Charlotte Pilot BMP Program
Why We Study BMPs?

• Learn how BMPs actually work in our area – overall role in stormwater management

• Learn what level of performance will BMPs provide – actual pollutant removal

• What types of BMPs will work best for us

• How much will they cost – City retrofits

• What are the maintenance requirements/costs
Program Purpose

- Install/Construct a wide variety of BMPs
- Monitor BMP stormwater inflow and outflow
- Determine Pollutant Removal Efficiency, Maintenance Requirements, and Cost/Benefit
- Utilize Data to help develop Local BMP Standards
- Utilize Data for overall Water Quality Management Program
Where are these BMPs?

- City Municipal Sites – Street maintenance yards, bus lots, garbage truck lots, fire stations, capital projects, etc.
- Public Properties – Parks, greenways
- Schools
- Commercial and Industrial Sites
- Private Development Sites
What we get from our BMP projects

• Stormwater treatment – improved water quality and flow abatement

• BMP data – chemical & flow data, O&M costs/requirements

• Educational opportunities

• Aesthetic benefits – wet ponds, wetlands, and rain gardens

• Habitat, open space, amenities
What’s the cost of BMP projects?

• Most municipal BMP projects are at retrofit sites, which are more involved

• Municipal project BMPs can range from $15k to over $600k each

• To date, we’ve spent over $5.2 million on 30 BMPs

• Average BMP cost ~ $175k
What about Maintenance?

- Can get expensive, site and BMP dependent

- Short term vs. Long term Maintenance

- Not a lot of data yet on costs

- Vegetation Management ~ $2500 per event

- Tank cleaning, pump & haul ~ $2000 per event
Study BMPs

Completed

(32 sites monitored since 2004)

- Wet pond (3 sites)
- Wetland (5 sites)
- Bioretention (4 sites)
- Level Spreader (1 site)
- Dry Detention Basin (2 sites)
- Sand Filter (1 site)
- Pervious Concrete (1 site)
- Hydrodynamic Separator (12 sites)
- Proprietary Cartridge Filter (2 sites)
- Proprietary Filter w/Infiltration (1 site)
Study BMPs

In Progress

(4 sites being monitored currently)

- Bioretention (1 site)
- Infiltration Trench (1 site)
- Regenerative Stormwater Conveyance - RSC (1 site)
- Sand Filter (1 site)
Study BMPs

Future

(6 sites proposed currently)

• Wet pond (3 sites)
• Wetland (1 site)
• Proprietary Cartridge Filter (1 site)
• Sand Filter (1 site)
BMP Monitoring

- Sample inflow and outflow
- Full storm, flow weighted composite samples, monthly sampling
- Automated samplers, flow measurement
- Install sampler stations, flow measurement structures
- Logistics – staff, equipment, etc.
Monitoring Costs

- Can get expensive
- Equipment & sample station cost per station ~ $7500
- Laboratory Costs ~ $230 per sample
- Staff costs ~ $375 per sample
- FY04 Equipment Purchase - $269,000 for ~ 34 samplers
- FY18 budgeted program costs ~ $120,000 (lab and labor)
Data Analysis

Wet Ponds (not designed)
- Averaged 50% TSS removal

Wetlands
- Averaged 54% TSS removal

Bioretention
- Averaged 75% TSS removal

Level Spreader
- Averaged 66% TSS removal

Dry Detention Basin
- Averaged 52% TSS removal
**Data Analysis**

**Sand Filter**
- Averaged 76% TSS removal

**Hydrodynamic Separator**
- Averaged 18% TSS removal

**Cartridge Filter**
- Averaged 68% TSS removal

**Filter w/Infiltration**
- Averaged 89% TSS removal
Pilot BMP Policy

• Guides how we may approve Pilot BMPs within Private Development Projects

• BMPs are usually proprietary or innovative

• Currently limited opportunities for in-line filter type and/or catch basin bio-filter type BMPs

• Other BMPs may include green roofs or pervious pavements

• Hydrodynamic type BMPs no longer accepted

• Pilot BMPs must be designed and sized to meet requirements of PCSO (detention and 1-inch water quality volume)
Pilot BMP Policy

• Developer must make application to PCSO program to propose a project for inclusion in the program

• Proposed project and BMP type must be reviewed and approved by CMSWS prior to beginning project design

• Pilot BMPs must be designed to be monitor-able per City Pilot Program specifications

• If approved, Developer must enter into a contract with the City, and provide $60,000 funding for administrative, monitoring, and data analysis costs
Questions

Jordan Miller, PE
City of Charlotte, NC

jbmiller@ci.charlotte.nc.us

http://charlottenc.gov/StormWater/SurfaceWaterQuality/Pages/PilotStormwaterControlMeasuresProgram.aspx