Maryland Stormwater Management, and MDE Technical Memos #2 and #4

Maryland-district of Columbia Utilities Association Environmental Conference

October 2018

Abstract

This presentation will examine Maryland's approach to "Low Impact Development" Stormwater Management: several localized, small facilities spread over a site rather than the historic approach of one large facility. After an overview of the approach, the presentation will focus on MDE Technical Memos #2 and #4, which provide clarification/detail on the use of stone as a pervious surface if designed to remain uncompacted.

Implementing MD SWM regulations can be challenging for Electrical Transmission site design projects. Uncompacted "site stone" is often viewed as an "impervious surface", resulting in oversized facilities with additional long-term O&M costs. MDE has released two technical memos that provide clarity on how to model uncompacted stone as an "alternative surface" or define site stone as a pervious surface if designed to remain uncompacted. When used appropriately, the memos provide a basis for more appropriately sizing a SWM facility to these project types.

Presentation Goals (1/2)

Review MD Stormwater Regulation

- Intent/Goals: What are we trying to accomplish, and why?
- Triggers for Implementation: When is SWM required?

Stone as an Impervious Surface

- Why has MDE's stance, historically, been that stone should be treated as an impervious surface?

MDE Technical Memos #2 and #4

- What do they say?

Presentation Goals (2/2)

How they may be applied

- Field road application
- Substation application

Forewarning: This is a discussion of State Regulation and Tech Memos from MDE

- Counties are charged w/ upholding/adhering-to State Regulations
- The Memo's do not specifically exempt our project types – they provide basis for a site design that reduces the required volume of structural SWM.
- Counties are looking to "cover their back" in an audit situation. Designs and design reports should clearly outline the approach to SWM compliance.

Maryland Stormwater Design Manual , Volumes I and II
Chapter 5: Environmental Site Design (ESD)

5.0.1 Background

"The primary goal of Maryland's stormwater management program is to maintain after development, as nearly as possible, the predevelopment runoff characteristics."

5.2 Addressing the Unified Sizing Criteria

"To accomplish the goal of maintaining predevelopment runoff characteristics, there must be a reasonable standard that is easily recognized, reproducible, and applied without opportunity for misrepresentation. The simplest and most effective solution is to eliminate the need for evaluating predevelopment conditions on a site-by-site basis and apply the same standard to all sites." … "To best maintain predevelopment runoff characteristics, the target for ESD implementation should be "woods in good condition". "

Maryland Stormwater Design Manual , Volumes I and II
Chapter 5: Environmental Site Design (ESD)

5.0.3 Environmental Site Design: Impacts of Imperviousness

"Documentation such as the Impacts of Impervious Cover on Aquatic Systems (Center for Watershed Protection, 2003) and other studies of Eastern Piedmont and Coastal Plain streams in Maryland (Morgan and Cushman, 2005) and headwater streams in Montgomery County (Moore and Palmer, 2005) all indicate that stream biodiversity decreases as impervious cover increases. There is no simple formula, rule, or threshold for determining how much impervious cover may be sustained in a given watershed. Generally, stream quality and watershed health diminish when impervious cover exceeds 10% and become severely degraded beyond 25% (Center for Watershed Protection, 2003). Results from the Maryland Biological Stream Survey (MBSS) indicated that in surveyed streams, health was never good when watershed imperviousness exceeded 15%, (Boward, 1999). These studies establish a fundamental connection between impervious cover and watershed impairment."

Stone as an Impervious Surface

Development of a 20,000sq.ft. “meadow” to a stoned yard

- Conversion includes > 5,000 of disturbance = ESC plan requirement
- Let’s say, for this presentation, that MDE doesn’t require SWM, or only for areas designated as vehicular paths.

5yrs pass. The property changes ownership. The new owner proposed to improve the stoned surface to asphalt.

- Improvement doesn’t generate disturbed grounds. No ESC review requirement, therefore no trigger for a SWM review.

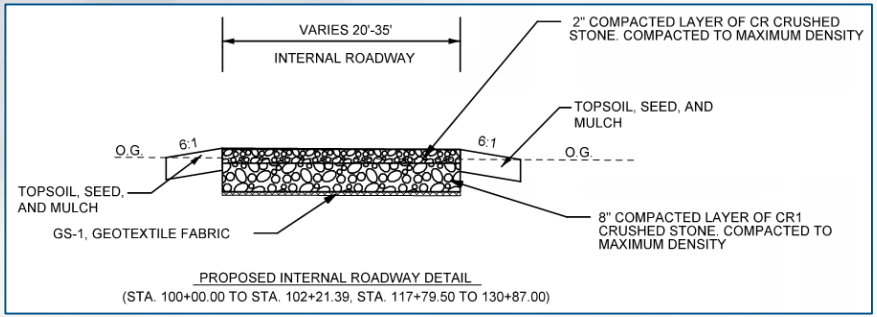
When should SWM have been implemented?

MDE Technical Memorandum #2

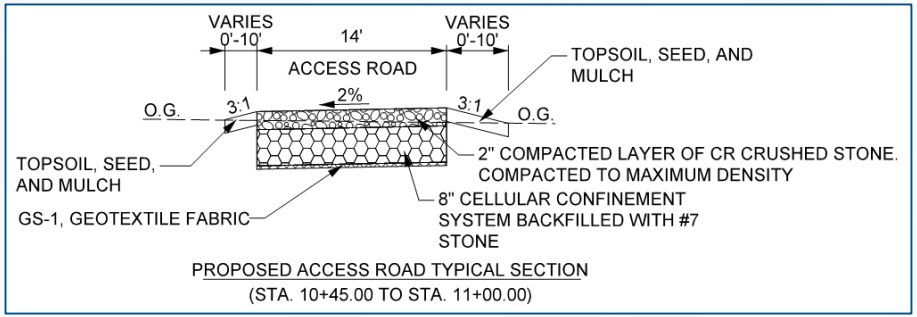
Technical Memo #2 (Sept, 2016)

- Defines an “alternative surface” as “*impervious but, in turn, also considered the surface as being treated*”
- May require a SWM easement

Replacement of this



With this



MDE Technical Memorandums: Overview

Technical Memo #4 (June, 2017)

- Primary intent is to clarify terms “redevelopment”, “reconstruction”, “new development” and “maintenance”
- Also clarifies MDE’s position on stone as an impervious or pervious surface, and adds definition on how to treat or design stone to remain uncompacted.

MDE Technical Memorandum #4

Broader applicability

Same concept as #2

Gravel Surfaces

The Plan Review Division's position is that gravel is only considered impervious when it is compacted. Gravel surfaces used for vehicular traffic are considered impervious because the vehicles compact the surface. As the surface compacts it will have the same hydrologic characteristics as a paved surface. Gravel used with a cellular confinement system should not compact if it is properly designed/installed according to the 2000 Maryland Stormwater Design Manual and is considered a pervious or alternative surface. Gravel that is not used for vehicular purposes is considered pervious, for example in stormwater management facilities, on pedestrian walkways, or as pads around electrical utilities. These gravel surfaces should be called out on the plans as not being compacted during installation.

Ok – but how do we model it?

It's also recommended to note the subgrade not be compacted

MDE Technical Memorandum #4

How pervious is stone? Or what RCN should be assigned?

- There may be multiple approaches
- This approach will vary with depth

Chapter 5 of the MD SWM manual provides tables to assign a value

- Table 5.5 “Effective RCNs for Permeable Pavements

Table 5.5 Effective RCNs for Permeable Pavements

Subbase	Hydrologic Soil Group			
	A	B	C	D
6"	76[1]	84[1]	93[2]	—
9"	62[3]	65[3]	77[3]	—
12"	40	55	70	—

[1] Design shall include 1 - 2" min. overdrain (inv. 2" below pavement base) per 750 s.f. of pavement area.
[2] Design shall include 1 - 2" min. overdrain (inv. 2" below pavement base) per 600 s.f. of pavement area
[3] Design shall include 1 - 3" min. overdrain (inv. 3" below pavement base) and a ½" underdrain at subbase invert.

Hydrologic Soil Group B										
%I	RCN*	P_E = 1"	1.2"	1.4"	1.6"	1.8"	2.0"	2.2"	2.4"	2.6"
0%	61									
5%	63									
10%	65									
15%	67	55								
20%	68	60	55	55						
25%	70	64	61	58						
30%	72	65	62	59	55					
35%	74	66	63	60	56					
40%	75	66	63	60	56					
45%	78	68	66	62	58					
50%	80	70	67	64	60					
55%	81	71	68	65	61	55				
60%	83	73	70	67	63	58				
65%	85	75	72	69	65	60	55			
70%	87	77	74	71	67	62	57			
75%	89	79	76	73	69	65	59			
80%	91	81	78	75	71	66	61			
85%	92	82	79	76	72	67	62	55		
90%	94	84	81	78	74	70	65	59	55	
95%	96	87	84	81	77	73	69	63	57	
100%	98	89	86	83	80	76	72	66	59	55

Cp_v Addressed (RCN = Woods in Good Condition)

RCN Applied to Cp_v Calculations

Recap

Stone has historically been viewed as an impervious surface

Counties are mandated to uphold the State Regulation

- They need to cover themselves in the event of an audit
- Design and Reports should clearly layout the approach

MDE Technical Memos #2 and #4 provide avenues to reduce the required volume of Stormwater required for treatment

- Elimination, or reduction is size, of assets requiring Maintenance can reduce yearly O&M spend.

When used <u>appropriately</u>, the memos provide a <u>basis</u> for more appropriately sizing a SWM facility to these project types.

Other topics glanced on in today's presentation

Keeping O&M Costs down

- Less specific or complicated planting plans
- Providing "easy" access

"redevelopment", "reconstruction", "new development" and "maintenance"

Other SWM issues: construction and maintenance

- Proper protection of features during construction to avoid long term issues/failure
- Construction SWM issues associated with ESD Regulation
  - Where do I put my sediment traps?
- Routine assessments and maintenance – the long term benefits
  - Maintenance and Inspection Agreements?

Thank You

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