Introducing Missouri Guide to Green Infrastructure

Ruth Wallace, Coordinator
Municipal Stormwater Program
Water Protection Program

Stormwater Information Clearinghouse

Meeting Missouri's Stormwater Regulations

- Local Government (MS4) Programs.
- Industrial Permits.
- Land Disturbance Permits.
- Stormwater Internet Map Viewer
- MS4 Program Plan Public Notice.
- Phase II Background, Highlights and Governance.
- Other Water Related Construction Site Permits.
- Announcing Missouri Guide to Green Infrastructure: Integrating Water Quality into Municipal Stormwater Management, May

~14,000 NPDES PERMITS

Land Disturbance

Industrial

MS4s

40 CFR Parts 9, 122, 123, 124, 125
10 CSR 20-6.200
NON-NPDES

• DNR 401
• COE 404
• Dam Safety
• Sand & Gravel Mining
• COE Section 10
Land Disturbance Permitting

- E-permitting went live June 25, 2012
- No paper applications will be accepted after September 1st (except for MOR100 and Site-specific permits).
- Planning to expand this opportunity for submittal of Discharge Monitoring Reports (DMRs)

Industrial Stormwater Permitting

• Rule being revised to clarify existing benchmark provision.
  – Numeric benchmark exceedance requires BMP improvement and SWPPP revision.
  – Numeric limits exceedance means violation of permit.

• Permit Assistant
  http://dnr.mo.gov/mopermitassistant/index.jsp
<table>
<thead>
<tr>
<th>Community</th>
<th>City</th>
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<th>Missouri Region</th>
<th>County Seat</th>
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<td>Parkville</td>
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<td>Riverview, Village of</td>
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<td>Springfield*</td>
<td>Winchester</td>
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<td>Newton County</td>
<td>St. Ann</td>
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<td>Herculaneum</td>
<td>Normandy</td>
<td>St. George (incorporated)</td>
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Newly designated 10K+ communities based on 2010 Census.
Newly designated communities <10K based on 2010 Census and redefined Urbanized Areas.
*Phase I communities with populations of 100,000+ at time of 1990 census.
Urban Pollutants of Concern

- Sediment
- Nutrients
- Chloride
- Bacteria
- Metals
- PAHs
- Oils & Greases
- Thermal
MS4 Program Requirements

- Public Education & Outreach
- Public Participation
- Illicit Discharge Detection and Elimination
- Active Construction Program
- Post construction program for new development and redevelopment sites ≥ 1 acre general requirement
- Pollution Prevention/Good Housekeeping
- Maximum Extent Practicable (MEP)
• EPAs current approach is not meeting stormwater management goals
• Appropriately emphasizes the role of managing hydrology for reducing pollutant loads
• Some have asserted that the NRC report is a call to “retain” stormwater on site
• MEP: narrative to prescriptive?
Small Storms are Significant

• Up to 0.5 inch rain events = bacterial discharges – can contain on site (os)
• 0.5 to 1.5 in. = about 75% of the urban runoff pollution – can contain/treat os
• > 1.5 in. (avg) = drainage design storms
  – Rate reduction more cost beneficial
  – Smaller storm treatment helps reduce pollution from these events
• Once-in-a-Blue Moon events should be conveyed in “secondary” drainage systems.

Source: Dr. Robert Pitt, UA 1999
Federal NPDES Rulemaking

- Propose Draft – June 2013 - Emphasis on Post-construction
- Final Stormwater Rule – December 10, 2014
- Missouri Phase II General Permit Renewal June 2013
Federal Rule Considerations

- Expand Universe of Regulated Discharges
- Establish Minimum Post-Construction Standards for New and Redevelopment Goal is Pre-Development Water Balance
- Retention Requirements (85-95% ), Treated Discharges?
- New vs. Redevelopment
- Develop Single Set of Consistent Requirements
- Address Retrofit Requirements for Existing Development
- Additional Requirements for Chesapeake Bay and other Sensitive Waters
A municipal how-to guide for post-construction

May 2012

Companion to PWQ Guide, which is useful when developing MS4 Construction Site Runoff Management Program

GI Guide Purpose

- For municipalities and their development communities.
- How to integrate green infrastructure into the local development program in a cost-effective manner to:
  - address community goals
  - aid stormwater compliance with post-construction requirements
- Funded by EPA
Caveats

• Not a design manual
• Not a regulatory document
Emphasis Areas of the Guide

• Integrating Green with Grey
• Triple Bottom Line, cost considerations
• Ordinances & Legal Impediments
• Sustainable Site Design
• Two-pronged approach
  – Design storm. Up to 90th percentile storm.
  – Continuous Simulation Modeling
• Midwest Case Studies & references
Prairie Crossing Development Site Plan. 
Source: Victoria Ranney, Co-Developer
Olivette, MO rain garden. Source: David A. Wilson, East-West Gateway Council of Governments.

Pervious alley in St. Louis City. Source: Metropolitan St. Louis Sewer District (MSD)
Porous asphalt alley, St. Louis, MO. Source: Metropolitan St. Louis Sewer District
Kansas City Performing Arts Center Parking Garage Green Roof

306,144 gallons of water storage
Low Impact Development (& GI) Principles

1. Plan First.
2. Prevent, then mitigate.
3. Minimize the disturbance.
4. Manage stormwater as a resource – not a waste.
5. Mimic the natural water cycle.
6. Disconnect, decentralize, distribute.
7. Integrate natural systems.
8. Maximize multiple benefits.
9. Make maintenance a priority.

CHAMPION DEVELOPMENTS NEEDED
The report’s top findings:
1. Not only does green infrastructure cost less, but these practices can further reduce costs of treating large amounts of polluted runoff.
2. Green infrastructure can help municipalities reduce energy expenses.
3. Green infrastructure can reduce flooding and related flood damage.
4. Green infrastructure improves public health — it reduces bacteria and pollution in rivers and streams, preventing gastrointestinal illnesses in swimmers and boaters.
Chapter 1: Introduction to Green Infrastructure
1.1 Concepts, Terminology and Trends
1.2 A Vision for Urban Sustainability
1.3 Principles of Green Infrastructure and Its Tools
1.4 Benefits of Green Infrastructure: Environmental, Social and Economical
1.5 Rethinking Stormwater
1.6 Leadership is Key
1.7 Use and Organization of this Guide
Chapter 2: Sustainable Site Design, Development Plan and Land Use Planning

2.1 Sustainable Development Planning and Site Design.
2.2 Planning and Permitting at the Municipal Scale
2.3 Green Infrastructure Planning at the Watershed Scale
2.4 Green Infrastructure Planning at the Regional Scale.
2.5 Considering Physiographic Regions Case Studies
Chapter 3: Green Infrastructure for MS4 Post-Construction Runoff Management
3.1 MS4 Program Requirements
3.2 Establishing, Adapting or Adopting SCM Design Manuals
3.3 Integrating Green Infrastructure into Program Development
3.4 Enhancing and Implementing Your Stormwater Management Program
Case Studies
Chapter 4: Integrating Green Infrastructure into Ordinances

4.1 Develop/Enhance and Implement Policies to Preserve and Restore Pre-Construction Runoff Conditions
4.2 Directing Development
4.3 Updating Codes and Ordinances
Case Studies
Chapter 5: Green Infrastructure Implementation Methods
5.1 Sustainable Site Design Principles
5.2 Defining the Source
5.3 Controlling the Source through Sustainable Site Design Methods and Practices
5.4 Green Infrastructure and Structural Stormwater Control Measures

Chapter 6: Stormwater Control Measures - Strategies, Practices and Tools
Appendices
A. Glossary
B. References
C. Additional Resources
Supporting Resources

• Banking on Green – ASLA
• The Value of Green Infrastructure – CNT/AR
• Rooftops to Rivers – NRDC
• Charting New Waters (January 2012) Financing Sustainable Water Infrastructure
• Environmental Health Perspectives (December 2011) “Stormwater Strategies: Cities Prepare Aging Infrastructure for Climate Change”

• Northeast Ohio Regional Sewer District Project Clean Lake and Green Infrastructure Plan: http://neorsd.org/projectcleanlake.php

NRDC Looking Up: How Green Roofs and Cool Roofs Can Reduce Energy Use in Southern California:
http://www.nrdc.org/water/pollution/green-roofs.asp

International BMP Performance (& cost) Database
(http://www.bmpdatabase.org/BMPPPerformance.htm)
Questions?

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