirements to comply with the city's MS4 permit or TMDL requirements.

8-530.3 WATER QUALITY COMPLIANCE

(a) Compliance with the water quality design criteria set out in subdivisions A 1 and A 2 of [9VAC25-870-63](#) shall be determined by utilizing the Virginia Runoff Reduction Method or another equivalent methodology that is approved by the State Water Control Board.

(b) The BMPs listed in 9VAC25-870-65.B are approved for use as necessary to effectively reduce the phosphorus load and runoff volume in accordance with the Virginia Runoff Reduction Method. Other approved BMPs found on the Virginia Stormwater BMP Clearinghouse Website may also be utilized. Design specifications and the pollutant removal efficiencies for all approved BMPs are found on the Virginia Stormwater BMP Clearinghouse Website.

(c) BMPs differing from those listed in subsection (b) of this section shall be reviewed and approved by the Director of Public Works and Utilities in accordance with procedures established by Virginia Stormwater BMP Clearinghouse and approved by the State Water Control Board.

- (d) The Director of Public Works and Utilities may establish limitations on the use of specific BMPs in accordance with § [62.1-44.15:33](#) of the Code of Virginia.
- (e) The City shall have the discretion to allow for application of the design criteria to each drainage area of the site. However, where a site drains to more than one HUC, the pollutant load reduction requirements shall be applied independently within each HUC unless reductions are achieved in accordance with a comprehensive watershed stormwater management plan in accordance with [9VAC25-870-92](#).
- (f) Offsite alternatives where allowed in accordance with [9VAC25-870-69](#) may be utilized to meet the design criteria of subsection A of [9VAC25-870-63](#).

8-530.4 WATER QUANTITY

- (a) Channel protection and flood protection shall be addressed in accordance with the minimum standards set out in this section and other applicable regulations.
- (b) Channel protection. Concentrated stormwater flow shall be released into a stormwater conveyance system and shall meet the criteria in subdivision (1), (2), or (3) of this subsection, where applicable, from the point of discharge to a point to the limits of analysis in subdivision (4) of this subsection.
 - (1) Manmade stormwater conveyance systems. When stormwater from a development is discharged to a manmade stormwater conveyance system, following the land-disturbing activity, either:
 - (i) The manmade stormwater conveyance system shall convey the postdevelopment peak flow rate from the two-year 24-hour storm event without causing erosion of the system. Detention of stormwater or downstream improvements may be incorporated into the approved land-disturbing activity to meet this criterion, at the discretion of the City; or
 - (ii) The peak discharge requirements for concentrated stormwater flow to natural stormwater conveyance systems in subdivision (3) of this subsection shall be met.
 - (2) Restored stormwater conveyance systems. When stormwater from a development is discharged to a restored stormwater conveyance system that has been restored using natural design concepts, following the land-disturbing activity, either:
 - (i) The development shall be consistent, in combination with other stormwater runoff, with the design parameters of the restored stormwater conveyance system that is functioning in accordance with the design objectives; or
 - (ii) The peak discharge requirements for concentrated stormwater flow to natural stormwater conveyance systems in subdivision (3) of this subsection shall be met.
 - (3) Natural stormwater conveyance systems. When stormwater from a development is discharged to a natural stormwater conveyance system, the maximum peak flow rate

from the one-year 24-hour storm following the land-disturbing activity shall be calculated either:

(i) In accordance with the following methodology:

$$Q_{\text{Developed}} \leq \text{I.F.} * (Q_{\text{Pre-developed}} * \text{RV}_{\text{Pre-Developed}}) / \text{RV}_{\text{Developed}}$$

Under no condition shall $Q_{\text{Developed}}$ be greater than $Q_{\text{Pre-Developed}}$ nor shall $Q_{\text{Developed}}$ be required to be less than that calculated in the equation $(Q_{\text{Forest}} * \text{RV}_{\text{Forest}}) / \text{RV}_{\text{Developed}}$; where

I.F. (Improvement Factor) equals 0.8 for sites > 1 acre or 0.9 for sites ≤ 1 acre.

$Q_{\text{Developed}}$ = The allowable peak flow rate of runoff from the developed site.

$\text{RV}_{\text{Developed}}$ = The volume of runoff from the site in the developed condition.

$Q_{\text{Pre-Developed}}$ = The peak flow rate of runoff from the site in the pre-developed condition.

$\text{RV}_{\text{Pre-Developed}}$ = The volume of runoff from the site in pre-developed condition.

Q_{Forest} = The peak flow rate of runoff from the site in a forested condition.

$\text{RV}_{\text{Forest}}$ = The volume of runoff from the site in a forested condition; or

(ii) In accordance with another methodology that is demonstrated by the Director of Public Works and Utilities to achieve equivalent results and is approved by the State Water Control Board.

(4) Limits of analysis. Unless subdivision (3) of this subsection is utilized to show compliance with the channel protection criteria, stormwater conveyance systems shall be analyzed for compliance with channel protection criteria to a point where either:

(i) Based on land area, the site's contributing drainage area is less than or equal to 1.0% of the total watershed area; or

(ii) Based on peak flow rate, the site's peak flow rate from the one-year 24-hour storm is less than or equal to 1.0% of the existing peak flow rate from the one-year 24-hour storm prior to the implementation of any stormwater quantity control measures.

(c) Flood protection. Concentrated stormwater flow shall be released into a stormwater conveyance system and shall meet one of the following criteria as demonstrated by use of acceptable hydrologic and hydraulic methodologies:

(1) Concentrated stormwater flow to stormwater conveyance systems that currently do not experience localized flooding during the 10-year 24-hour storm event: The point of discharge releases stormwater into a stormwater conveyance system that, following the land-disturbing activity, confines the postdevelopment peak flow rate from the 10-year 24-hour storm event within the stormwater conveyance system. Detention of stormwater or downstream improvements may be incorporated into the approved land-disturbing activity to meet this criterion, at the discretion of the Director of Public Works and Utilities.

(2) Concentrated stormwater flow to stormwater conveyance systems that currently experience localized flooding during the 10-year 24-hour storm event: The point of discharge either:

- (i) Confines the postdevelopment peak flow rate from the 10-year 24-hour storm event within the stormwater conveyance system to avoid the localized flooding. Detention of stormwater or downstream improvements may be incorporated into the approved land-disturbing activity to meet this criterion, at the discretion of the Director of Public Works and Utilities; or
 - (ii) Releases a postdevelopment peak flow rate for the 10-year 24-hour storm event that is less than the predevelopment peak flow rate from the 10-year 24-hour storm event. Unless required by the Director of Public Works and Utilities, downstream stormwater conveyance systems do not require any additional analysis to show compliance with flood protection criteria if this option is utilized.
- (3) Limits of analysis. Unless subdivision (2) (ii) of this subsection is utilized to comply with the flood protection criteria, stormwater conveyance systems shall be analyzed for compliance with flood protection criteria to a point where:
- (i) The site's contributing drainage area is less than or equal to 1.0% of the total watershed area draining to a point of analysis in the downstream stormwater conveyance system;
 - (ii) Based on peak flow rate, the site's peak flow rate from the 10-year 24-hour storm event is less than or equal to 1.0% of the existing peak flow rate from the 10-year 24-hour storm event prior to the implementation of any stormwater quantity control measures; or
 - (iii) The stormwater conveyance system enters a mapped floodplain or other flood-prone area, adopted by ordinance, or any locality.
- (d) The postdevelopment peak flow for the 2-year 24-hour storm event shall be released at a rate that is equal to or less than the predevelopment peak flow rate from the 2-year 24-hour storm event and the postdevelopment peak flow for the 10-year 24-hour storm event shall be released at a rate that is less than or equal to the predevelopment peak flow rate from the 10-year 24-hour storm event. Stormwater management facilities shall be designed to regulate the peak discharge from the 2-year, 10-year, and 100-year 24-hour storms, if located adjacent to special flood hazard areas.
- (e) Increased volumes of sheet flow resulting from pervious or disconnected impervious areas, or from physical spreading of concentrated flow through level spreaders, must be identified and evaluated for potential impacts on down-gradient properties or resources. Increased volumes of sheet flow that will cause or contribute to erosion, sedimentation, or flooding of down gradient properties or resources shall be diverted to a stormwater management facility or a stormwater conveyance system that conveys the runoff without causing down-gradient erosion, sedimentation, or flooding. If all runoff from the site is sheet flow and the conditions of this subsection are met, no further water quantity controls are required.
- (f) For purposes of computing predevelopment runoff, all pervious lands on the site shall be assumed to be in good hydrologic condition in accordance with the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) standards, regardless of conditions existing at the time of computation. Predevelopment runoff calculations utilizing

other hydrologic conditions may be utilized provided that it is demonstrated to and approved by the Director of Public Works and Utilities that actual site conditions warrant such considerations.

- (g) Predevelopment and postdevelopment runoff characteristics and site hydrology shall be verified by site inspections, topographic surveys, available soil mapping or studies, and calculations consistent with good engineering practices. Guidance provided in the Virginia Stormwater Management Handbook and on the Virginia Stormwater BMP Clearinghouse Website shall be considered appropriate practices.

8-530.5 OFFSITE COMPLIANCE OPTIONS

- (a) Offsite compliance options that the Director of Public Works and Utilities may allow an operator to use to meet required phosphorus nutrient reductions include the following:

- (1) Offsite controls utilized in accordance with a comprehensive stormwater management plan adopted pursuant to [9VAC25-870-92](#) for the local watershed within which a project is located;
- (2) A locality pollutant loading pro rata share program established pursuant to § [15.2-2243](#) of the Code of Virginia or similar local funding mechanism;
- (3) The nonpoint nutrient offset program established pursuant to § [62.1-44.15:35](#) of the Code of Virginia;
- (4) Any other offsite options approved by an applicable state agency or state board; and
- (5) When an operator has additional properties available within the same HUC or upstream HUC that the land-disturbing activity directly discharges to or within the same watershed as determined by the Director of Public Works and Utilities, offsite stormwater management facilities on those properties may be utilized to meet the required phosphorus nutrient reductions from the land-disturbing activity.

- (b) Notwithstanding subsection (a) of this section, and pursuant to § [62.1-44.15:35](#) of the Code of Virginia, operators shall be allowed to utilize offsite options identified in subsection (a) of this section under any of the following conditions:

- (1) Less than five acres of land will be disturbed;
- (2) The post-construction phosphorus control requirement is less than 10 pounds per year; or
- (3) At least 75% of the required phosphorus nutrient reductions are achieved on-site. If at least 75% of the required phosphorus nutrient reductions cannot be met on-site, and the operator can demonstrate to the satisfaction of the City that (i) alternative site designs have been considered that may accommodate on-site best management practices, (ii) on-site best management practices have been considered in alternative site designs to the

maximum extent practicable, (iii) appropriate on-site best management practices will be implemented, and (iv) full compliance with postdevelopment nonpoint nutrient runoff compliance requirements cannot practicably be met on-site, then the required phosphorus nutrient reductions may be achieved, in whole or in part, through the use of off-site compliance options.

(c) Notwithstanding subsections (a) and (b) of this section, offsite options shall not be allowed:

(1) Unless the selected offsite option achieves the necessary nutrient reductions prior to the commencement of the operator's land-disturbing activity. In the case of a phased project, the operator may acquire or achieve offsite nutrient reductions prior to the commencement of each phase of land-disturbing activity in an amount sufficient for each phase.

(2) In contravention of local water quality-based limitations at the point of discharge that are (i) consistent with the determinations made pursuant to subsection B of § [62.1-44.19:7](#) of the Code of Virginia, (ii) contained in a municipal separate storm sewer system (MS4) program plan accepted by the Department of Environmental Quality, or (iii) as otherwise may be established or approved by the State Water Control Board.

(d) In order to meet the requirements of [9VAC25-870-66](#), offsite options described in subdivisions (1) and (2) of subsection (a) of this section may be utilized.

8-530.6 DESIGN STORMS AND HYDROLOGIC METHODS

(a) Unless otherwise specified, the prescribed design storms are the one-year, two-year, and 10-year 24-hour storms using the site-specific rainfall precipitation frequency data recommended by the U.S. National Oceanic and Atmospheric Administration (NOAA) Atlas 14. Partial duration time series shall be used for the precipitation data.'

(b) Unless otherwise specified, all hydrologic analyses shall be based on the existing watershed characteristics and how the ultimate development condition of the subject project will be addressed.

(c) The U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) synthetic 24-hour rainfall distribution and models, including, but not limited to TR-55 and TR-20; hydrologic and hydraulic methods developed by the U.S. Army Corps of Engineers; or other standard hydrologic and hydraulic methods, shall be used to conduct the analyses described in this part.

(d) For drainage areas of 200 acres or less, the City may allow for the use of the Rational Method for evaluating peak discharges.

(e) For drainage areas of 200 acres or less, the City may allow for the use of the Modified Rational Method for evaluating volumetric flows to stormwater conveyances.

8-530.7 STORMWATER HARVESTING

In accordance with § [62.1-44.15:28](#) of the Code of Virginia, stormwater harvesting is encouraged for the purposes of landscape irrigation systems, fire protection systems, flushing water closets and urinals, and other water handling systems to the extent such systems are consistent with federal, state, and city regulations.

8-530.8 LINEAR DEVELOPMENT PROJECTS

Linear development projects shall control postdevelopment stormwater runoff in accordance with a site-specific stormwater management plan or a comprehensive watershed stormwater management plan developed in accordance with these regulations.

8-530.9 STORMWATER MANAGEMENT IMPOUNDMENT STRUCTURES OR FACILITIES

- (a) Stormwater management wet ponds and extended detention ponds that are not covered by the Impounding Structure Regulations ([4VAC50-20](#)) shall, at a minimum, be engineered for structural integrity for the 100-year storm event.
- (b) Construction of stormwater management impoundment structures or facilities may occur in karst areas only after a study of the geology and hydrology of the area has been conducted to determine the presence or absence of karst features that may be impacted by stormwater runoff and BMP placement.
- (c) Discharge of stormwater runoff to a karst feature shall meet the water quality criteria set out in [9VAC25-870-63](#) and the water quantity criteria set out in [9VAC25-870-66](#). Permanent stormwater management impoundment structures or facilities shall only be constructed in karst features after completion of a geotechnical investigation that identifies any necessary modifications to the BMP to ensure its structural integrity and maintain its water quality and quantity efficiencies. The person responsible for the land-disturbing activity is encouraged to screen for known existence of heritage resources in the karst features. Any Class V Underground Injection Control Well registration statements for stormwater discharges to improved sinkholes shall be included in the SWPPP.

8-530.10 COMPREHENSIVE STORMWATER MANAGEMENT PLANS

- (a) They City may develop comprehensive stormwater management plans to be approved by the Department of Environmental Quality that meet the water quality objectives, quantity objectives, or both of this ordinance:
 - (1) Such plans shall ensure that offsite reductions equal to or greater than those that would be required on each contributing site are achieved within the same HUC or within another locally designated watershed. Pertaining to water quantity objectives, the plan may provide for implementation of a combination of channel improvement, stormwater detention, or other measures that are satisfactory to the City to prevent downstream erosion and flooding.
 - (2) If the land use assumptions upon which the plan was based change or if any other amendments are deemed necessary by the City, the City shall provide plan amendments to the Department of Environmental Quality for review and approval.
 - (3) During the plan's implementation, the City shall document nutrient reductions accredited to the BMPs specified in the plan.

- (4) State and federal agencies may develop comprehensive stormwater management plans, and may participate in locality-developed comprehensive stormwater management plans where practicable and permitted by the City.

8-530.11 EXCEPTIONS TO THE TECHNICAL REQUIREMENTS

- (a) The Director of Public Works and Utilities may grant exceptions to the technical requirements of Part II B or Part II C of the VSMP Regulations, provided that (i) the exception is the minimum necessary to afford relief, (ii) reasonable and appropriate conditions are imposed so that the intent of the Act, the Regulations, and this Ordinance are preserved, (iii) granting the exception will not confer any special privileges that are denied in other similar circumstances, and (iv) exception requests are not based upon conditions or circumstances that are self-imposed or self-created. Economic hardship alone is not sufficient reason to grant an exception from the requirements of this Ordinance.
- (1) Exceptions to the requirement that the land-disturbing activity obtain required VSMP authority permit shall not be given by the Director of Public Works and Utilities, nor shall the Director of Public Works and Utilities approve the use of a BMP not found on the Virginia Stormwater BMP Clearinghouse Website, or any other control measure duly approved by the Director of Public Works and Utilities.
- (2) Exceptions to requirements for phosphorus reductions shall not be allowed unless offsite options otherwise permitted pursuant to 9VAC25-870-69 have been considered and found not available.
- (b) Nothing in this section shall preclude an operator from constructing to a more stringent standard at their discretion.

(NEW) 8-540 TECHNICAL CRITERIA FOR REGULATED LAND DISTURBING ACTIVITIES FOR GRANDFATHERED PROJECTS

8-540.1 DEFINITIONS(9VAC25-870-93)

For the purposes of Section 8-540 only, the following words and terms have the following meanings unless the context clearly indicates otherwise:

"Adequate channel" means a channel that will convey the designated frequency storm event without overtopping the channel bank nor causing erosive damage to the channel bed or banks.

"Aquatic bench" means a 10-foot to 15-foot wide bench around the inside perimeter of a permanent pool that ranges in depth from zero to 12 inches. Vegetated with emergent plants, the bench augments pollutant removal, provides habitats, conceals trash and water level fluctuations, and enhances safety.

"Average land cover condition" means a measure of the average amount of impervious surfaces within a watershed, assumed to be 16% or a calculated watershed-specific value for the average land cover condition.

"Bioretention basin" means a water quality BMP engineered to filter the water quality volume (i) through an engineered planting bed consisting of a vegetated surface layer (vegetation, mulch, ground cover), planting soil, and sand bed and (ii) into the in-situ material.

"Bioretention filter" means a bioretention basin with the addition of a sand filter collector pipe system beneath the planting bed.

"Constructed wetlands" means areas intentionally designed and created to emulate the water quality improvement function of wetlands for the primary purpose of removing pollutants from stormwater.

"Development" means a tract of land developed or to be developed as a unit under single ownership or unified control which is to be used for any business or industrial purpose or is to contain three or more residential dwelling units.

"Grassed swale" means an earthen conveyance system which is broad and shallow with erosion resistant grasses and check dams, engineered to remove pollutants from stormwater runoff by filtration through grass and infiltration into the soil.

"Infiltration facility" means a stormwater management facility that temporarily impounds runoff and discharges it via infiltration through the surrounding soil. While an infiltration facility may also be equipped with an outlet structure to discharge impounded runoff, such discharge is normally reserved for overflow and other emergency conditions. Since an infiltration facility impounds runoff only temporarily, it is normally dry during nonrainfall periods. Infiltration basin, infiltration trench, infiltration dry well, and porous pavement shall be considered infiltration facilities.

"Nonpoint source pollutant runoff load" or "pollutant discharge" means the average amount of a particular pollutant measured in pounds per year, delivered in a diffuse manner by stormwater runoff.

"Planning area" means a designated portion of the parcel on which the land development project is located. Planning areas shall be established by delineation on a master plan. Once established, planning areas shall be applied consistently for all future projects.

"Sand filter" means a contained bed of sand that acts to filter the first flush of runoff. The runoff is then collected beneath the sand bed and conveyed to an adequate discharge point or infiltrated into the in-situ soils.

"Shallow marsh" means a zone within a stormwater extended detention basin that exists from the surface of the normal pool to a depth of six to 18 inches, and has a large surface area and, therefore, requires a reliable source of baseflow, groundwater supply, or a sizeable drainage area to maintain the desired water surface elevations to support emergent vegetation.

"Stormwater detention basin" or "detention basin" means a stormwater management facility that temporarily impounds runoff and discharges it through a hydraulic outlet structure to a downstream conveyance system. While a certain amount of outflow may also occur via infiltration through the surrounding soil, such amounts are negligible when compared to the outlet structure discharge rates and are, therefore, not considered in the facility's design. Since a detention facility impounds runoff only temporarily, it is normally dry during nonrainfall periods.

"Stormwater extended detention basin" or "extended detention basin" means a stormwater management facility that temporarily impounds runoff and discharges it through a hydraulic outlet structure over a specified period of time to a downstream conveyance system for the purpose of water quality enhancement or stream channel erosion control. While a certain amount of outflow may also occur via infiltration through the surrounding soil, such amounts are negligible when compared to the outlet structure discharge rates and, therefore, are not considered in the facility's design. Since an extended detention basin impounds runoff only temporarily, it is normally dry during nonrainfall periods.

"Stormwater extended detention basin-enhanced" or "extended detention basin-enhanced" means an extended detention basin modified to increase pollutant removal by providing a shallow marsh in the lower stage of the basin.

"Stormwater retention basin" or "retention basin" means a stormwater management facility that includes a permanent impoundment, or normal pool of water, for the purpose of enhancing water quality and, therefore, is normally wet even during nonrainfall periods. Storm runoff inflows may be temporarily stored above this permanent impoundment for the purpose of reducing flooding or stream channel erosion.

"Stormwater retention basin I" or "retention basin I" means a retention basin with the volume of the permanent pool equal to three times the water quality volume.

"Stormwater retention basin II" or "retention basin II" means a retention basin with the volume of the permanent pool equal to four times the water quality volume.

"Stormwater retention basin III" or "retention basin III" means a retention basin with the volume of the permanent pool equal to four times the water quality volume with the addition of an aquatic bench.

"Vegetated filter strip" means a densely vegetated section of land engineered to accept runoff as overland sheet flow from upstream development. It shall adopt any natural vegetated form, from grassy meadow to small forest. The vegetative cover facilitates pollutant removal through filtration, sediment deposition, infiltration, and absorption, and is dedicated for that purpose.

"Water quality volume" means the volume equal to the first 1/2 inch of runoff multiplied by the impervious surface of the land development project.

8-540.2 APPLICABILITY

This part specifies the technical criteria for regulated land-disturbing activities that are not subject to the technical criteria of Section 8-530 in accordance with the City of Manassas Code of Ordinance Chapter 58 Section 58-101.

8-540.3 GENERAL

- (a) Determination of flooding and channel erosion impacts to receiving streams due to land-disturbing activities shall be measured at each point of discharge from the land disturbance and such determination shall include any runoff from the balance of the watershed that also contributes to that point of discharge.
- (b) The specified design storms shall be defined as either a 24-hour storm using the rainfall distribution recommended by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) when using NRCS 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.
- (c) 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.
- (d) Construction of stormwater management facilities or modifications to channels shall comply with all applicable laws, regulations, and ordinances. Evidence of approval of all necessary permits shall be presented.
- (e) Impounding structures that are not covered by the Impounding Structure Regulations ([4VAC50-20](#)) shall be engineered for structural integrity during the 100-year storm event.
- (f) Predevelopment and postdevelopment runoff rates shall be verified by calculations that are consistent with good engineering practices.

- (g) Outflows from a stormwater management facility or stormwater conveyance system shall be discharged to an adequate channel.
- (h) Proposed residential, commercial, or industrial subdivisions shall apply these stormwater management criteria to the land disturbance as a whole. Individual lots in new subdivisions shall not be considered separate land-disturbing activities, but rather the entire subdivision shall be considered a single land development project. Hydrologic parameters shall reflect the ultimate land disturbance and shall be used in all engineering calculations.
- (i) All stormwater management facilities shall have an inspection and maintenance plan that identifies the owner and the responsible party for carrying out the inspection and maintenance plan.
- (j) Construction of stormwater management impoundment structures within a Federal Emergency Management Agency (FEMA) designated 100-year floodplain shall be avoided whenever 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.
- (k) Natural channel characteristics shall be preserved to the maximum extent practicable.
- (l) Land-disturbing activities shall comply with the Virginia Erosion and Sediment Control Law and attendant regulations.
- (m) Flood control and stormwater management facilities that drain or treat water from multiple development projects or from a significant portion of a watershed may be allowed in resource protection areas provided such facilities are allowed and constructed in accordance with the Stormwater Management Act and this chapter, and provided that (i) the local government has conclusively established that the location of the facility within the resource protection area is the optimum location; (ii) the size of the facility is the minimum necessary to provide necessary flood control, stormwater treatment, or both; (iii) the facility must be consistent with a comprehensive stormwater management plan developed and approved in accordance with [9VAC25-870-92](#) or with a VSMP that has been approved prior to July 1, 2012, by the board, or the Board of Conservation and Recreation; (iv) all applicable permits for construction in state or federal waters must be obtained from the appropriate state and federal agencies, such as the U.S. Army Corps of Engineers, the Department of Environmental Quality, and the Virginia Marine Resources Commission; (v) approval must be received from the local government prior to construction; and (vi) routine maintenance is allowed to be performed on such facilities to assure that they continue to function as designed. It is not the intent of this subdivision to allow a best management practice that collects and treats runoff from only an individual lot or some portion of the lot to be located within a resource protection area.

8-540.4 WATER QUALITY

- (a) Compliance with the water quality criteria may be achieved by applying the performance-based criteria or the technology-based criteria to either the site or a planning area.
- (b) Performance-based criteria. For land-disturbing activities, the calculated postdevelopment nonpoint source pollutant runoff load shall be compared to the calculated predevelopment load based upon the average land cover condition or the existing site condition. A BMP shall be located, designed, and maintained to achieve the target pollutant removal efficiencies specified in Table 1 of this section to effectively reduce the pollutant load to the required level based upon the following four applicable land development situations for which the performance criteria apply:

- (1) Situation 1 consists of land-disturbing activities where the existing percent impervious cover is less than or equal to the average land cover condition and the proposed improvements will create a total percent impervious cover that is less than the average land cover condition.
Requirement: No reduction in the after disturbance pollutant discharge is required.
 - (2) Situation 2 consists of land-disturbing activities where the existing percent impervious cover is less than or equal to the average land cover condition and the proposed improvements will create a total percent impervious cover that is greater than the average land cover condition.
Requirement: The pollutant discharge after disturbance shall not exceed the existing pollutant discharge based on the average land cover condition.
 - (3) Situation 3 consists of land-disturbing activities where the existing percent impervious cover is greater than the average land cover condition.
Requirement: The pollutant discharge after disturbance shall not exceed (i) the pollutant discharge based on existing conditions less 10% or (ii) the pollutant discharge based on the average land cover condition, whichever is greater.
 - (4) Situation 4 consists of land-disturbing activities where the existing percent impervious cover is served by an existing stormwater management BMP that addresses water quality.
Requirement: The pollutant discharge after disturbance shall not exceed the existing pollutant discharge based on the existing percent impervious cover while served by the existing BMP. The existing BMP shall be shown to have been designed and constructed in accordance with proper design standards and specifications, and to be in proper functioning condition.
- (c) Technology-based criteria. For land-disturbing activities, the postdeveloped stormwater runoff from the impervious cover shall be treated by an appropriate BMP as required by the postdeveloped condition percent impervious cover as specified in Table 1 of this section. The selected BMP shall be located, designed, and maintained to perform at the target pollutant removal efficiency specified in Table 1 or those found in [9VAC25-870-65](#). Design standards and specifications for the BMPs in Table 1 that meet the required target pollutant removal efficiency are available in the 1999 Virginia Stormwater Management Handbook. Other approved BMPs available on the Virginia Stormwater BMP Clearinghouse Website may also be utilized.

Table 1*

Water Quality BMP*	Target Phosphorus Removal Efficiency	Percent Impervious Cover
Vegetated filter strip	10%	16-21%
Grassed swale	15%	
Constructed wetlands	20%	22-37%
Extended detention (2 x WQ Vol)	35%	
Retention basin I (3 x WQ Vol)	40%	
Bioretention basin	50%	38-66%
Bioretention filter	50%	
Extended detention-enhanced	50%	
Retention basin II (4 x WQ Vol)	50%	
Infiltration (1 x WQ Vol)	50%	

Sand filter	65%	
Infiltration (2 x WQ Vol)	65%	67-100%
Retention basin III (4 x WQ Vol with aquatic bench)	65%	
<p>*Innovative or alternate BMPs not included in this table may be allowed at the discretion of Director of Public Works and Utilities or the Department of Environmental Quality. Innovative or alternate BMPs not included in this table that target appropriate nonpoint source pollution other than phosphorous may be allowed at the discretion of the Director of Public Works and Utilities or the Department of Environmental Quality.</p>		

8-540.5 STREAM CHANNEL EROSION

- (a) Properties and receiving waterways downstream of any land-disturbing activity shall be protected from erosion and damage due to changes in runoff rate of flow and hydrologic characteristics, including, but not limited to, changes in volume, velocity, frequency, duration, and peak flow rate of stormwater runoff in accordance with the minimum design standards set out in this section.
- (b) Land-disturbing activity shall comply with subdivision 19 of [9VAC25-840-40](#) of the Erosion and Sediment Control Regulations, promulgated pursuant to the Erosion and Sediment Control Law.
- (c) The City may determine that some watersheds or receiving stream systems require enhanced criteria in order to address the increased frequency of bankfull flow conditions (top of bank) brought on by land-disturbing activities or where more stringent requirements are necessary to address total maximum daily load requirements or to protect exceptional waters. Therefore, in lieu of the reduction of the two-year postdeveloped peak rate of runoff as required in subsection (b) of this section, the land development project being considered shall provide 24-hour extended detention of the runoff generated by the one-year, 24-hour duration storm.
- (d) In addition to subsections (b) and (c) of this section, the Manassas City Code of Ordinances may in accordance with § [62.1-44.15:33](#) of the Code of Virginia, or the board by state regulation may, adopt more stringent channel analysis criteria or design standards to ensure that the natural level of channel erosion, to the maximum extent practicable, will not increase due to the land-disturbing activities. These criteria may include, but are not limited to, the following:
 - (1) Criteria and procedures for channel analysis and classification.
 - (2) Procedures for channel data collection.
 - (3) Criteria and procedures for the determination of the magnitude and frequency of natural sediment transport loads.
 - (4) Criteria for the selection of proposed natural or manmade channel linings.

8-540.6 FLOODING

- (a) Downstream properties and waterways shall be protected from damages from localized flooding due to changes in runoff rate of flow and hydrologic characteristics, including, but not limited to, changes

in volume, velocity, frequency, duration, and peak flow rate of stormwater runoff in accordance with the minimum design standards set out in this section.

- (b) The 10-year postdeveloped peak rate of runoff from the development site shall not exceed the 10-year predeveloped peak rate of runoff.
- (c) Land-disturbing activity shall comply with the requirements of Article 8 of the City's DCSM.
- (d) Linear development projects shall not be required to control postdeveloped stormwater runoff for flooding, except in accordance with a watershed or regional stormwater management plan.

8-540.7 REGIONAL (WATERSHED-WIDE) STORMWATER MANAGEMENT PLANS

Water quality requirements and where allowed, water quantity requirements, may be achieved in accordance with Section 8-530.5 and 8-530.10.

Contact: Sung Jin Chung, EIT

Department: Public Works

Manager Approval: Patrick Moore, P.E.

Manager Title: Assistant Director of Public Works