

# 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



Forebay



Stone Flow Spreader



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



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



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



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



Remove sediment and trash from pretreatment and filter bed



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



Rehabilitate clogged or slow draining media if necessary



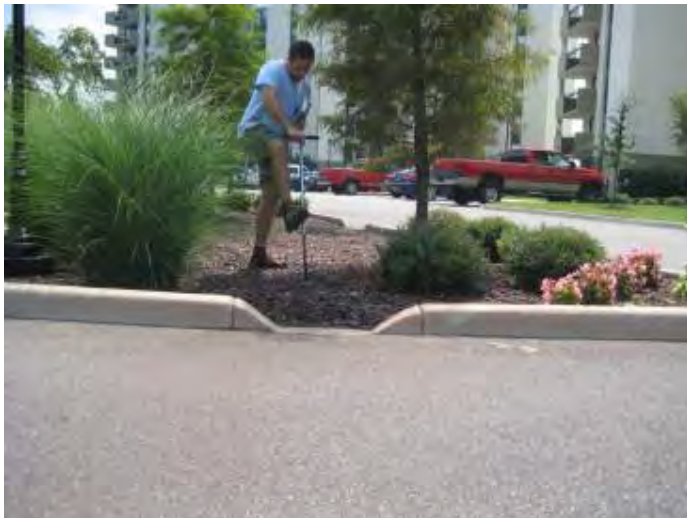
# Maintenance Issues (typical)



Sediment buildup at grass edge diverts flow



Unhealthy or dead plants



Too much mulch added – diverts flow from inlets



Overgrown or taken over by invasives