Sand Seepage Wetland Design as a Stormwater BMP

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URBAN HYDROGRAPH

A - Pre-Urbanized Condition

B - Post Urbanized Condition

C - Post Urbanized with Stormwater Management

Work = channel erosion
Our Broken Stream Systems Function as Major Sources & Conveyors of Sediment & Nutrients

Zone of Erosion/Transport

Zone of Deposition

Why a Universal Restoration Credit Doesn't Make Sense (CWP Literature Review)

Hyporheic Zone Treatment
Stream Functions Pyramid

A Guide for Assessing & Restoring Stream Functions

1. HYDROLOGY » Transport of water from the watershed to the channel

2. HYDRAULIC » Transport of water in the channel, on the floodplain, and through sediments

3. GEOMORPHOLOGY » Transport of wood and sediment to create diverse bed forms and dynamic equilibrium

4. PHYSIOCHEMICAL » Temperature and oxygen regulation; processing of organic matter and nutrients

5. BIOLOGY » Biodiversity and the life histories of aquatic and riparian life
Sand seepage bed
Sized to treat first 1.5-in precipitation
Cumulative Distribution Plot
Event Rainfall Volume - 4 Hour Minimum Interevent Time
Philadelphia International Airport (Hourly Data)
1948 - 2011

1.5 in event

Source: PWD
Number of runoff responses in the perennial downstream channel

Source: Filosa 2013
Hydro-Modification

Source: Palmer and Filoso, 2009
Hydrographs during individual storms
WILELINOR

Discharge (L/s)

0.46 in
0.90 in
0.43 in
1.12 in
0.57 in

upstream
downstream

Source: Solange Filoso, University of Maryland
Figure 32. Percent load reduction of TN in the restored reach of Howard’s Branch during five different storm events.

Figure 34. Percent load reduction of TSS in the restored reach of Howard’s Branch during five different storm events.
Reference System? Beaver Dam Complex
Questions?