Developing a Standard & Specification for Biosoil Media: A Delaware Perspective

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Background

- Conservation Design Manual released in 1997
- Goals
  - Maximize recharge
  - Minimize runoff
  - Reduced reliance on structural SWM

Bioretention

- Hydrologic Cycle
- Mimic Natural Hydrologic Cycle
  = Quantity Mgt.

Bioretention – “Past”

- Original guidelines from PG County, MD
  - Sizing criteria
  - Materials
  - Plant selection

Biological Processes in Plant/Soil Complex

= Quality Mgt.

Many Successful Installations
Some Not-So-Successful Installations!

- Day 1 – No Problem
- Day 4 – Problem?
- Day 10 – PROBLEM!

“Anecdotal Forensics”

- Approx. 25% failure rate – Unacceptable
- 4 Issues Identified
  - Design
  - Construction
  - Materials
  - Maintenance

Material Issues

Bioretention – “Present”

- “Green Technology”
  - Bioswales
  - Filter strips
  - Terraces
  - Riparian Buffers
  - Bioretention

Standards & Specifications

- Design guidelines
- Typical detail
- Material specifications
- Plant lists
- Construction methods
- Maintenance guidelines

Material Specifications

Biosoil Media

- Equal parts by volume
  - Triple-shredded hardwood mulch
  - Sphagnum peat
  - Concrete sand
- Drum mixed batch
- DNREC approved supplier
Mulch Specifications

- Free of dirt & debris
- Triple shredded hardwood
- Single shredded may be used as top dressing

Peat Moss Specifications

- Virgin sphagnum peat moss
- Typically must be imported from Canada

Sand Specifications

- ASTM C-33 concrete sand
- Clean, washed
- Fineness modulus of 2.75 or greater

Mixing Specifications

- Batch mixed
- Use of appropriate mixing equipment
- Trommel screen

What about QA/QC?

Biosoil Media Conformance Testing Protocol

Step 1 – Visual Inspection

- Typically two 5 gal. samples
- Visually checked to see if sample generally consists of equal parts sand, peat moss & triple-shredded hardwood mulch
Biosoil Media Conformance Testing Protocol

Step 2 – Sieve Analysis

- ASTM D 422
- Organic fraction assumed retained above No. 30 sieve
- Fineness modulus determined for fraction passing No. 30 sieve
- ASTM D 5856 – “Constant Head” Method
- Sample + geotextile + aggregate placed in accordance with DNREC detail
- Measure time required to filtrate 1 liter water through sample (4X)
- Avg. rate > 5”/hr

Step 3 – Hydraulic Conductivity

Questions?

http://www.swc.dnrec.delaware.gov/SedimentStormwater.htm