

Bay-Wide Stormwater Runoff Rendezvous: Panel 3: Next Generation Stormwater Design Criteria



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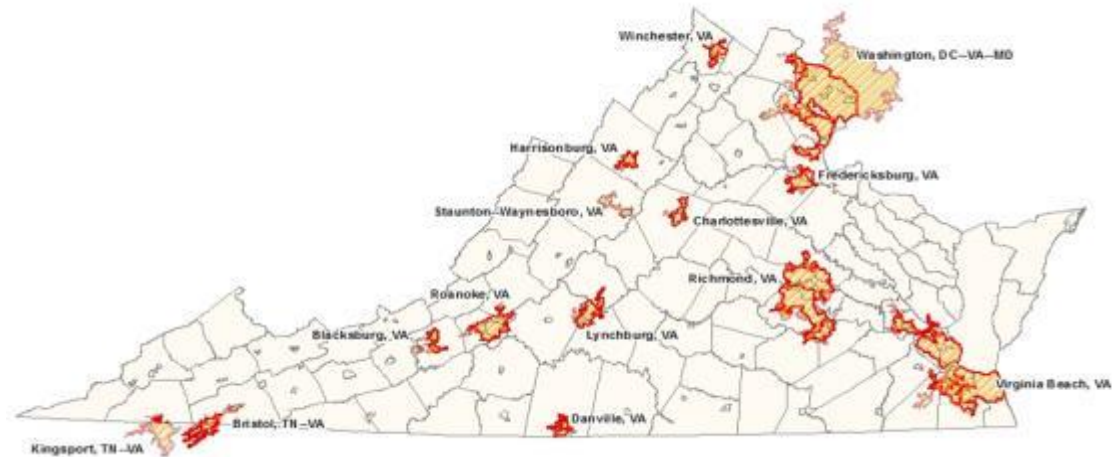


MS4 Program Manager

CO Maintenance Division

VDOT SWM and MS4 Program Scale

- VDOT has statewide stormwater management responsibilities that apply to the third most extensive roadway network in the nation, behind North Carolina and Texas
- The Commonwealth is divided into nine VDOT Districts with 15 MS4 Census Urban Areas
- VDOT currently is responsible for over 2400 separate stormwater BMPs or MTDs



Recommended Bioretention Specification Enhancements

- Emphasis on improved and effective pre-treatment options, especially to intercept fines and keep them from clogging the filter media
- Improved media mix specification that can be replicated more easily across regions with a reliable test method to ensure consistency of mix
- Emphasis on native herbaceous/pollinator vegetative cover on the media bed with simpler vegetative maintenance
- Improved specifications for performance enhancing additives – what to add in what proportions for what specific purposes
- Develop better training materials with a visual emphasis, especially regarding construction and maintenance – the two aspects that lead to most failures

Use Native Herbaceous Vegetation and Pollinators as Veg Cover

- Spec plantings of small trees and shrubs require continual attention and maintenance and typically suffer high frequencies of poor condition and mortality
- Specifying native herbaceous vegetation (mowable meadows) improves performance and eases maintenance.
- In rural settings, turfgrass can be used as an alternative vegetative cover – lower pollution removal, but easier to incorporate into routine mowing/maintenance
- Use small trees and shrubs only in urban areas, where appearance is more valued by public



Ignored, overgrown with non-spec/invasives



Planting native herbaceous cover in 2019



Result of native/pollinator plantings - 2021

Update Bioretention Filter Media Spec to Be Consistently Replicated, with Test Procedure to Ensure Compliance

- Problem: Standard media mix formula in State-approved design specs cannot be replicated in all regions of state due to lack of appropriate soils, therefore not consistently available
- Particularly troublesome for VDOT, which has responsibility for most roads across Virginia through three distinct physiographic regions and an Individual MS4 permit that covers 15 Census Urban Areas across the State.
- VDOT worked for several years with our Location and Design Division, Materials Division, media product vendors Luck Stone and Yard Works, Virginia Tech soil scientists, the Virginia Transportation Research Council staff at the University of Virginia, and our Department of Environmental Quality (DEQ) to develop a more reliable and available Bioretention media spec for use on VDOT projects across the state.

VDOT Special Provision for Bioretention Media Mix

- The VDOT Special Provision (SP) addresses the various difficulties vendors have had with meeting the Virginia DEQ Bioretention Media spec, as well as the challenges of material availability across the state
- The new SP added tolerances for the various media components, which provides reasonable flexibility for media producers while still ensuring product consistency and performance
- The team also developed and agreed upon a new Mesocosm testing method to ensure that vendors are providing consistent quality of media produced
- In updating the Bioretention Specification, direction should be provided about integrating various performance enhancements – e.g., when to use, how to integrate, maintenance considerations, etc.

PED Category	Total Studies	Field Studies	Lab Studies
Water Treatment Residuals (WTR)	H	L	M
Iron/Steel Wool	H	L	M
Biochar/Activated Carbon	M	L	H
Internal Water Storage (IWS)	H	M	M
Vegetation	M	L	M
H = High = 10 studies or more M = Medium = 5 to 9 studies L = Low = Less than 5 studies			

From *Final Report: Performance Enhancing Devices for Stormwater Management Practices*, CSN, April 2017

Additional Training Materials with Visual Emphasis

- It would be helpful to develop some training videos or Powerpoint presentations focused on the most troublesome aspects of making Bioretention work – Construction and Maintenance.
- Including visuals would be extremely helpful for contractors and staff unfamiliar with these practices or having continual difficulty employing proper techniques for building and caring for them
- For construction, it would be especially helpful to focus on techniques that avoid and prevent the potential for soil and media compaction and sediment entering the basin and clogging the media before vegetative cover is established.
- For maintenance, visuals would be especially helpful to focus on the “invisible” issues, such as clogging, underdrains, holding and/or ponding water, conducting “soil pit” tests, etc.