

# Overview of Proposed NJDEP Stormwater Management Rule



## NJSME Continuing Education

June 5, 2019



# Stormwater Management Goals

- Mimic existing hydrology
- Reduce proposed peak runoff rates
- Reduce increase in runoff volume
- Promote recharge
- Support stream baseflow
- Mitigate water quality (TSS, nutrients, thermal, etc.)

# Inherent Flaws in Current 7:8 LID Stds.

- Non-structural “strategies” are goals, not standards
- Inherently difficult to objectively assess and measure
- Result has been inconsistent and ineffective

# OBJECTIVE Alternative? Green Infrastructure



GREEN INFRASTRUCTURE  
GUIDANCE MANUAL  
FOR NEW JERSEY



# Proposed Green Infrastructure Std.

- GI BMPs must be used to satisfy recharge, quality, and quantity standards
- 3 Tables identifying the performance of each BMP in meeting the 3 standards
  - Water Quality and Recharge – BMPs in Table 5-1
  - Quantity – BMPs in Tables 5-1 & 5-2
  - If Waiver/Variance granted, Table 5-3 BMPs can also be used for that specific drainage area

# Proposed Tiered GI Approach

## 1. Local, Decentralized Green Infrastructure

- First line of treatment
- Local recharge

## 2. End of pipe Green Infrastructure

- Secondary line of treatment
- Design storm attenuation

# Table 5-1 GI

- **Decentralized**
- **Small** scale or limited contributory drainage area (1 – 2.5 acres)
- Required for Water Quality and Groundwater Recharge
- Optional for Water Quantity



# Table 5-1 – Rain Garden





# Table 5-1 – Small Bioretention



# Table 5-1 – Parking Bioretention





# Table 5-1 – Planters/Bumpouts

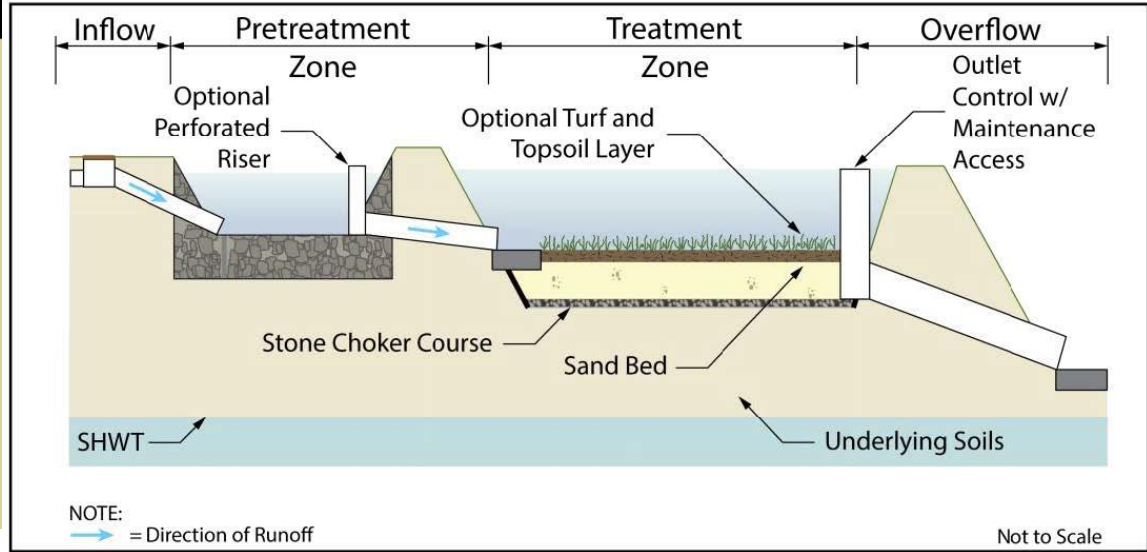
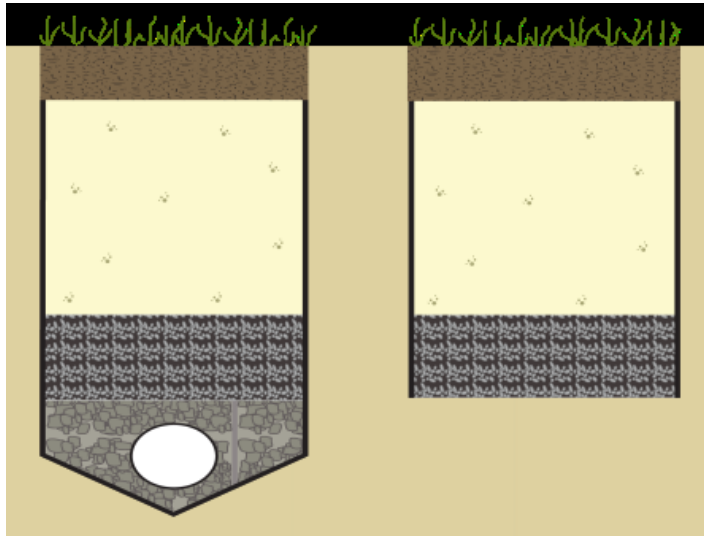


Source: Philadelphia Water Dept GSI Tools



Portland, OR - Source: Philadelphia Water Dept GSI Tools

# Table 5-1 – Sand Filter



Source: NJ BMP Manual Chapter 9.9

# Table 5-1 – Roadside





# Table 5-1 – Porous Pavement



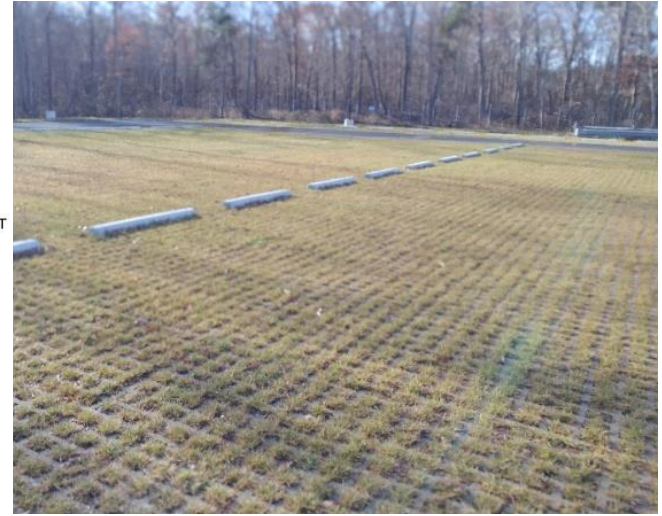
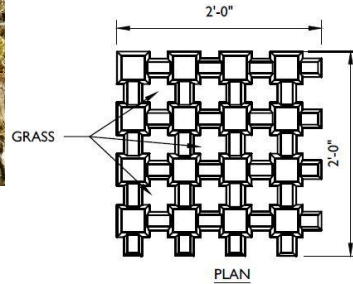
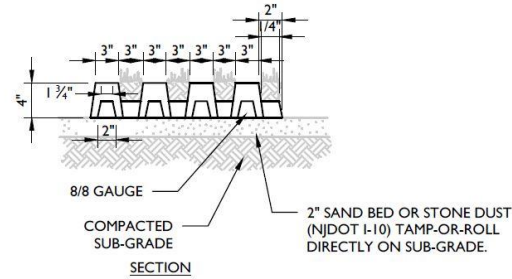
TYPICAL POROUS ASPHALT SUBGRADE: CROSS-SECTION



Source: Rutgers Green Infrastructure Guidance Manual



# Table 5-1 – Grass Pavers



# Table 5-1 – Green Roofs



# Table 5-1 – Roof Cistern/Recharge



Source: Philadelphia Water Dept GSI News Stream: Mt. Airy Rain Barrels



# Table 5-1 – Vegetative Filter Strips



*Source: New Jersey Developers' Green Infrastructure Guide Pg. 17*

# Artificial Turf ??

- No fertilizer
- No pesticides
- Excellent infiltration





# Forested Bioretention??





# Table 5-2 GI

- **Larger** scale
- Unlimited contributory drainage area
- Quantity if Tier 1 not enough
- Seeking to permit for Water Quality when recharge not required
- Not for Recharge

# Table 5-2 – Infiltration Basin



# Table 5-2 – Subsurface Infiltration



source: [www.stormtrap.com](http://www.stormtrap.com)



source: <http://www.sco-llc.com>



# Table 5-2 – Constructed Wetlands



# Table 5-2 – Large Bioretention





# Table 5-2 – Wet Ponds





# Table 5-3 – Waiver/Variance

Best Management Practice	Quality TSS removal rate (percent)	Quantity	Recharge	Minimum separation from seasonal high water table (feet)
Blue Roofs	0	Yes	No	N/A
Extended Detention Basins	40-60	Yes	No	1
Manufactured Treatment Device	50 or 80	No	No	Dependent upon the device
Sand Filters	80	Yes	No	1
Subsurface Gravel Wetlands	90	No	No	1
Wet ponds	50-90	Yes	No	N/A

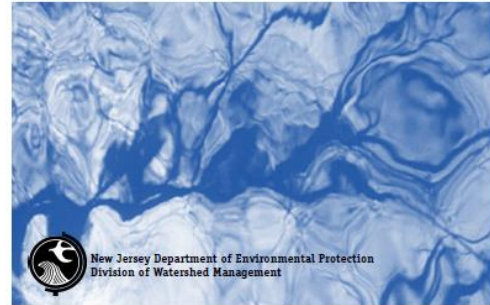
Table 5-3 BMPs may only be used with mitigation

# Simultaneous Changes to BMP Manual

- Chapters 5 & 9 to be updated
- Stakeholders working on revised BMPs
- Stakeholders working on revised App E



New Jersey  
**Stormwater**  
Best Management Practices Manual



# All GI SWM Will “Count”

- Recognize ALL types of GI stormwater management strategies contribute toward LID
- Allow routing with the design infiltration rate
  - BMP App. E design rate (i.e. FOS = 2)
  - Check groundwater mounding
- Non-infiltration - Apply reduced curve number method\* for ALL design storm events including 100 year \*(MD, McCuen, R. MDE, 1983)

# “Counting” Infiltration

- Pretreatment Recommended/Req'd – 10% of water quality vol or any recognized BMP
- 2D or 3D modeling (In the future)
- Update Appendix E requirements
  - Add/Remove tests
  - Provide more guidance on tests
  - Add testing guidelines for multiple tier 1 BMPs

# Reduced Curve Number Method

(McCuen R., MDE, 1983)

$$CN^* = \frac{200}{|(P + 2Q + 2) - \sqrt{5PQ + 4Q^2}|}$$

$$Q_P = \frac{(P - 0.2S)^2}{(P + 0.8S)} \quad (\text{Equation 2.3, TR-55, USDA NRCS 1986})$$

$$S = (1000/RCN) - 10 \quad (\text{Equation 2-4, TR-55})$$

# Reduced Curve Number Method

- Allows GI to be consistently modeled
  - $CN^*$  = Adjusted curve number
  - $P$  = Rainfall depth in design storm
  - $Q = Q_p - Q_{GI}$
  - $Q_p$  = Post development runoff depth
  - $Q_{GI}$  = Equivalent runoff depth stored in GI (GI volume/tributary area)



# Approach

- Small GI will be less sensitive to GW mounding, therefore get most credit for infiltration
- Small GI will have BIGGEST impact
- Seeking NJDEP adoption of forested retention areas to incentivize minimizing LOD

# Approach

- Should be part of concept plan process
- Involve ALL disciplines from the beginning
  - Planner
  - Civil Engineer
  - Geotechnical Engineer
  - Landscape Architect

# Approach

- Map soils as part of concept planning
- Use every “left over” area in layout as a local BMP
- Consider sun exposures in siting BMPs
- Consider viewsheds and multi-function BMPs (e.g. outdoor seating overlooking or intertwined with a BMP)

# Municipalities will have 1 Year

- Municipalities are given up to one year to modify their stormwater control ordinances
  - Part IV.A.3.e. NJPDES Tier A municipal separate storm sewer system (MS4) permit
  - Part IV.A.3.d. NJPDES Tier B MS4 permit



# Applicants will have 1 Year

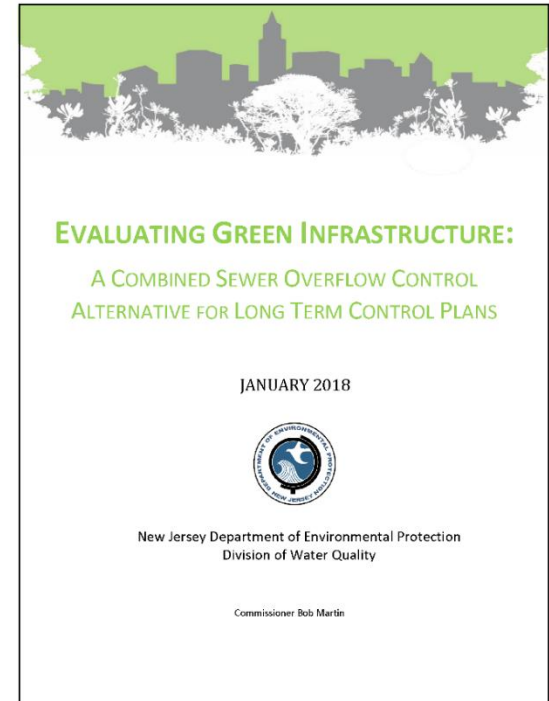
- Proposed rule will require a change in the way stormwater systems are designed
- 1 year operative date delay and grandfathering provision will allow projects already substantially designed with existing rules to finish approval process thereby avoiding costly redesign

# Engineers will have 1 Year

- NJDEP will need to provide training to both design engineers and review engineers
- 565 municipalities and many more design engineers, the number of individuals requiring training likely exceeds 1,000
- One year will give NJDEP & others the required time to offer training to engineers

# NJDEP CSO GI Guidance

- GI not just for new development
- CSOs will need to implement as well
- [https://www.nj.gov/dep/dwq/pdf/CSO\\_Guidance\\_Evaluating\\_Green\\_Infrastructure\\_A\\_CSO\\_Control\\_Alternative\\_for\\_LTCPs.pdf](https://www.nj.gov/dep/dwq/pdf/CSO_Guidance_Evaluating_Green_Infrastructure_A_CSO_Control_Alternative_for_LTCPs.pdf)



# For Further Information...



[http://water.rutgers.edu/Green\\_Infrastructure\\_Guidance\\_Manual/2015-03-31\\_Manual.compressed.pdf](http://water.rutgers.edu/Green_Infrastructure_Guidance_Manual/2015-03-31_Manual.compressed.pdf)



<https://developersguide.njfuture.org/wp-content/uploads/2017/10/Developers-Green-Infrastructure-Guide-Aug-2017-web.pdf>

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