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Toronto and Region Conservation for The Living City

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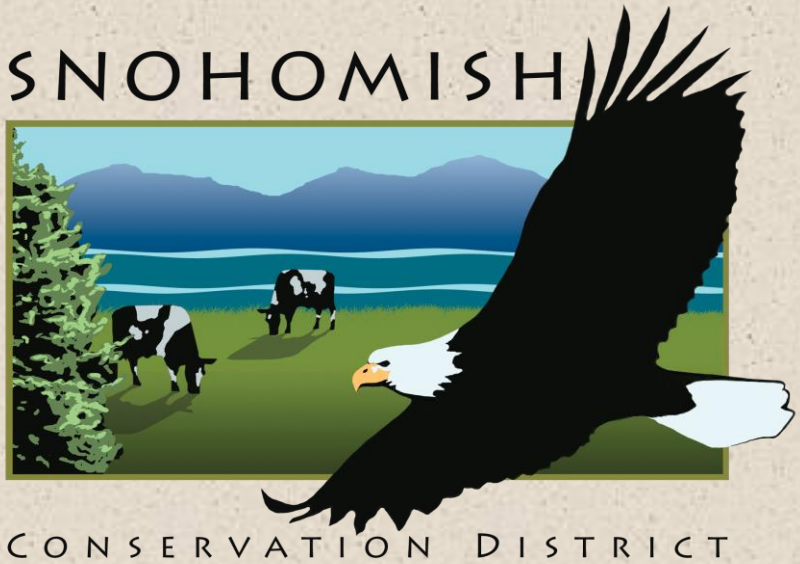
Stormwater BMP's for Difficult Sites and Soils

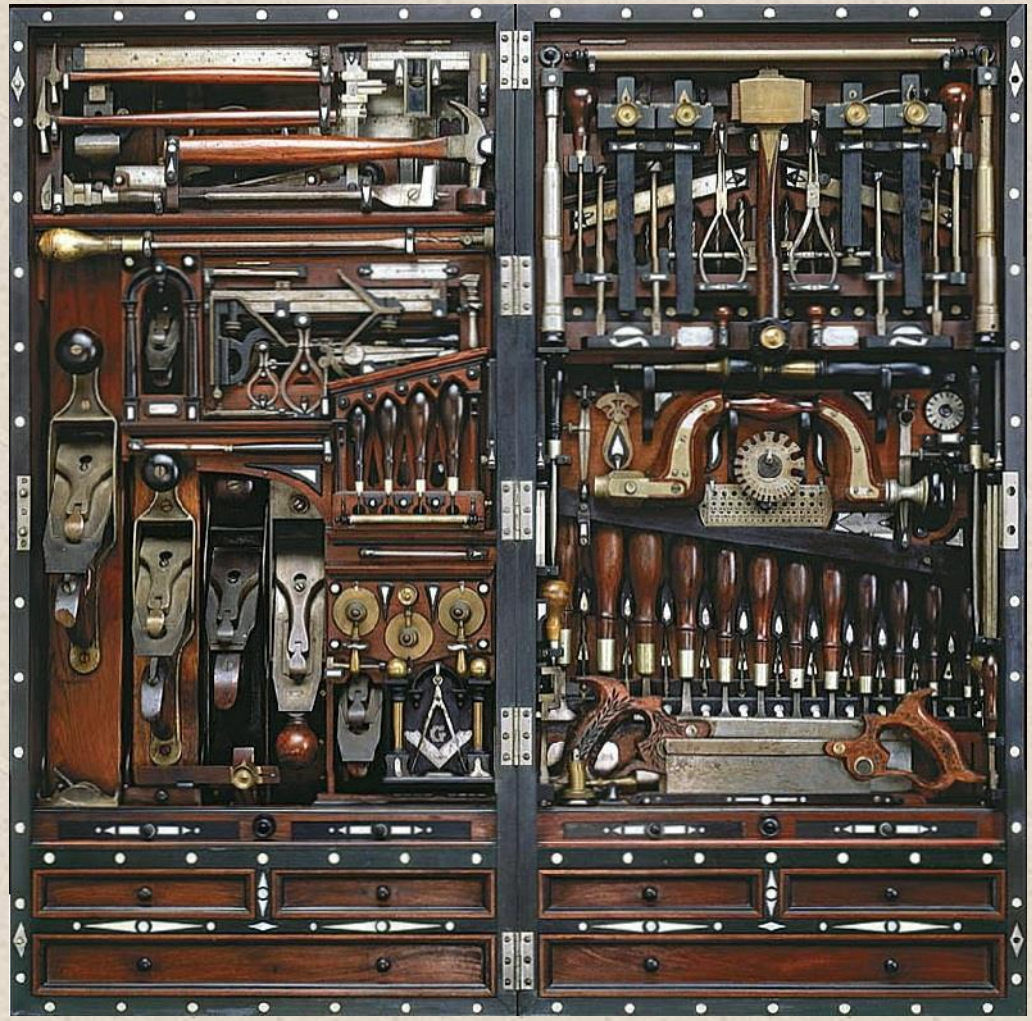


Derek Hann P.E.
Design Engineer
(425) 335-5634 x119
derek@snohomishcd.org

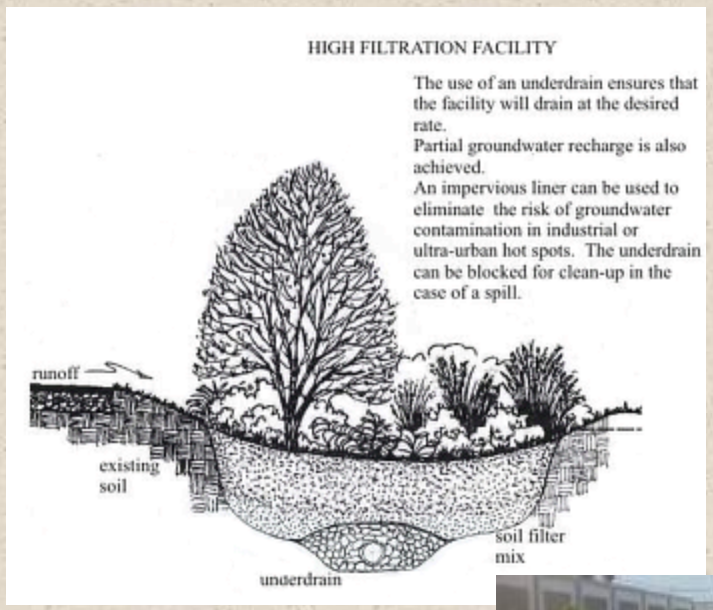
Zsofia Pasztor
LID Consultant & Designer
(425) 210-5541
zs.pasztor2011@gmail.com

The Toolbox

- Vertical Underdrains
- Rain Arbors
- Semi-permeable Compost berms
- Compost Socks
- Rain Garden Boxes



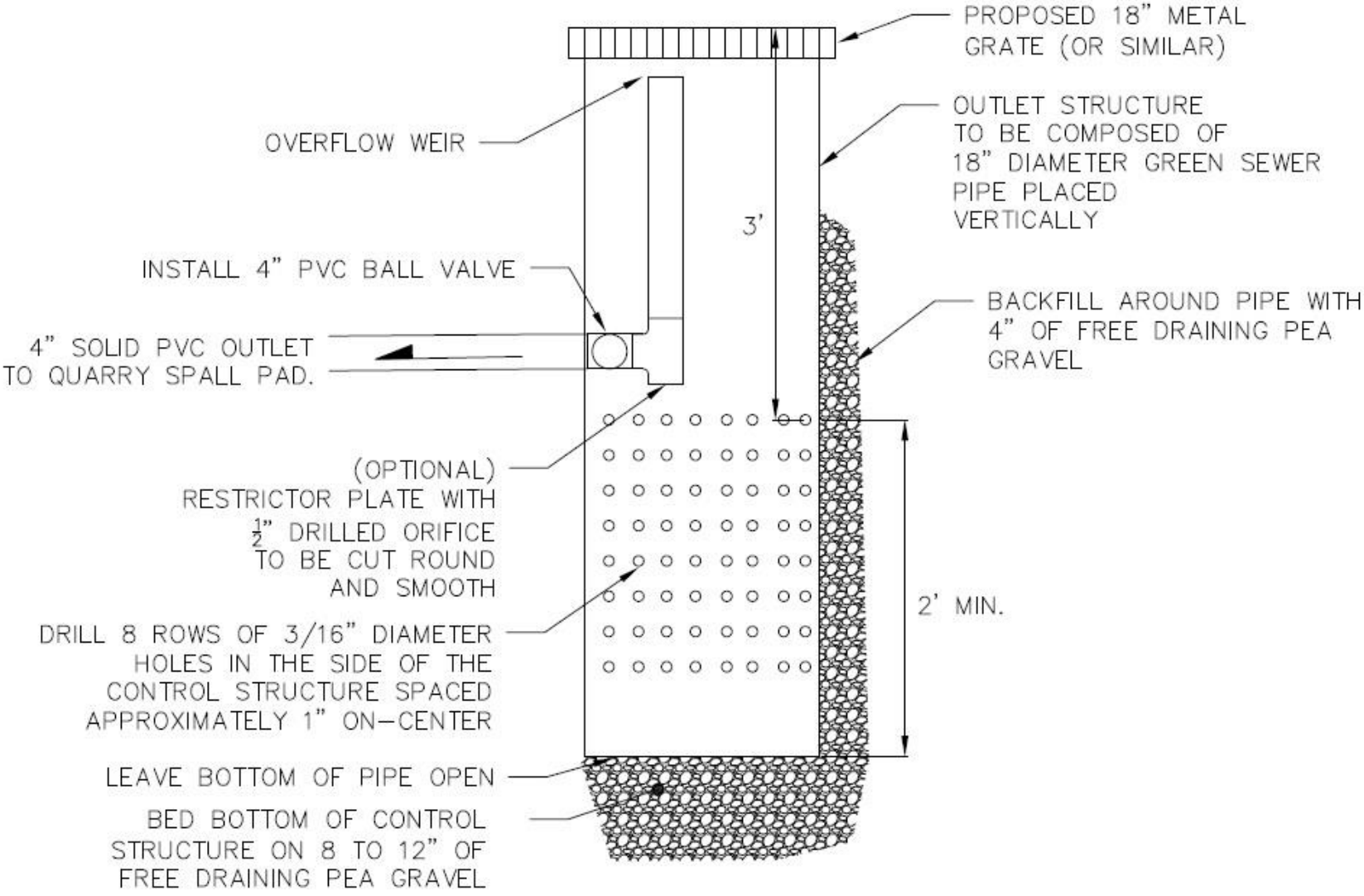
Traditional Underdrains



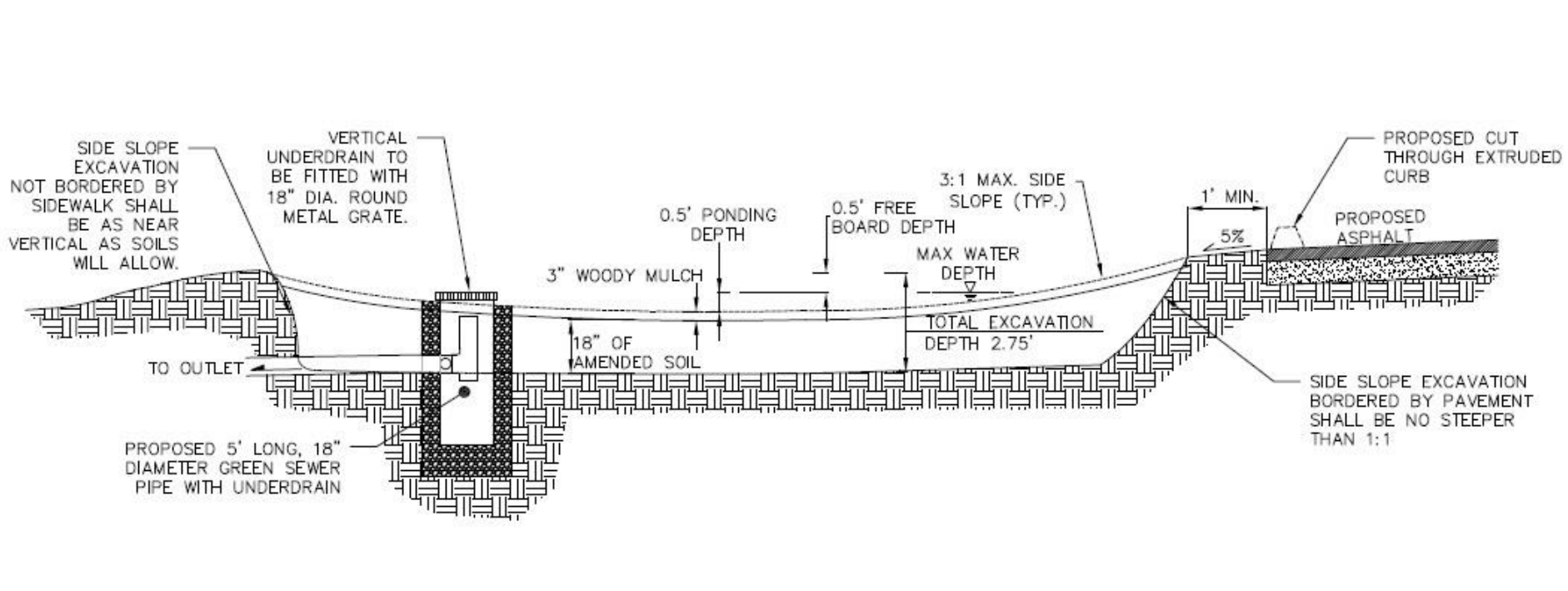
The Problem with Underdrains

- Leaching
- Low residence time
- Costly
  ~Double cost of rain garden
- Adds ~2’ of required depth to rain garden
- Very difficult to clean
- Materials are difficult to find
- Complicated, not DIY friendly

Vertical Underdrain



Vertical Underdrain

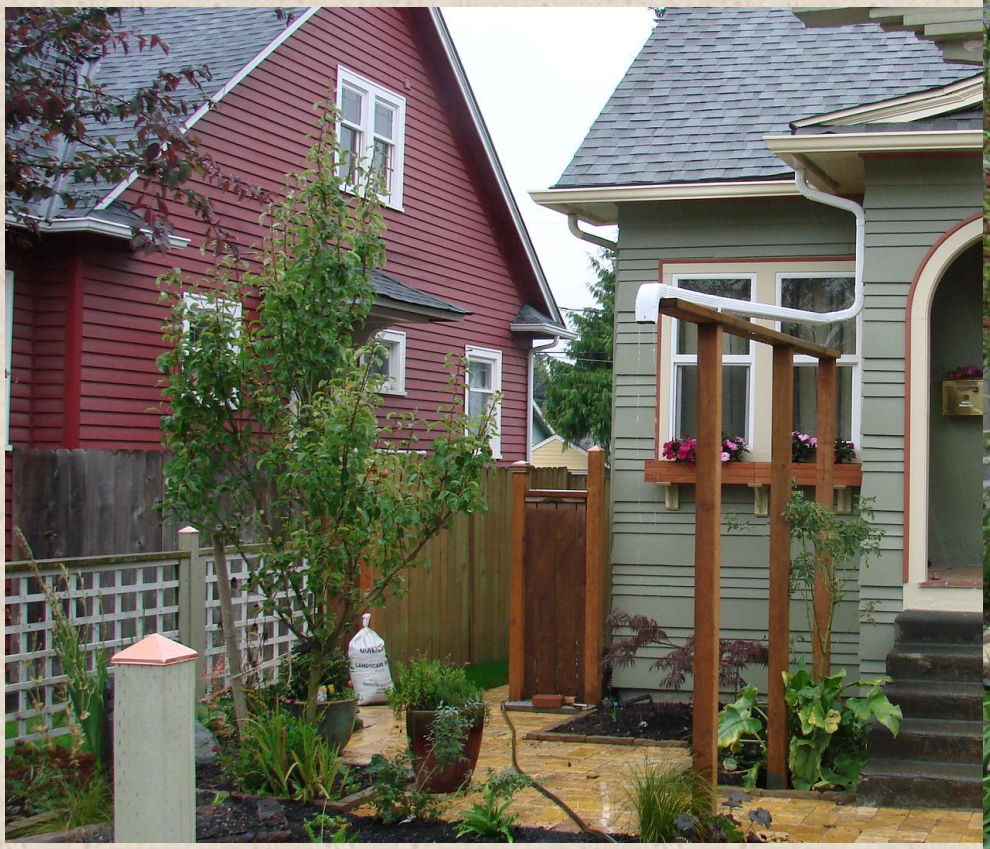


Vertical Underdrain

- Increased residence time
- Control of release rate
- Relatively Inexpensive
  - $300 to $500
- Saturated anaerobic zone
- Control of outlet elevation
- Easy to clean
- Easy to install

Vertical Underdrain

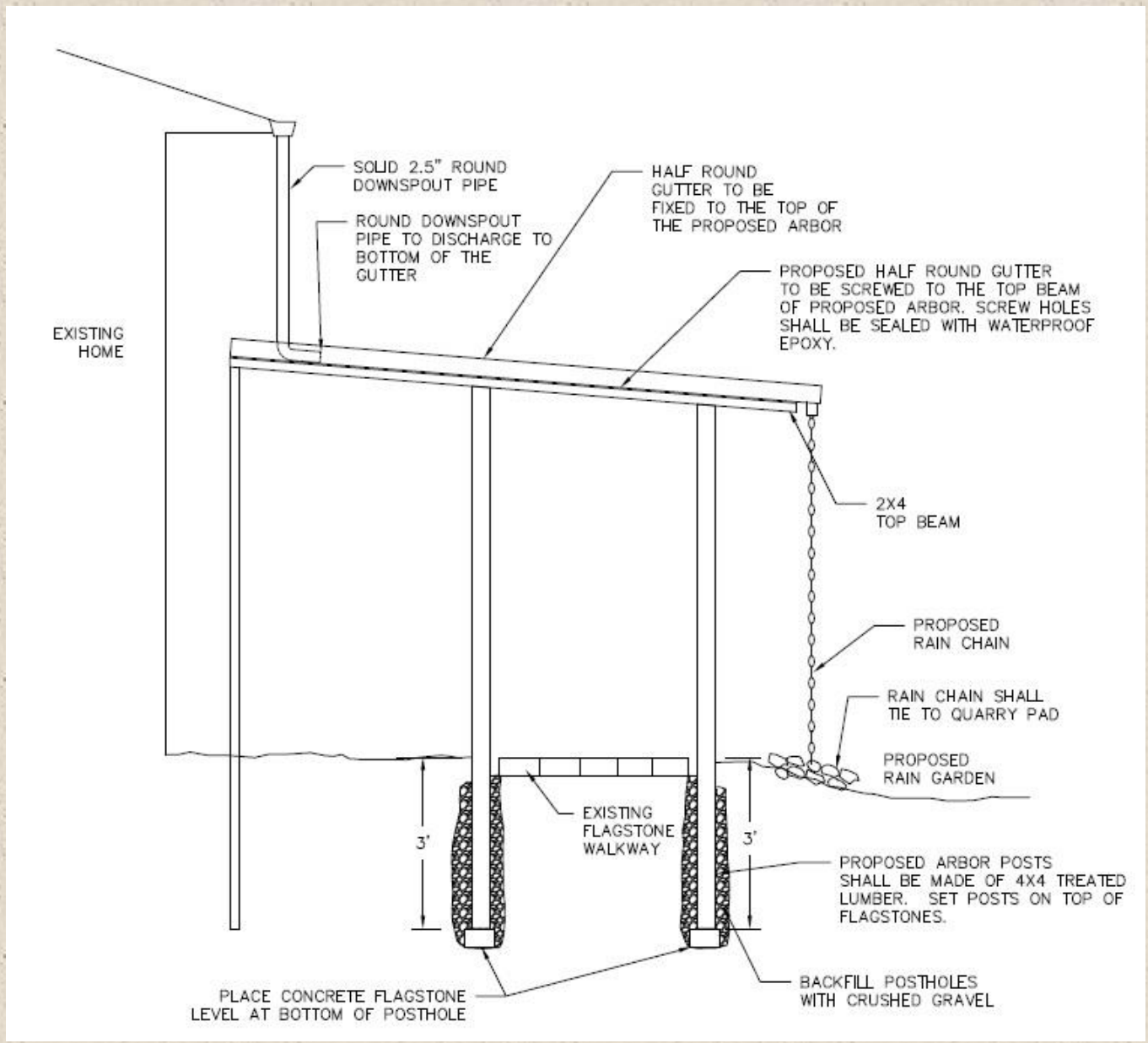
Rain Arbors



Rain Arbor Advantages

- Getting over paved areas
- Elevation problems between roof and garden
- Narrow rain gardens that would need very deep ponding areas if a pipe were used.
- Aesthetic appeal

Rain Arbors


SOLID 2.5" ROUND DOWNSPOUT PIPE
ROUND DOWNSPOUT PIPE TO DISCHARGE TO BOTTOM OF THE GUTTER
HALF ROUND GUTTER TO BE FIXED TO THE TOP OF THE PROPOSED ARBOR
PROPOSED HALF ROUND GUTTER TO BE SCREWED TO THE TOP BEAM OF PROPOSED ARBOR. SCREW HOLES SHALL BE SEALED WITH WATERPROOF EPOXY.
EXISTING HOME
2X4 TOP BEAM
PROPOSED RAIN CHAIN
RAIN CHAIN SHALL TIE TO QUARRY PAD
PROPOSED RAIN GARDEN
EXISTING FLAGSTONE WALKWAY
3'
3'
PROPOSED ARBOR POSTS SHALL BE MADE OF 4X4 TREATED LUMBER. SET POSTS ON TOP OF FLAGSTONES.
BACKFILL POSTHOLES WITH CRUSHED GRAVEL
PLACE CONCRETE FLAGSTONE LEVEL AT BOTTOM OF POSTHOLE

Semi-Permeable Compost Berms

Semi-Permeable Compost Berms

- ~10% of the water goes through the berm
- ~90% of the water is directed along the back of berm to somewhere else
- Coarseness of compost determines how much water flows through berm
- Planted with Zone 3 plants

Semi-Permeable Compost Berms

Berms Are Better Than Ditches

Pros:

- Sedimentation advantages
- Less revegetation required
- Reduced water table influences
- Semi-permeable
- Generally harder to get rid of soil than add it
- Digging ditches is hard work
- Permitting benefits
- Generally larger storage volume

Cons:

- Elevation Problems
  - Hills
  - Very flat sites

Menu of BMPs Home

BMP Background

Public Education & Outreach on Stormwater Impacts

Public Involvement/ Participation

Illicit Discharge Detection & Elimination

Construction Site Stormwater Runoff Control

Post-Construction Stormwater Management in New Development & Redevelopment

Pollution Prevention/Good Housekeeping for Municipal Operations

Stormwater Home

Search BMPs | All of the words | Filter by Minimum Measure: All | GO | Browse Fact Sheets | Search Help

Compost Filter Berms

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Minimum Measure: Construction Site Stormwater Runoff Control

Subcategory: Sediment Control

Description

A compost filter berm is a dike of compost or a compost product that is placed perpendicular to sheet flow runoff to control erosion in disturbed areas and retain sediment. It can be used in place of a traditional sediment and erosion control tool such as a silt fence. The compost filter berm, which is trapezoidal in cross section, provides a three-dimensional filter that retains sediment and other pollutants (e.g., suspended solids, metals, oil and grease) while allowing the cleaned water to flow through the berm. Composts used in filter berms are made from a variety of feedstocks, including municipal yard trimmings, food residuals, separated municipal solid waste, biosolids, and manure.

Vegetated compost filter berm. Note sediment on upstream side of berm and clear water on downstream side. Source: S. McCoy, Texas Commission on Environmental Quality.

Compost filter berms are generally placed along the perimeter of a site, or at intervals along a slope, to capture and treat stormwater that runs off as sheet flow. A filter berm also can be used as a check dam in small drainage ditches. The berms can be vegetated or unvegetated. Vegetated filter berms are normally left in place and provide long-term filtration of stormwater as a post-construction best management practice (BMP). Unvegetated berms are often broken down once construction is complete and the compost is spread around the site as a soil amendment or mulch.

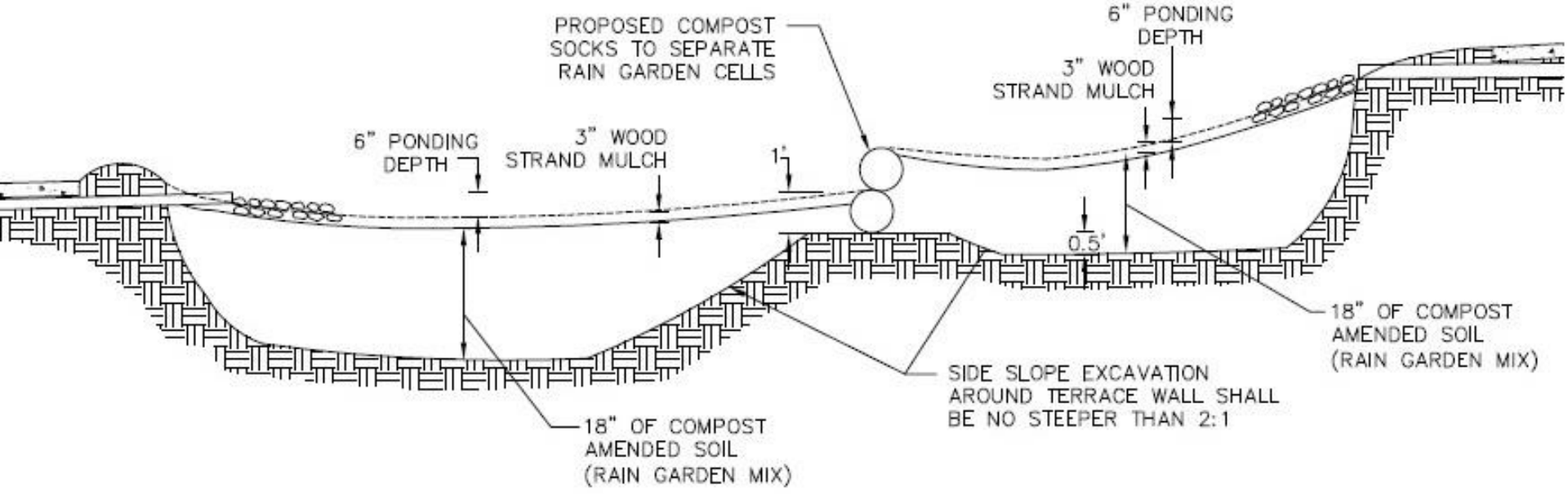
Filter berms, in general, provide an effective physical barrier in sheet flow conditions; however, the use of compost in the filter berm provides additional benefits. These benefits include the following:

- The compost retains a large volume of water, which helps prevent or reduce rill erosion and aids in establishing vegetation on the berm.
- The mix of particle sizes in the compost filter material retains as much or more sediment than traditional perimeter controls, such as silt fences or hay bale barriers, while allowing a larger volume of clear water to pass through the berm. Silt fences often become clogged with sediment and form a dam that retains stormwater, rather than letting the filtered stormwater pass through.
- In addition to retaining sediment, compost can retain pollutants, such as heavy metals, nitrogen, phosphorus, oil and grease, fuel, herbicides, pesticides, and other potentially hazardous substances, from stormwater.improving water quality downstream of the berm (USEPA, 1998).
- Nutrients and hydrocarbons adsorbed and/or trapped by the compost filter can be naturally cycled and decomposed through bioremediation by microorganisms commonly found in the compost matrix (USEPA, 1998).

Applicability

Compost filter berms are applicable to construction sites with relatively small drainage areas, where stormwater runoff occurs as sheet flow. Common industry practice is to use compost filter berms in drainage areas that do not exceed 0.25 acre per 100 feet of berm length and where flow does not typically exceed 1 cubic foot per second (see Siting and Design Considerations discussion for more detail). Compost filter berms can be used on steeper slopes with faster flows if they are spaced more closely or used in combination with other stormwater BMPs such as compost blankets or silt fences.

Terraced Rain Gardens Using Compost Socks

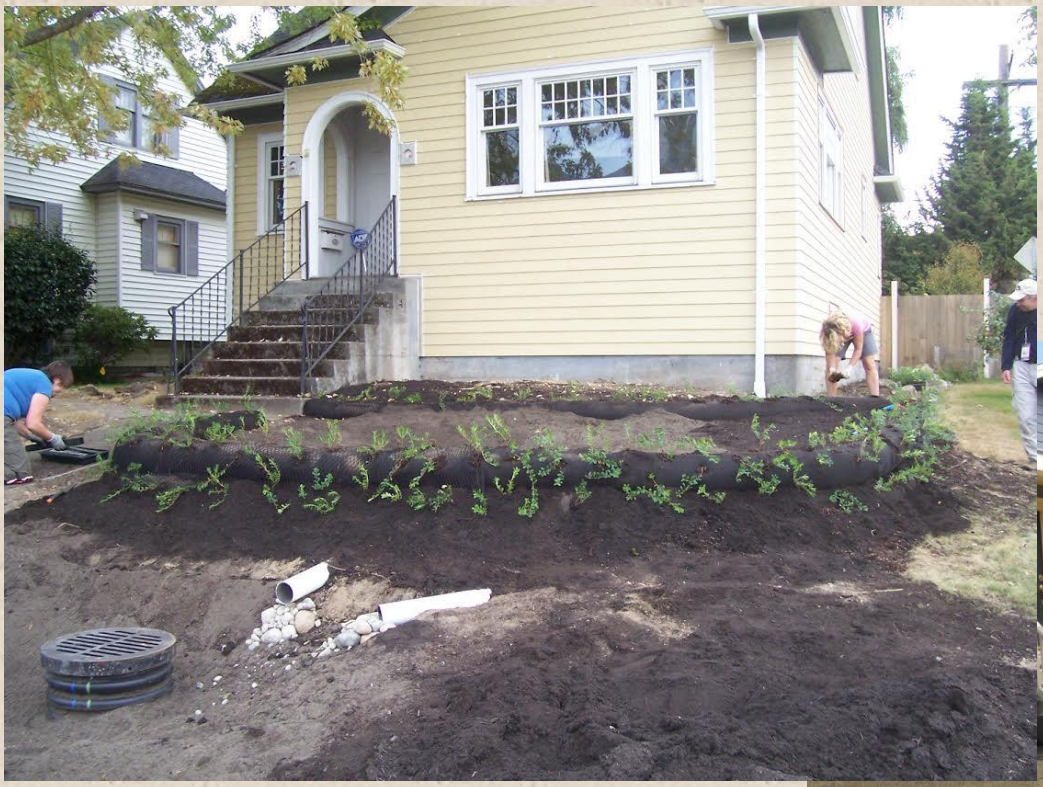


Compost Socks

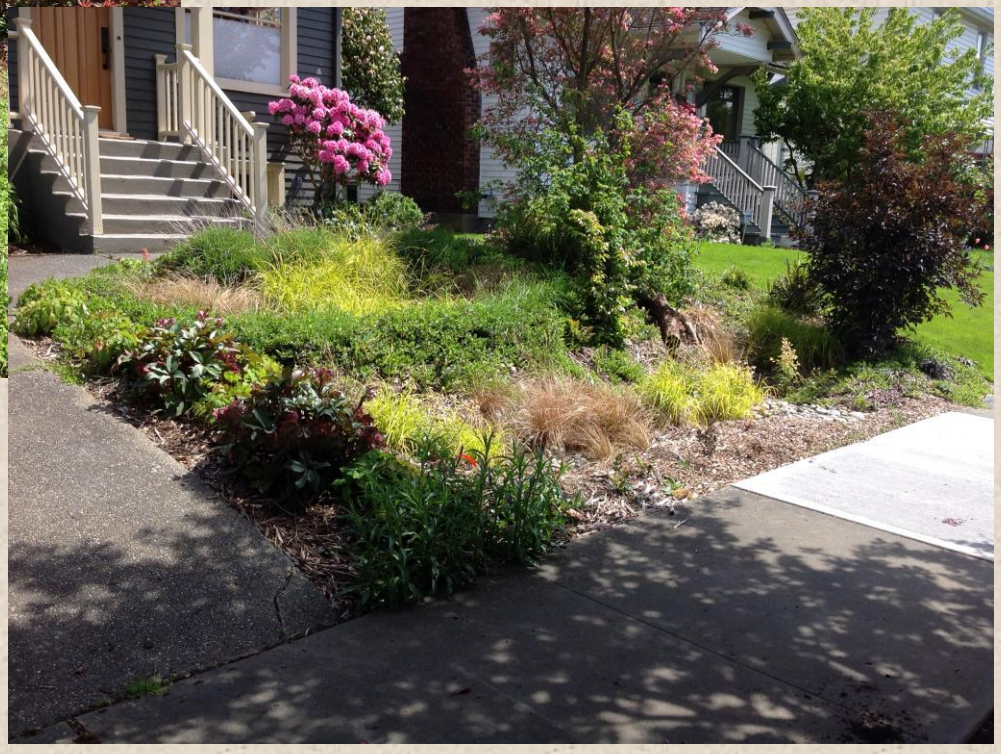
Compost Socks

- Come in 8”, 12” and 18” diameters
- 12” are most convenient for rain gardens
- Can be purchased on pallets in 10’ lengths
  - (5 per pallet)
- Or socks can be blown in, in a continuous sock
  - More expensive due to truck mobilization
- Can be stacked to make walls
- Socks are susceptible to UV degradation, so plant ground cover (kinnikinnik most common) into socks. Make a living wall.

Compost Socks

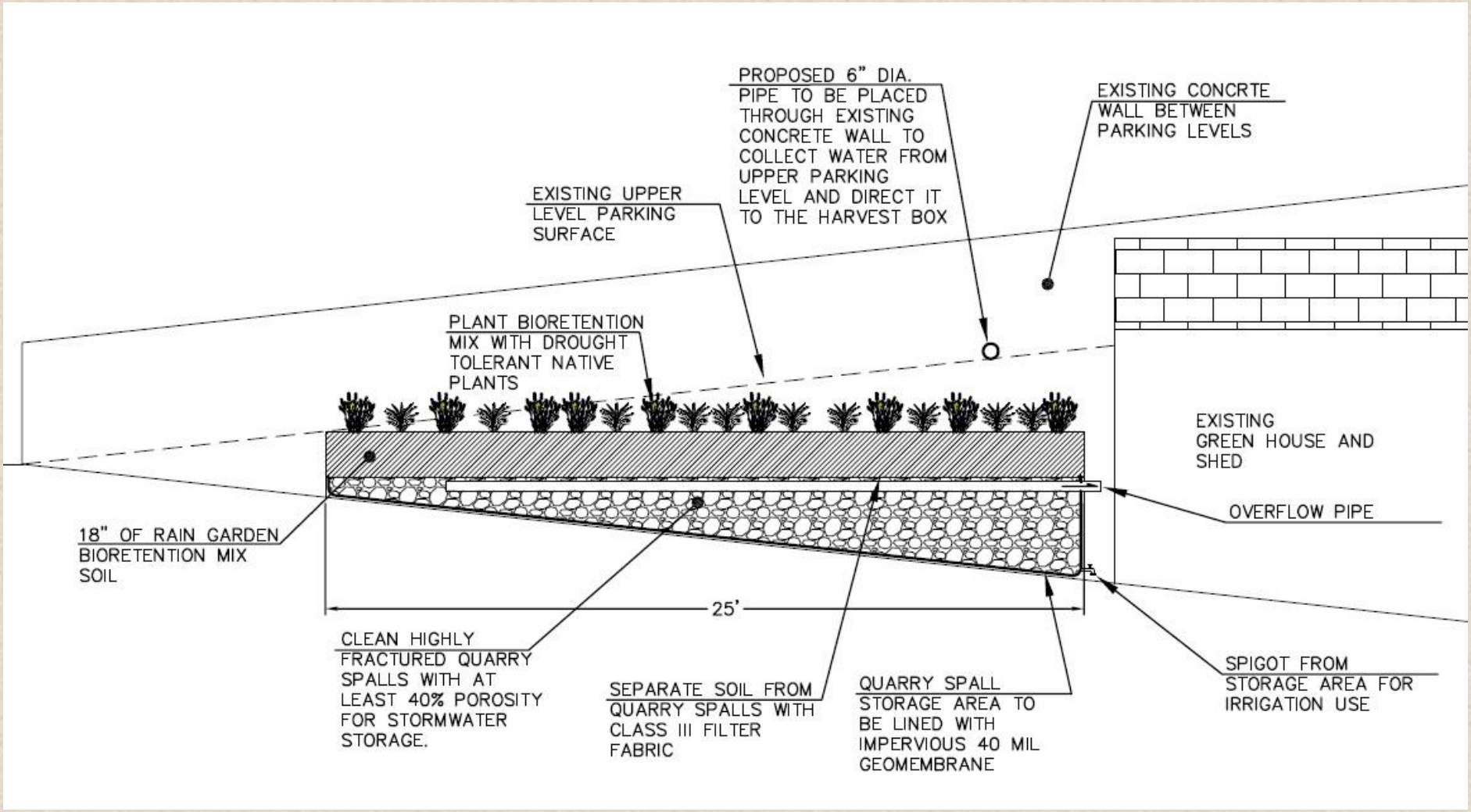


Compost Socks



Rain Garden in a Box

Rain Garden in a Box



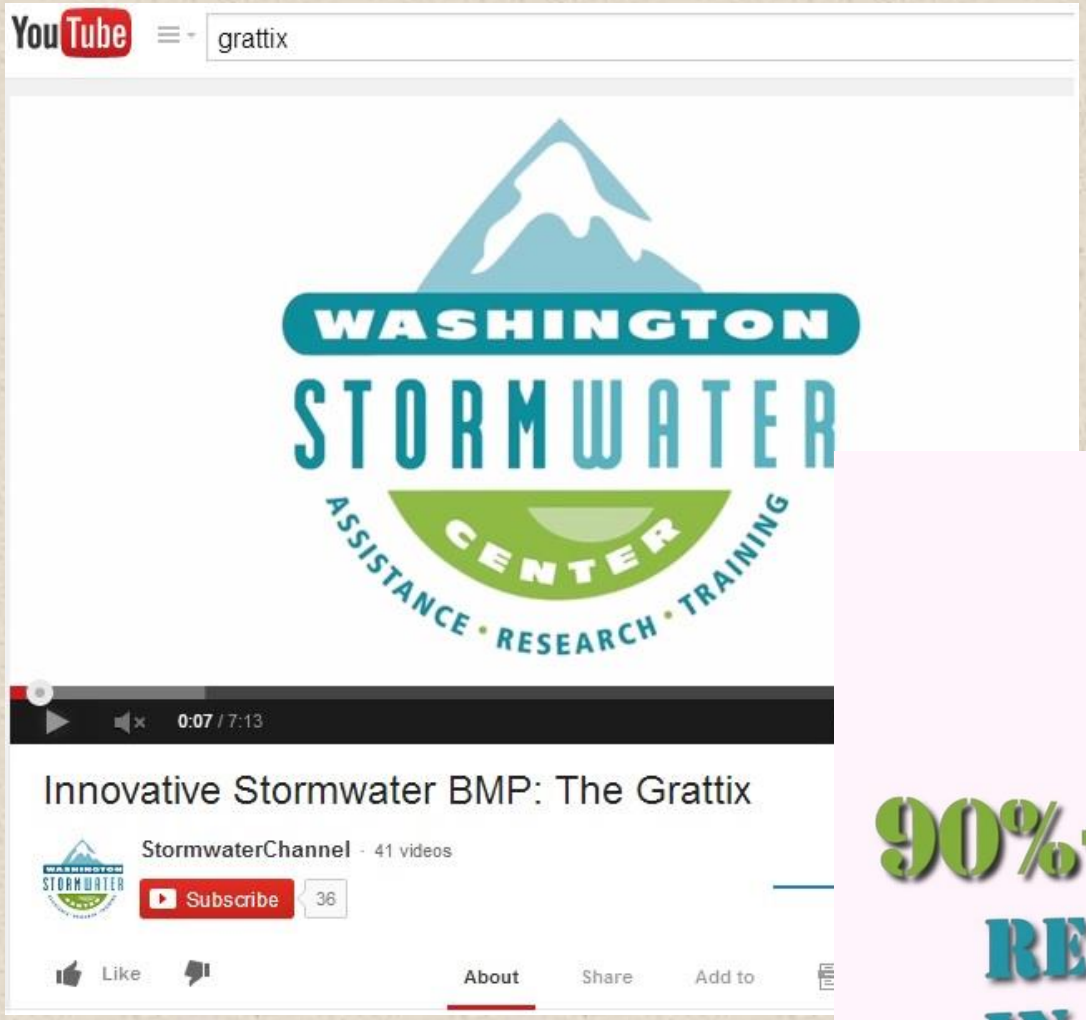
Rain Garden in a Box

- Provides treatment and collection for heavily paved areas with no infiltration
- Good for roof runoff from polluted roof sources
  - Large galvanized metal roof
  - Parking Garages
- Many materials can be used
  - Wood, plastic, metal
- Can be as large, or small as you want

Grattix Box


Port of Vancouver USA
A CENTURY OF POSSIBILITIES.
GRATTIX
Port of Vancouver USA
THIS SIDE UP

Grattix Box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Innovative Stormwater BMP: The Grattix
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90%-95%
REDUCTION
IN ZINC

Grattix Box

- For treatment only, no storage
- For large areas of galvanized roof
- Designed for zinc removal primarily
- May remove nutrients at high concentrations, not good for minimal concentrations

Questions?

Derek Hann P.E.
Design Engineer
(425) 335-5634 x119
derek@snohomishcd.org

Zsofia Pasztor
LID Consultant & Designers
(425) 210-5541
zs.pasztor2011@gmail.com