Green Infrastructure

It is only as good as the landscape maintenance

Supply in the Sky

January 24, 2017

Santa Rosa WATER

OUR FUTURE IN EVERY DROP

RUSSIAN RIVER FRIENDLY LANDSCAPING

Overview

- What is Green Storm Water Infrastructure?
- What are the challenges for landscape maintenance companies?
- How do I maintain these new landscapes?

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Green Storm Water Infrastructure

- Also known as Low Impact Development (LID), or Green Infrastructure
- Preserves and protects the natural site condition

Rhode Island

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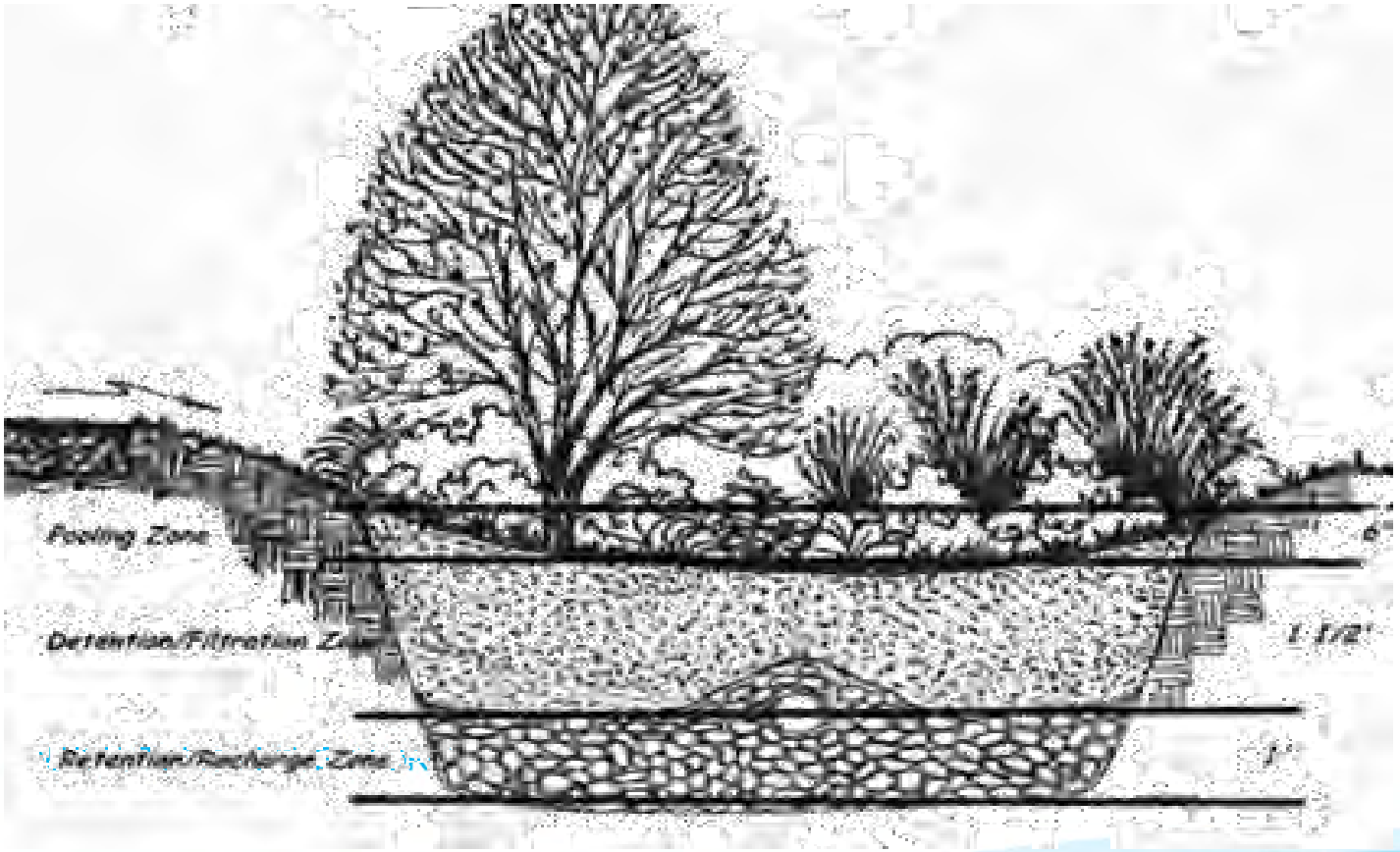
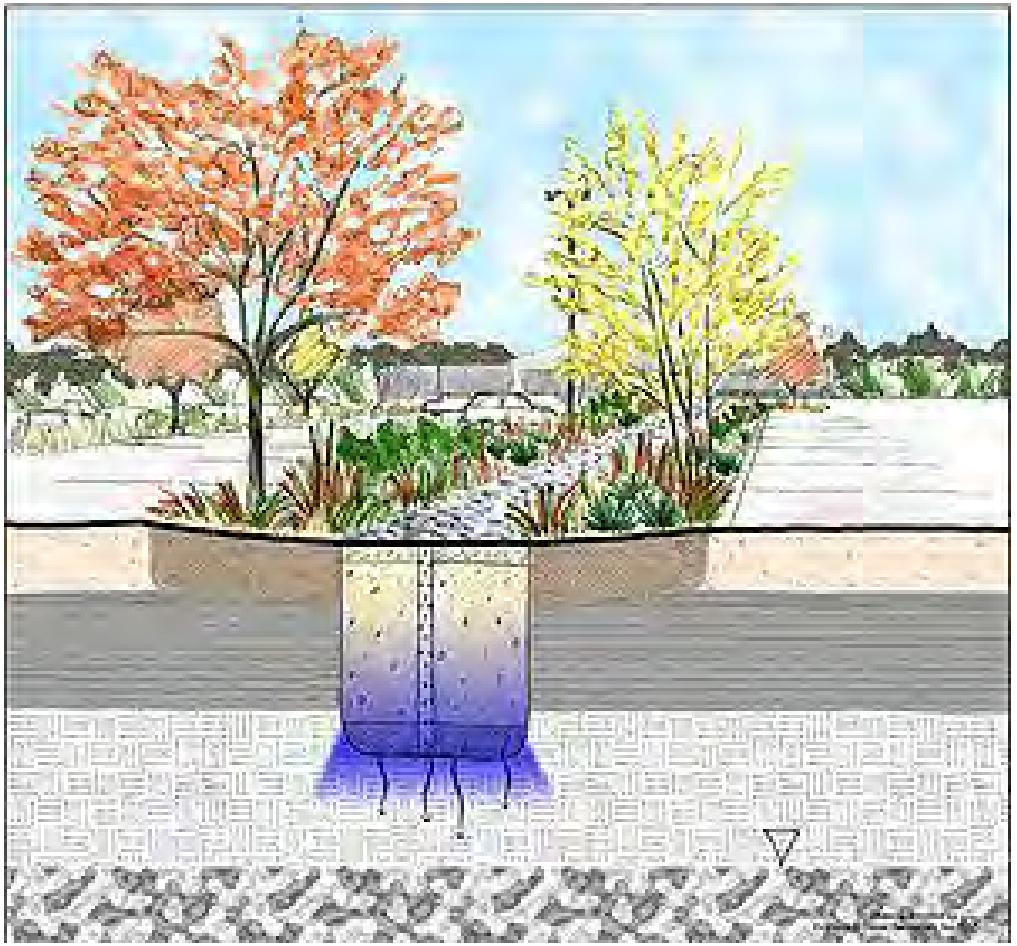
Intention of Green Storm Water Infrastructure:

Capture and clean storm water runoff



Capture: Prevent water from running off site

- The landscape captures storm water runoff
- Aids in getting the water to infiltrate into the soil
- Replenishes soil moisture and groundwater recharge



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Water Quality Treatment:

Filter the storm water runoff

- Slow down storm water
- Plants and soil microorganisms remove pollutants
- Minimize chemical discharge into creeks and rivers

Paso Robles, CA

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Types of Green Storm Water Infrastructure

- Rain Gardens
- Bioretention
- Flow Through Planters
- Constructed Wetlands
- Rainwater Harvesting
- Green Roofs

Charlotte, NC

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Raingardens

- Used for water quality treatment and volume capture.
- Not used for areas with contamination
- No standing water over 72 hours

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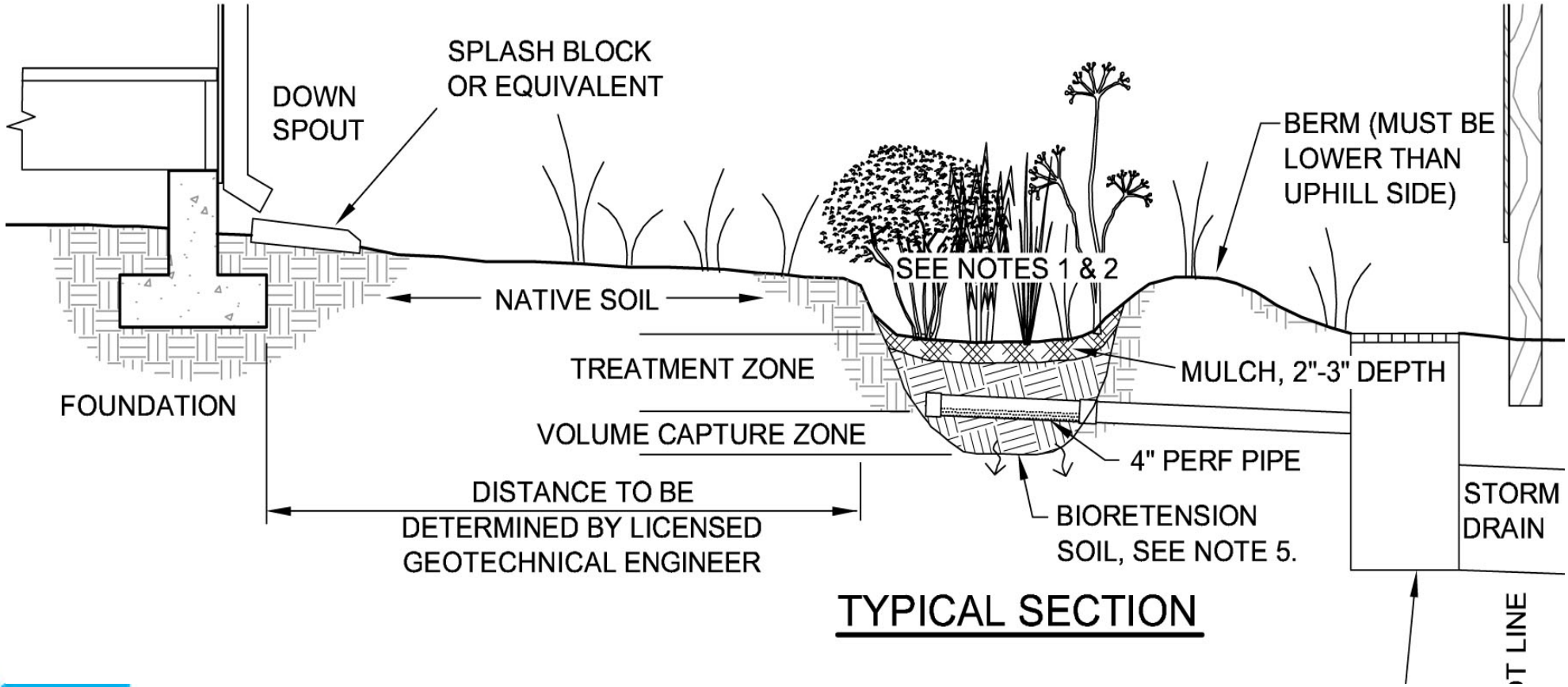
Raingardens



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Rain Gardens

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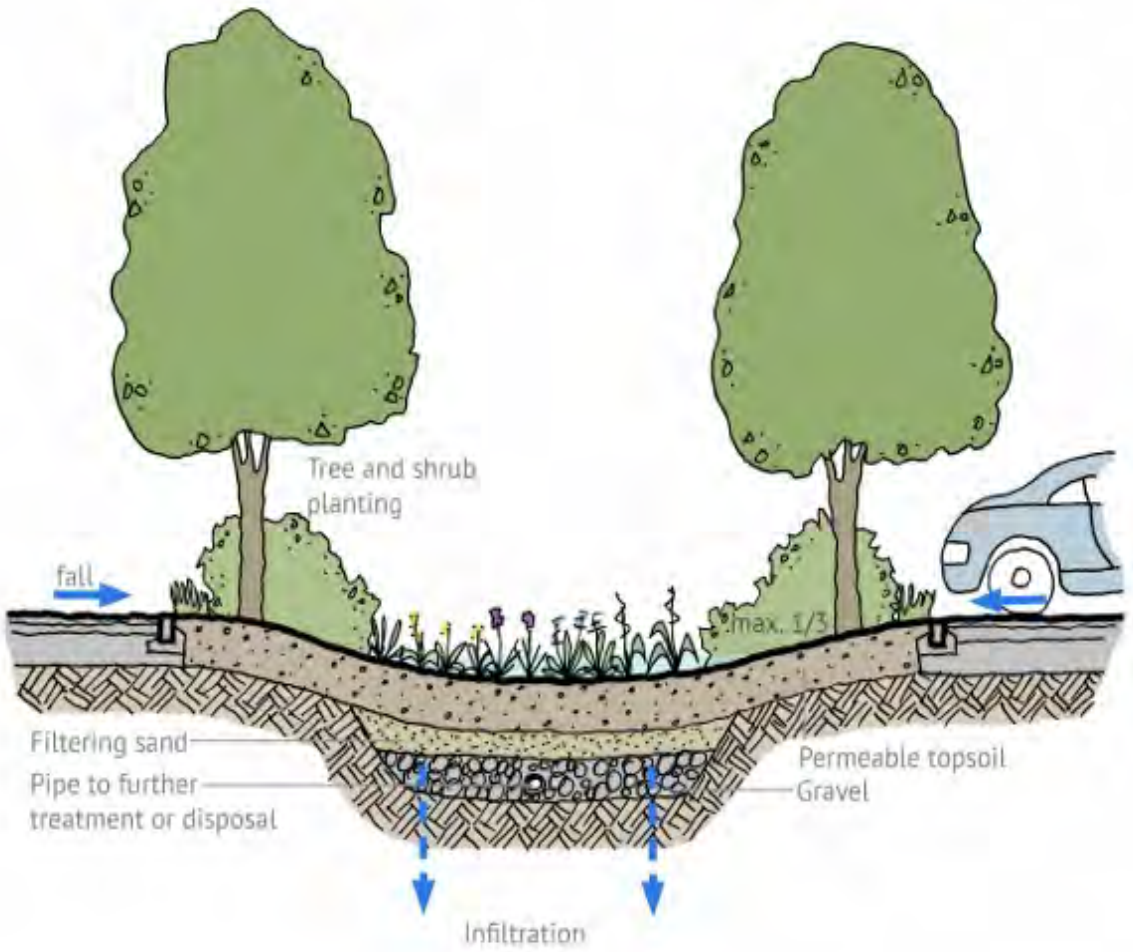
Bioretention

- Provides water quality treatment and volume capture
- Can use structural soil to support roads and other hardscape
- Does not work on slopes greater than 10%



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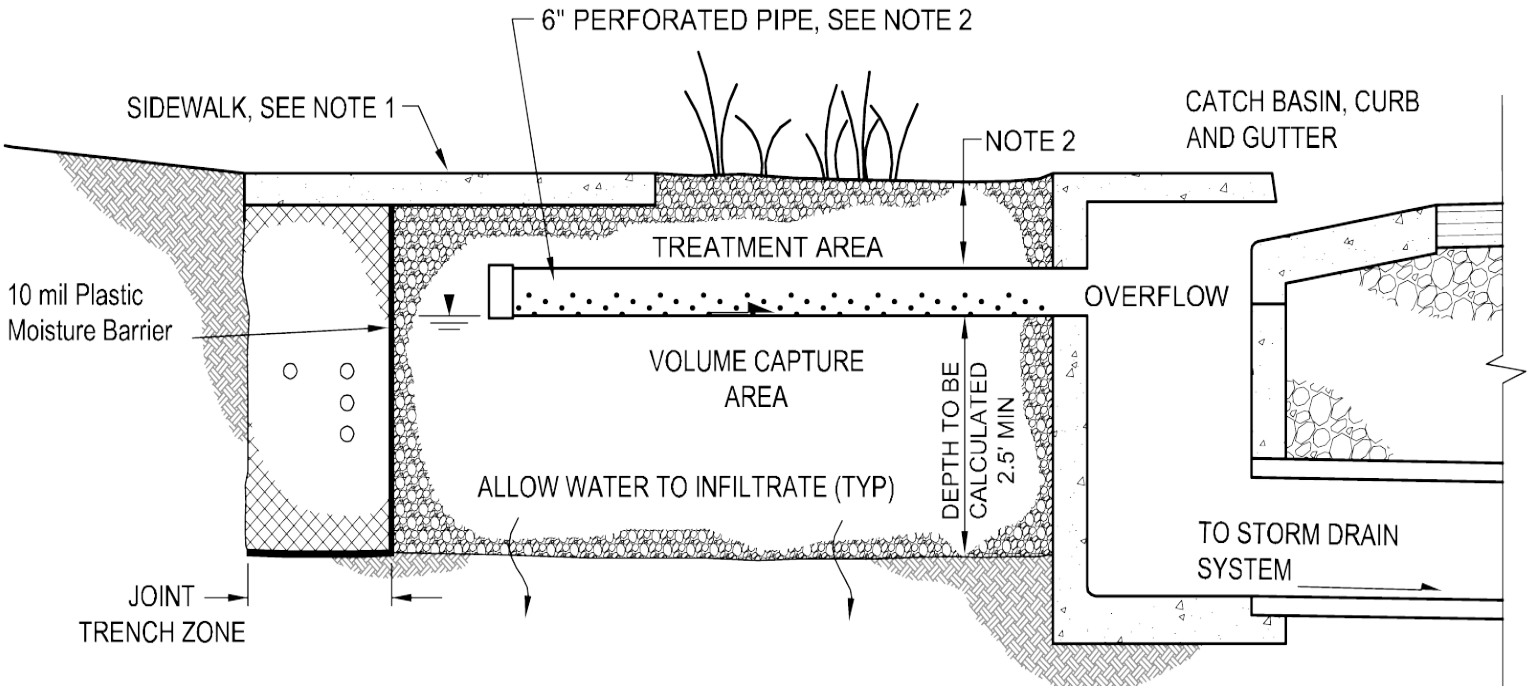
Bioretention



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Bioretention

Santa Rosa, CA

Virginia Beach, VA

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Flow Through Planter

- Provides water quality treatment
- Used in areas of low percolation or contaminated soil
- Used in conjunction with other features to achieve storm water goals

Pittsburgh, PA

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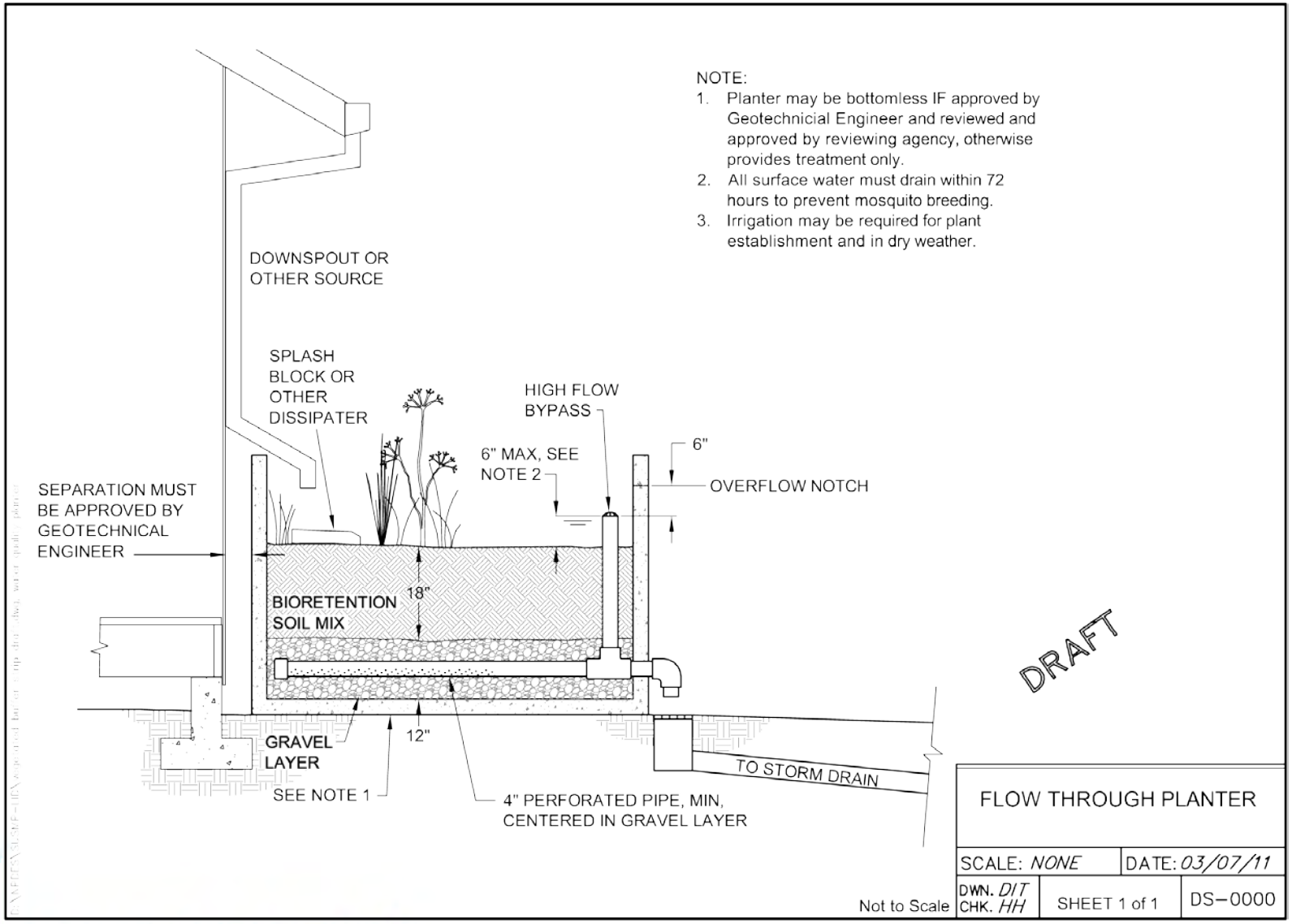
Flow Through Planter



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Flow Through Planter

Portland, OR

Santa Rosa, CA

Constructed Wetlands

- Complicated features
- Provides water quality treatment and volume capture
- Provides habitat
- Must prevent mosquito breeding

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Rainwater Harvesting

- Catchment surfaces
- Gutters and downspouts
- First flush diverters
- Storage tanks

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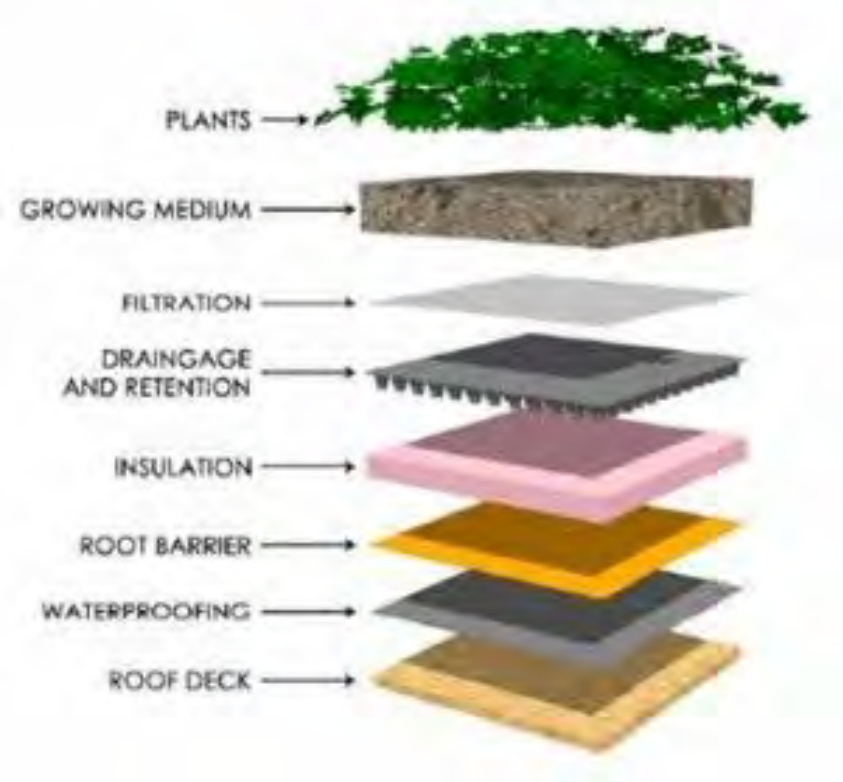
Green Roof



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Challenges for landscape maintenance companies

- Customer expectations
- New landscape materials and features
- Different skills for landscape professionals

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Customer Expectations

- What will show the customer that you maintained their landscapes?

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New Landscape Components

- Different soils
- Hardscape is more permeable
- Changes to the curb and gutter

Milwaukee, WI

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New Components - Structural Soil

- Mix of rock, clay particles, organic matter and a tackifier (glue)
- Can be compacted to support hardscaped areas
- provides significant void space for storm water retention and tree roots
- Need to keep sandy particles from entering the structural soil

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New Components - Permeable hardscape

- Paver stones/ flag stones
- Turf blocks
- Pervious pavement

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New Components - Curb and Gutter

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Permeable hardscape Maintenance

- Keep soil from washing onto surface
- Do not stockpile soil or other amendments on surface
- Regularly vacuum area

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New Skills Needed

- Monitoring and documenting maintenance
- Pruning instead of mowing
- Cleaning hardscape
- Identify weeds early and pull/ remove mechanically

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Inspection and Monitoring

- Develop site plan identify irrigation, and green infrastructure elements
- Create schedule for monitoring from inspection checklists
- Some inspections should occur before, during or just after rainfall

Inspection and Maintenance Checklist
Bioretention Area

Property Address: _____ Property Owner: _____

Date of Inspection: _____ Type of Inspection: ❑ Pre-rainy season ❑ Monthly ❑ Quarterly ❑ Annual ❑ Re-inspection[1]

Inspector(s): _____

Item	Conditions When Maintenance Is Needed	Maintenance Needed? (Y/N)	Comments (Describe maintenance completed; and if any needed maintenance was not conducted, note what is needed and when it will be done)	Results Expected When Maintenance Is Performed
General				
Trash & Debris	• Trash and debris accumulated in basin • Visual evidence of dumping			Trash and debris cleared from site.
Contaminants and Pollution	Any evidence of oil, gasoline, contaminants or other pollutants			No contaminants or pollutants present.
Vegetation	• When the planted vegetation becomes excessively tall. • When nuisance weeds and other vegetation start to take over.			Vegetation mowed per specifications or maintenance plan, or nuisance vegetation removed so that flow is not impeded. Vegetation should never be mowed lower than the design flow depth. Remove clippings from the area and dispose appropriately.
Tree/Brush Growth and Hazard Trees	• Growth does not allow maintenance access or interferes with maintenance activity • Dead, diseased, or dying trees			• Trees do not hinder maintenance activities. • Remove hazard trees as approved by the City or County. (Use a certified Arborist to determine health of tree or removal requirements)

[1] Re-inspection of a previously-noted maintenance issue.

[[== Insert Agency Name ==]]

Attachment 5-2, Page 3

Regular Maintenance Activities

- Maintain irrigation system
- Clean trash and debris from inlets
- Mechanically remove weeds monthly - No pesticides allowed

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Regular Maintenance Activities

- Replace dead or diseased plants
- Ensure features drain within 72 hours
- Monitor and repair erosion
- Add mulch

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Rainwater Harvesting Maintenance

- Monitor tank levels
- Clean gutters and first flush diverters
- Repair leaks
- Change filters
- Maintain disinfection equip
- Test water quality

9000 gallon tank

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Landscape Issues Activity

- Identify what was done wrong or not done!

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Summary

- Green Stormwater infrastructure is the future
- The challenge for landscape contractors is that the landscape needs are changing
- Maintenance of these new landscapes are not harder, just different

Questions

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Customer Expectations

- Lawn reductions
- Increased water efficiency requirements
- Increase of storm water green infrastructure

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Regular site inspections

- Scheduled inspections dictate work crew activity
  - Weeds
  - Irrigation
  - Sediment accumulation
  - Drainage
- Provide records to client or directly with regulatory agency