Bioretention

Photo Tutorial to Accompany
Bioretention Design Specification
Applications: Micro-Scale
Impervious Area Treated = 250 to 2,500 square feet

Residential Lots

Commercial Rooftop
Applications: Small-Scale

- Parking Lot Edges
- Parking Lot Medians
- Courtyards
- Right-of-way/Urban Bioretention
Applications: Bioretention Basins

Institutional

Bottom of ED Pond
Design, Construction, Maintenance Guidance

- Pretreatment
- Geometry
- Vegetation/Surface Cover
- Construction
- Maintenance
Pretreatment (types)

- Grass Filter Strip
- Grass Channel
- Stone Flow Spreader
- Forebay
- Stone/Rip Rap Apron
Results of Poor or No Pretreatment

Debris from Curb Cut Blocks Outlet

Flow from Curb Cut Creates By-Pass Channel

Sediment clogs filter surface
Geometry: Long Flow Path, Good Treatment

Grass inlet channel lengthens flow path

Long flow path from inlet to outlet
Geometry: Short Flow Path, Less Treatment

These practices have a lack of storage and treatment due to:
• Curb inlets too close to outlets
• Outlet structure flush with filter surface
• Direct or almost direct conveyance from inlet to outlet
Vegetation & Surface Cover (options)

- Perennial Garden
- Herbaceous-tree
- Tree-shrub-mulch
- Turf-tree
Other Types of Surface Cover

- Stone/cobble
- Stepping stones for pedestrian flow
- Concrete cells -- herbaceous
Vegetation: Poor Examples

Too much rock

Sparse, ground too soggy

Sparse, not enough herbaceous

Plant substitutions lead to mortality, not enough herbaceous
Typical Construction Sequence

**Install secondary E&S, excavate from side**

**Scar, rip, or till bottom to promote some infiltration**

**Install geotextile on SIDES ONLY (optional), add gravel to create stone storage layer up to design elevation**

**Install underdrain pipes and pack #57 stone around the pipes**
Construction Sequence (cont.)

Add 3" choker stone (#8 or #89) on top of underdrain stone instead of filter fabric

Install surface cover: mulch, stone, matting, etc.

Add soil media in 12" lifts from sides. Bring to design elevation and add more after settling

Install plant materials and water until established
Typical Construction Problems

- Installed too early during construction
- Improper soil mix
- Stone too high at inlet – blocks flow
- Small grade changes divert flow from inlet
Maintenance (representative)

Remove sediment from inlets, curb cuts, pavement edges

Water, add/replace plants, replace mulch, check invasives

Remove sediment and trash from pretreatment and filter bed

Rehabilitate clogged or slow draining media if necessary
Maintenance Issues (typical)

Sediment buildup at grass edge diverts flow

Too much mulch added – diverts flow from inlets

Unhealthy or dead plants

Overgrown or taken over by invasives