

# From Stormwater Management to Artful Rainwater Design

Presentation by Salma Mehter



Based on the article by  
Stuart Echols and  
Eliza Pennypacker in  
the Landscape Journal

# What is Stormwater?

Stormwater = Total Precipitation

- Precipitation Infiltrated by soil
- Plant uptake
- Precipitation evaporated into the atmosphere

# Why does Stormwater need to be managed?

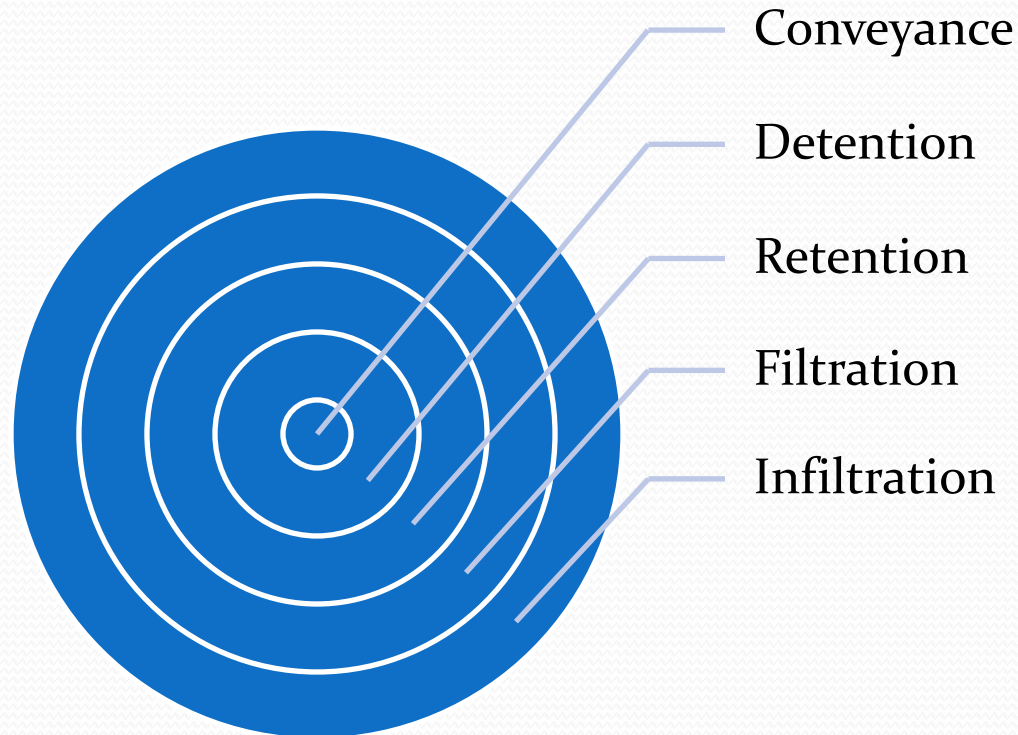
**Flooding:** volume and timing of runoff

**Polluting:** possible contaminants that that water could carry

# What is Artful Rainwater Design?

- -Effective stormwater management as an art form: approaching stormwater management in a way that is environmentally best management practice in designs that call attention to stormwater practices in ways that both educate and delight those who visit (Echols & Pennypacker 2008)
- Artful Rainwater Design = “the Utilities of Stormwater Management” x “the Specified Amenities”

# Design techniques for the utility aspects of Stormwater Management



# Conveyance → Safely convey stormwater away

- Curbing
- Pipes
- Swales
- Ditches

# Conveyance Example



# Detention → Reduce downstream flooding

- Conventional dry basins
- Extended detention basins
- Micro-pool ponds



# Detention Example



# Retention → Hold stormwater for reuse

- Wet ponds
- Multiple pond systems
- Water harvesting ponds
- Cisterns

# Example of Retention



<http://www.forestlumber.com/images/cisternha.jpg>

# Filtration → Reduce stormwater pollution

- Bio-retention gardens
- Green roof systems
- Water quality inlets
- Constructed wetlands
- Sand filters
- Grassed swales
- Oil and grit separators

# Bioretention Garden Plants

## ***Herbaceous***

### ***Perennials***

New England Aster  
Butterfly Weed  
Purple Coneflower  
Wild Geranium  
False Blue Indigo  
Heath Aster  
Cardinal Flower  
Stokes' Aster  
New York Ironweed  
Summer Phlox  
Wild Bergamot  
Joe Pye Weed  
Obedient Plant  
Goldenrod  
Great Blue Lobelia  
Blue Flag  
Bleeding Heart  
Soft Rush

### ***Shrubs***

Virginia Sweetspire  
Summersweet  
Winterberry Holly  
Elderberry  
Red Osier Dogwood  
Chokeberry  
Cranberry Bush  
Snowberry

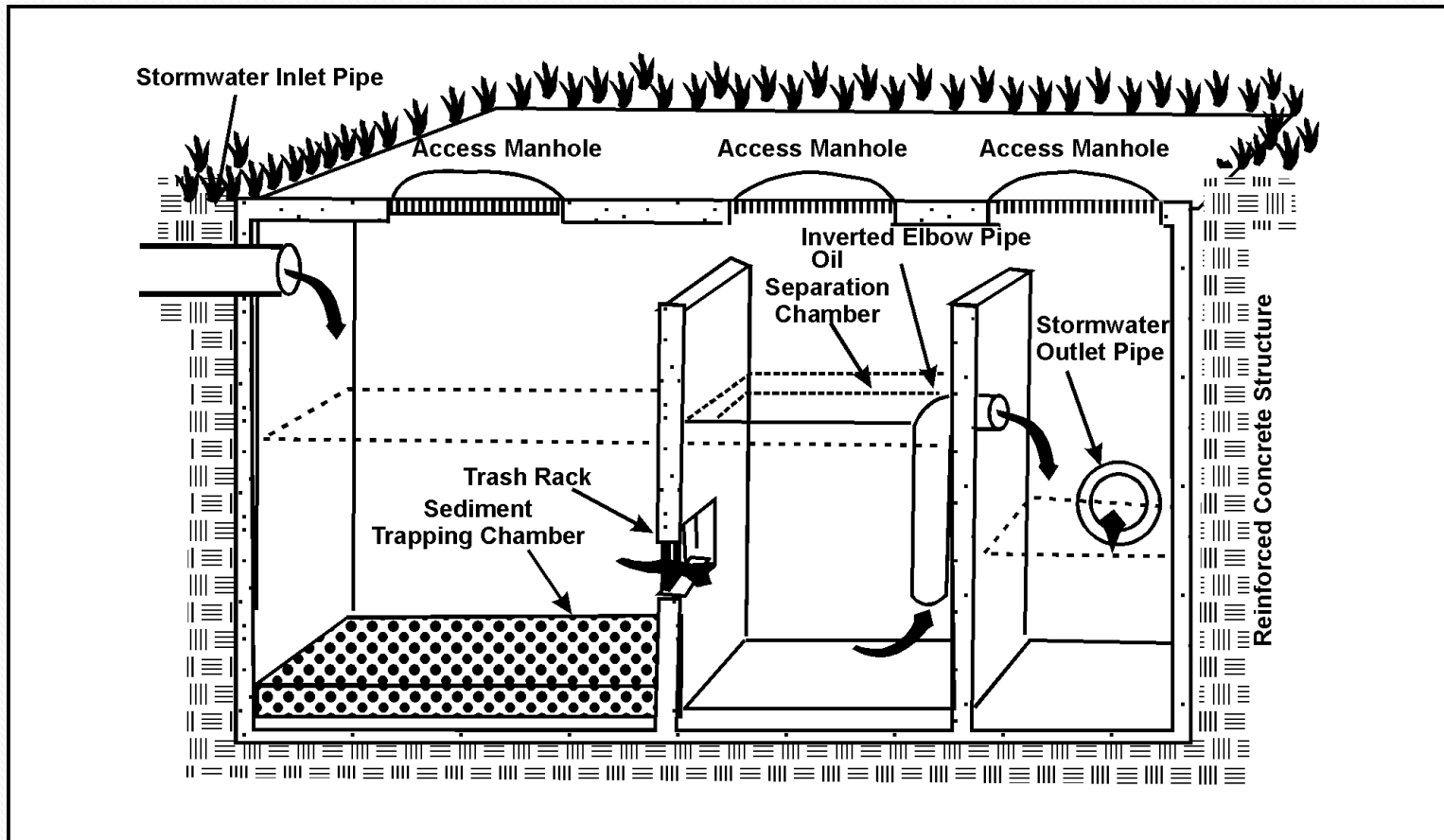
## ***Trees***

Serviceberry  
Red Buckeye  
Eastern Redbud  
Red Maple

## ***Others***

Pennsylvania Sedge  
Switch Grass

# Filtration Example: Water Quality Inlet



Source: Reference 3

<http://www.epa.gov/owmitnet/mtb/wtrqlty.pdf>

# Filtration Examples: Green Roof



<http://www.worldbusinesschicago.com/newsletters/art/CityHall.jpg>

# Infiltration → Promote groundwater recharge



Dry wells (French drains)
Infiltration trenches
Infiltration basins
Porous pavements



# Infiltration Example



**High Point (West Seattle, Washington)**

# Amenity Aspects (the goals)



Convenience: Location, ease, or comfort

Education: favorable conditions for learning

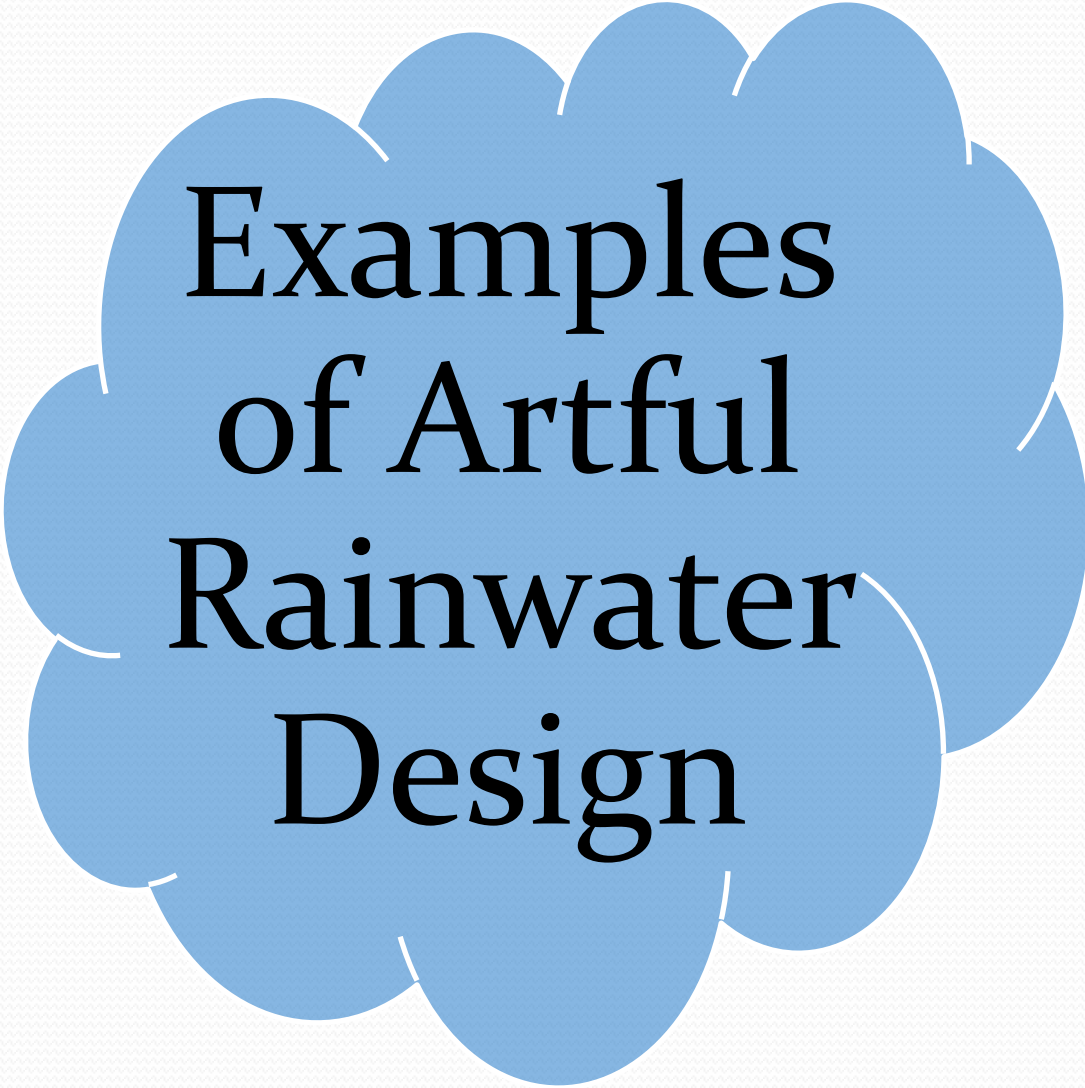

Recreation: favorable conditions for play and/or relaxation

Safety: freedom from exposure to danger or risk

Social interaction: commingling of individuals or groups

Public relations: semiotic expression of values of the designer and/or owner

Aesthetic richness: beauty or pleasure as a result of design composition



# Examples of Artful Rainwater Design

# 10<sup>th</sup> @ Hoyt Portland, Oregon



By Koch Landscape Architecture

All the stormwater professionals that I've spoken to recognize that it is the Landscape Architecture that made this (project) valuable and not the Engineering" –Echols (interview)



“You can do a lot of things to mitigate the impacts of stormwater, but typical and mostly mechanical methods provide no cultural or aesthetic function; the function here is detention and human delight.” –Steve Koch(Lead designer of the project)



# Regarding the 10<sup>th</sup> @ Hoyt

“This project is one of the top, if not the top example currently of artful rainwater design in the United States” –Stuart Echols

# Siskiyou Green Street

Portland, Oregon



By Kevin Robert Perry





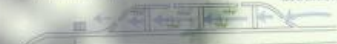
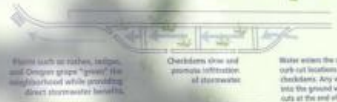


## Sustainable Stormwater Management A Green Street Project

This landscaped area uses permeable flex curb retention and allows water to soak into the ground before reaching street drains. Projects like this drain stormwater from the watershed and help reduce combined sewer overflow (CSO).

This is Portland's first sustainable stormwater management project. It is a sustainable approach that meets natural conditions and improves water quality and neighborhood aesthetics. It is an example of how Portland can build or retrofit streets to manage stormwater effectively and innovatively.

For more information visit [www.portlandoregon.gov](http://www.portlandoregon.gov)  
Call 503-233-2279



Water enters the curb retention at curb set locations and is retained with checkdams. Any water that doesn't soak into the ground will then overflow at curb sets at the end of the curb sections.



Portland Department of Transportation  
Sustainable Stormwater



<http://www.artfulrainwaterdesign.net/projects/show/34>

## SEA Streets

“Seattle's pilot Street Edge Alternatives Project (SEA Streets) is designed to provide drainage that more closely mimics the natural landscape prior to development than traditional piped systems. To accomplish this, the design reduced impervious surfaces to 11% less than a traditional street, provided surface detention in swales, and added over 100 evergreen trees and 1100 shrubs. Two years of monitoring show that SEA Street has reduced the total volume of stormwater leaving the street by 98% for a 2-year storm event.”

# Challenges-

It is important for the designers to first consider all runoff treatment methods before designing because they all have pros and cons

Conveyance can create awareness of stormwater but does not educate about environmental issues

People rarely realize that wet ponds treat stormwater (unless there is signage)

Infiltration presents amenity challenges because most this is where signage is used most frequently to reveal the infiltration story.

# Why is Artful Rainwater design Beneficial?



Raise Property Values

Increase public  
exposure and  
education

Encourages  
maintenance of  
stormwater  
management systems  
by making them a clear  
added values

# Works Cited

- [http://h2o.enr.state.nc.us/su/what\\_is\\_stormwater.htm](http://h2o.enr.state.nc.us/su/what_is_stormwater.htm)
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