

Developing the Next Generation Stormwater Design Criteria

A DESIGNER'S WISH LIST

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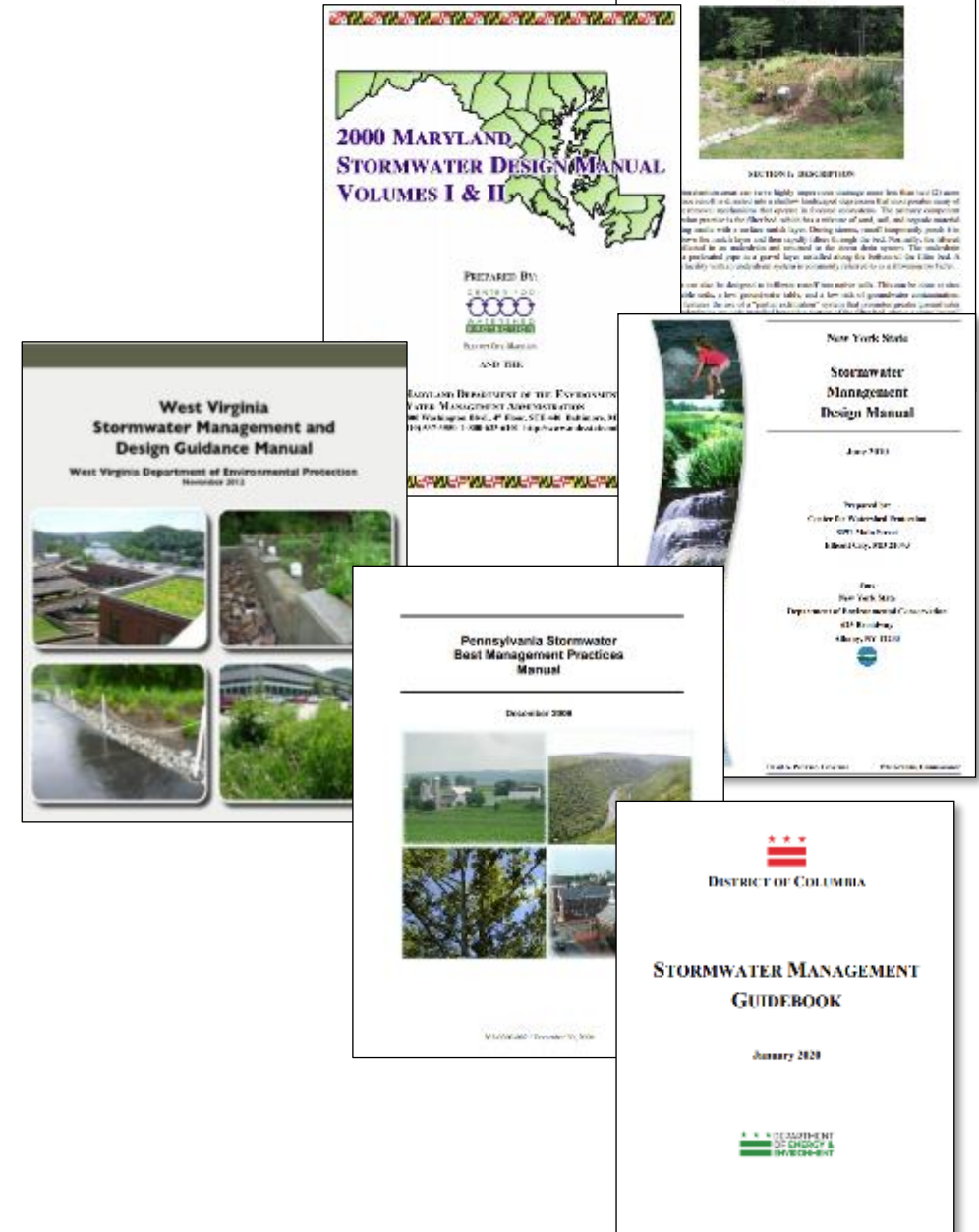
CityScape Engineering LLC

Baltimore, MD



Designer's Wish List

- Review of Sizing Guidelines
- Additional Design Recommendations
 - Planting Trees in Bioretention
 - BMPs as Site Amenities
 - Incorporation of Quantity Control
- Construction Performance Metrics



Sizing Guidelines

- Bioretention Area Sizing Example:
 - 20,000 sf drainage area, 80% impervious
 - Rainfall depth = 1.0 inch, target $WQ_v/T_v = 1,290$ cf
 - Bioretention Design: 6" ponding, 24" media, 12" gravel
- Required Filter Area ranges from **600 sf to 1150 sf +**
 - Different State storage/sizing methods (Darcy's law, 75%-100% storage, surface ponding requirements)
 - Dependent of type of media used (MD, Darcy's Law)
 - Volumetric vs. Pollutant removal performance targets

Updated Sizing Guidelines

- Should we review bay-wide BMP sizing criteria?
 - Sizing guidelines are from 2000-2013
 - Is there recent research to better inform sizing/performance outcomes?
 - GOAL: Simplified equations to best represent complex processes
- BSM Media Ksat values (MD)
 - Standard BSM $k = 0.5$
 - SHA media $k = 2.0$
 - Option for $k=1.0$?
 - Slower drainage
 - Expanded plant palette



Additional Design Recommendations

- How can we better mimic woods in good condition?
 - Hydrology
 - Biodiversity
 - Soil health and composition
 - Benefits of trees
- How to best incorporate trees into bioretention areas
 - Underdrain placement requirements
 - Soil media depth/composition/placement
 - ***Filter Media for Tree Planting Areas.*** A more organic filter media is recommended within the planting holes for trees, with a ratio of 50% sand, 30% topsoil and 20% acceptable leaf compost.
 - Use of geotextiles along sides?
 - Bare root versus root ball install



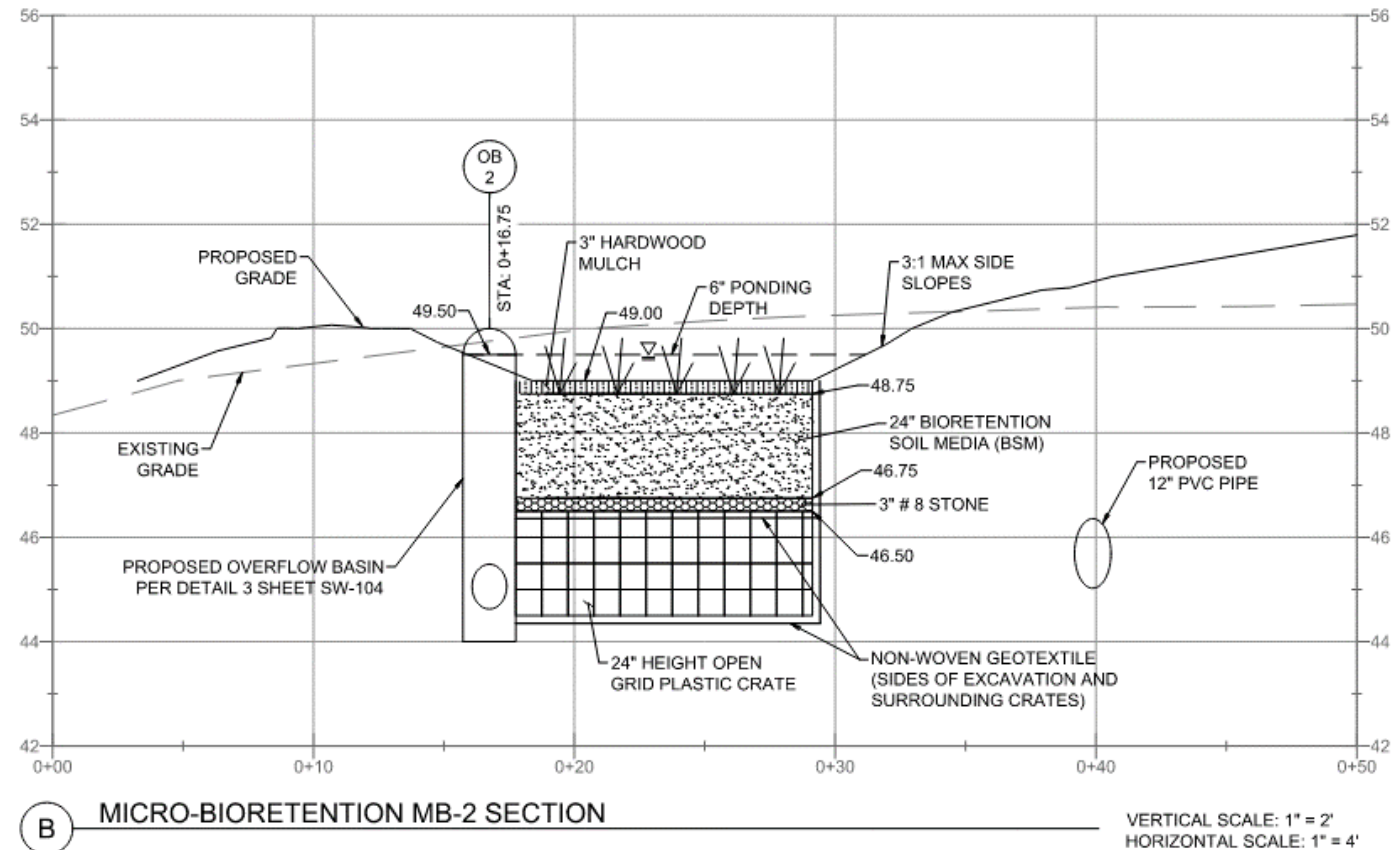
Additional Design Recommendations

- BMPs increasingly used as site amenities
- Key considerations to expand use:
 - Multi-modal safety
 - Setbacks
 - Vertical drops
 - Step out zones
 - Utility design considerations
- Standard details
 - Edge treatments
 - Inflow/curb cut design



Additional Design Recommendations

- Incorporation of Quantity Control
 - Design guidelines for providing storage within BMP footprint
 - Incentives for voluntary quantity management?



Layers and Cross-Section of a Bio-Retention System



Construction Performance Metrics

- Proof of Performance
 - During Construction- Bucket test
 - Post-Construction - Soil media drainage test after large rainfall event

