Weather Proof
Collaborative Stormwater Solutions
Tuesday, April 8, 2014

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LAURENS VAN DER TAK
CH2M HILL
Stormwater Management: Regional Collaboration and Decision Tools for MS4 Permit Compliance

Metropolitan Planning Council

April 8, 2014
Presentation Outline

Examples of Collaborative Regional Stormwater Programs for MS4 Permits and Climate Resilience

Green Infrastructure Programs at City/County Scale:
- Onondaga County NY
- Lancaster PA

Tools:
- Site Evaluation Tools – Business Case Analysis
- Triple Bottom Line Analysis

Innovative Financing:
- Impervious Area Based Stormwater Utility Fees
- Credits/Rebates
- Public Private Partnerships
Collaborative Regional Stormwater Program Examples: HR Storm
(HRstorm.org and askHRGreen.org)

- Stormwater education program of the Hampton Roads Planning District Commission (HRPDC), in Tidewater VA
- Coalition of local government staff members from 16 cities/counties to share ideas and pool resources for targeted educational program efforts about stormwater management
- Started by HRPDC’s Regional Stormwater Management Committee in 1992 after NPDES Phase 1 stormwater permits.
Collaborative Regional Stormwater Program Examples: HR Storm (HRstorm.org and askHRGreen.org)

HRStorm replaced in 2011 with broader program (stormwater, FOG, recycling, water awareness), and rebranded as askHRgreen.org:
- Materials (brochures)
- Tools
- Media kits
- Tips

Surveys and annual reports (3 online surveys – 2010-2013):
- Gauge the region’s environmental literacy
- Identify target audiences for specific behaviors
- Establish a baseline for evaluating campaign progress
Collaborative Regional Stormwater Program Examples: Washington DC Region (COG) and Local (TWG)

**MWCOG**
(http://www.mwcog.org/environment/water/stormwater.asp)
- MWCOG’s water resources committee facilitates regular meetings on regional regulatory and stormwater management issues for DC, MD, VA localities
- Provides a clearinghouse for resources, though does not produce educational materials

**Washington DC’ Stormwater Technical Working Group**
(interagency collaboration on policy and regulations):
- MS4 reporting
- Guidance and design criteria
- Updated regulations
Collaborative Regional Stormwater Program
Examples: Southeast Florida Climate Compact
http://southeastfloridaclimatecompact.org/

Regional agreement of 4 counties to address:

- Sea level rise
- Storm surge
- Extreme precipitation
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Collaborative Regional Stormwater Program

Examples: Southeast Florida Climate Compact
http://southeastfloridaclimatecompact.org/

- Studies
- Annual Summit
- Clearinghouse for news, events, documents
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Balanced Approach to Urban Catchment Management: Gray + Green
Onondaga County, NY’s Save the Rain Green Combined Sewer Overflow Program

- Led a rapid planning, analysis, and negotiation process to amend the federal Consent Judgment to a balanced green-grey approach
- Formed close partnership between County and City of Syracuse agencies to enable GI implementation
- Completed Project 50 in 2011 – over 50 distinct GI projects in a single year
- Local, regional, and national recognition for the client
- Signature green projects: Streets, Parks, Libraries, Post Offices, the Zoo, and:
  - War Memorial Cistern Rainwater Reuse System
  - 1st U.S. Hockey Team to Play on “Green Ice”
  - OnCenter Convention Center Green Roof
  - 2nd Largest Green Roof in NY (66,000 SF)
  - Harbor Brook CSO Wetland Treatment System
  - 1st CSO Treatment Wetland in NY
  - Connective Corridor – USGBC Leadership Award
Align Regulatory and Community Goals: Water Quantity and Quality Objectives with Quality of Life Impacts
Provide incentives for retrofitting impervious area on private property
Understand Infrastructure Drivers, as they can and will Influence Funding
Connective Corridor Project
(Onondaga County, NY)
Develop Quality Verification Systems to Track Performance and Create Regulatory Transparency

- Parcel level mapping of impervious surfaces, and retrofits
- Robust Monitoring Program (Micro and Macro)
- Modeling (SWMM and other modeling software)
Develop Quality Verification Systems to Track Performance and Create Regulatory Transparency

- Maintenance Program based on holistic Asset Management (Gray + Green)
Lancaster, PA Green Infrastructure Program

- $75M GI Implementation Program
- Chesapeake Bay Watershed
- Partnering with US EPA R3 to pilot an integrated municipal planning approach to reduce CSO/MS4 discharges and nutrients
- Integrated Water Quality, Transportation and Community Enhancements
- Public Private partnership improves local businesses and adds clean water Infrastructure at less cost

<table>
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<tr>
<th>Status</th>
<th>Number of Projects</th>
<th>Impervious Area Managed (sq. ft.)</th>
<th>Impervious Area Managed (acres)</th>
<th>Annual Runoff Capture (Gal/yr)</th>
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<td>Constructed / Under Construction</td>
<td>24</td>
<td>611,400</td>
<td>14</td>
<td>12,117,000</td>
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<td>In Design for Construction</td>
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<td>636,600</td>
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<td>-</td>
<td>-</td>
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<tr>
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<td>149</td>
<td>2,592,100</td>
<td>60</td>
<td>43,403,000</td>
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Lancaster Green Infrastructure Program

- Roads & Alleys
- Parking
- Rooftops
Project Concepts in GI Plan Document
Managed Impervious Areas and Secured $11.5 M in Funds
Implementation Programs

Based on Integrated Infrastructure:

- Green Streets & Alleys
- Green Parks
- Green Parking Lots
- Vegetated Roofs
- Enhanced Tree Planting
- Green Schools & Public Facilities
- Private Property
6th Ward Park Plan – Extending the Benefit of the Playcourt
6th Ward Park Re-dedication Ceremony
Brandon Park

4 Million Gallons / year reduction in runoff volume
$0.15 / gal
Alley 148 Greened for 10% Additional Cost

Before (July 2011) ~$20.30/SF

After (February 2012) ~$22.40/SF

<table>
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<tr>
<th>Component</th>
<th>Conventional Unit Cost ($/square foot)</th>
<th>Green Unit Costs ($/SF)</th>
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<tbody>
<tr>
<td>Pavement Removal/Excavation</td>
<td>$1.08</td>
<td>$1.08</td>
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<tr>
<td>Crushed Stone w/ geotextile</td>
<td>$0.35</td>
<td>$1.39</td>
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<tr>
<td>Pipes/Cleanouts/etc.</td>
<td>---</td>
<td>$0.82</td>
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<td>8-inch reinforced concrete</td>
<td>$18.89</td>
<td>$18.89</td>
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<tr>
<td>Permeable Pavers</td>
<td>---</td>
<td>$19.44</td>
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<tr>
<td><strong>Total Weighted Average</strong></td>
<td><strong>$20.32</strong></td>
<td><strong>$22.37</strong></td>
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</tbody>
</table>

Conventional reconstruction ~$20.30/SF (8-inch reinforced concrete)

Green alley retrofit ~$22.40/SF (permeable pavers with infiltration trench)
Composite prioritization criteria for Pavement Assessment, ADA Ramps, and GI

- **Pavement Condition**
- **ADA Priority**
- **Basin Priority (CSO vs MS4)**
- **Street Slope**

**Green Street Potential**

**Conventional Pavement Restoration**
Using traffic safety and transportation funding to reduce accidents and runoff.
Mifflin St. public Parking lot emphasizes safety and tree canopy

Annual SW Capture = 614,000 gallons
Urban Tree Canopy Assessment & Enhanced Tree Plantings

- Funded by PA-DCNR Bureau of Forestry
- GIS analysis of existing tree canopy by Univ. of Vermont
- Prioritize potential planting areas and locations for canopy preservation
- Model for other urban Chesapeake Bay watershed communities
- Follow-Up Tree Inventory
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Develop Cost Effective Business Case Model to Facilitate Planning and Decision Making
Triple Bottom Line Analysis of Adaptation Strategies Promotes Mitigation and Other Co-Benefits (Economic, Social, Environmental)

DC Water GI Challenge Award Submissions

- **Enhanced Wildlife Habitat, Pollinator Food Sources, and Biodiversity**
- **New and Improved Public Park Space and Community Gathering Space**
- ** Enhanced Property Values Adjacent to the Site**
- **Positive Impact on Carbon Sequestration, Reduction in Air Pollutants, and Energy Use Reductions**
- **Connection to Environmental Educational Initiatives at Adjacent Neighborhood School**
- **Sustainable Capture of Roadway Runoff**
- **Reduced Flooding and Improved Drainage**
- **Green Jobs Created For Bioretention Maintenance**

**Environmental Benefits**

**Economic Benefits**

**Social Benefits**
Modeling and Optimization Tools Can Target GI Retrofits for Maximum CSO Reduction Efficiency

Factors affecting LID impact

- Baseline condition overflow
  - Degree / frequency of surcharge
- Regulator hydraulics
- Hydraulic interactivity from adjacent basins

Efficiency = CSO volume Reduced ÷ Inflow Volume Reduced
Stormwater user fees are an equitable mechanism for funding stormwater programs

- **Regulatory compliance requirements**
- **Stormwater management needs**
- **Economic development initiatives**

To address these issues, a *reliable, dedicated* funding mechanism is needed
Leveraging Grants and SRF Loans to Incentivize Green Infrastructure Investments

- **Incentive Programs** Encourage Installation of Stormwater Projects on Private Property, Helping with MS4 and CSO Permit Requirements

**• Incentives come in 2 forms:**
  - **Rebates or Grants** 1 time assistance with construction cost:
    - For example up to $1,200 for residences, $5,000 for businesses to install GI
  - **Credits** – a percentage reduction in the annual impervious area fee:
    - For example up to 50% for businesses treating impervious area with green infrastructure projects
Innovative Financing: Using the SRF to create Public-Private Partnerships

- **$7 M SRF Loan**
- **2 Programs**
  - Green Roofs
  - Other
- **Private Landowners provide**
  - 10% of construction costs
  - 30 yr maintenance agreement
- City is also implementing a Green Alley Program that residents pay $500 into repaving costs
Innovative Financing: Using the SRF to create Public-Private Partnerships

- $7M SRF PENNVEST Loan to fund implementation of GI on private property
- 45 GI/BMP sites, many on private property
- Early adopters incentive program
Onondaga County NY, Green Improvement Fund - Lessons Learned

Demand Exists!
- $6 M in awards
- 121 applications submitted for grant funding to-date
- 40 Grant awarded project completed
- 20 Projects currently under construction
- 40 Projects under contract for 2014 Construction Season

Transparency of Process is Paramount

It’s OK to modify program—Must adapt as program evolves
- A project in 2013 will not necessarily receive the same grant funding as a project in 2010
- Funding Caps Promote Bad Behavior
- Tiered Approach allows for both small and large scale projects
- Small scale projects contribute to community support
- Business case ensures value to City and County
- A thorough review process will ensure a good outcome
Green Up DC web site makes it easy for property owners to make decisions about green projects.
runoff calculated with rainfall-runoff method from center for watershed protection

- Pre-loaded impervious area data
- 9 project types
- Context-sensitive information
- Runoff before treatment is calculated from preloaded impervious area information

Users can choose from up to 9 project types
Conclusions and Lessons Learned

- Regional collaboration increases effectiveness of stormwater programs, particularly for education and financing
- Regional collaboration successes tied to strong leadership and clear goals and funding
- Balancing grey with green infrastructure approaches can lead to cost effective compliance, and alignment of community and regulatory goals
- Tools are available to target stormwater retrofits, align infrastructure asset management programs, and incentivize private sector participation
Collaborative Stormwater Solutions

Bob Newport

April 8, 2014
Case Study - Cincinnati

Lick Run Watershed
Pre-Development
Implementation Example

Cincinnati
A “Win” for the Cincinnati CSO Program  
(Lower Mill Creek Service Area)

Default solution: Tunnel
Alternative solution: Keep water out of the system (strategic sewer separation, “green corridor) and “right size” grey infrastructure components

Reduction in CSOs: 1.78 billion gallons (in a typical year for these sewersheds)

Costs
  - Default: $414.4 million (2006 dollars)
  - Alternative: $244.3 million (2006 dollars)
A Potential “Win” for the Community

- Adjoining streets will be “parkside drives”
  - Economic revitalization opportunities
- Open space and recreation
  - Neighborhood amenities
  - Health benefits
But Logistically More Complicated for the Sewer District

- Land acquisition
- Brownfield issues
- Demolitions
- Historic preservation
- Re-route surface transportation network
- Zoning
- Community involvement
- Maintenance
Partnerships and Stakeholders

- City & County Departments
- Mill Creek Restoration Project
- Community Building Institute – Xavier University
- University of Cincinnati
- Local Initiative for Support Corporations (LISC)
- OKI Regional Council of Governments
- Chamber of Commerce Agenda 360
- US Green Building Council
- Business owners in the Corridor
- Neighborhood Organizations
- Green Partnership of Greater Cincinnati
- Cincinnati Preservation
- State of Ohio
- Port Authority of Greater Cincinnati
- Cincinnati Park Board
So Collaboration Can Produce Win-Win Outcomes, and Looking Across Organizational Budgets, It Can Help Save Money

But Providing for Effective Collaboration Can Seem Like A Lot of Work, and There Can Be Many Logistical and Institutional Barriers to Overcome
Collaborations Between Stormwater Authorities and Park Districts

• Parks provide opportunities for stormwater practices
• But there has to be something in it for the Park District
  • New and Existing Park Demands
    • Trails and connectivity
    • Natural areas and habitat restoration
  • Reduced Maintenance Costs
    • Mowing grass costs money!
    • Native plantings instead of turf

Key Point #1
Creating an interconnected system of parks and open space is manifestly more beneficial than creating parks in isolation.

Key Point #2
Cities can use parks to help preserve essential ecological functions and to protect biodiversity.

Key Point #3
When planned as part of a system of green infrastructure, parks can help shape urban form and buffer incompatible uses.

Key Point #4
Cities can use parks to reduce public costs for stormwater management, flood control, transportation, and other forms of built infrastructure.
Village of South Holland
Veterans Memorial Park
Village of South Holland, Veterans Memorial Park
Let’s Add a Natural Area!
Naturalized Stormwater Basin
Homeowner Associations

Danada Woods Homeowner Assoc.
Naperville, IL
Corporate Campuses

Tellabs
Naperville, IL
Collaborations between Stormwater Authorities and Transportation Organizations

• In almost any city there are opportunities for green streets

Grange Avenue Bioswale
Greendale, WI
Traffic Calming

NE Siskiyou Street
Portland, OR
Excellent opportunities, but implementation challenges can often be encountered, e.g.,

- Design standards don’t seem to accommodate the green practice
- Combining funding sources may be logistically complicated
- Who will do the maintenance?
Aligning Schedules

It is almost always less expensive to put in place green features at the time road repairs or replacements are being made vs. doing the green infrastructure as a stand-alone project.
Michigan Avenue
TetraTech and C2AE

Before
Michigan Avenue

- 4 city blocks, both sides
- Typical garden, no overflow for 1-inch event
- 600 block north side, no overflow for 4.1-inches (25-year event)
Economic Development

- Department of Commerce
  - “Green” Industrial Park
- Small Business Administration
  - Firms to perform maintenance

- Entry level landscaping: Job skills with inspiring purpose
- “For the first time, I can go home and tell my mother I’m proud of what I’m doing”
Brownfields Program

- Implementing stormwater practices on infill sites and vacant parcels – some may be Brownfield properties
- Collaboration with the Brownfields program is needed to make sure all legal requirements are met and to make sure there are no unexpected or unintended consequence from implementation of a stormwater control measure

- Example: infiltration practices where there is soil contamination
Land Banks
$100 million in federal funds to be dispersed to 5 Michigan cities

Detroit to see $52.3 million for blight removal; Flint, Grand Rapids, Pontiac, Saginaw also receiving funds

Author: Joanne Marie Hoopes, ClickOnDetroit.com writer
Challenges After Demolitions

• Basements
• Impervious Surfaces
• Rocks and Debris
• Poor Soils for Vegetation
Menu of Bid Spec Modifications to Improve Demo Practices

- Soils for Earthwork
- Placement of Fill
- Grading
- Soil Stabilization and Seeding
- Impervious Surface Removal
- Pre-Demolition Survey
- Asbestos NESHAP Compliance
- Managing Harmful Dust
- Waste Management Plan
- Recycling and Salvage
- Waste Handling and Disposal
- Deconstruction
Coordinate Stormwater Program with work on Climate Change, Resiliency, and Flooding
Methods for Effective Collaboration

- Convene discussions with local groups, State agencies, Federal partners
- Convene discussions with business leaders on issues such as how green can contribute to economic revitalization and jobs
- Leveraging funding for related projects (e.g., lining up HUD or DOT funds to combine with stormwater funds)
  - Integrated asset management
- Engage foundations in discussions on opportunities for involvement
- Technical assistance on Brownfield issues
- Technical assistance on property acquisition/assembling parcels
- Technical assistance on historic preservation and adaptive re-use of buildings
- Technical assistance on institutional arrangements (e.g., partnerships with parks, partnerships with schools)
- Technical assistance on updating zoning, codes and ordinances
Methods for Effective Collaboration

• Look for common goals, establish shared vision
• Look for win-win situations, usually should be something in the plan for collaborating partners
  • Multi-purpose projects
• Communicate and quantify
• Identify barriers
  • Budgeting/cost-sharing
  • Timing
  • Ordinances
• Standard Methods (e.g., DOT Manual)
  • Immediate solutions (variance)
  • Long-term solution (update manual, update ordinance)
Q & A

Please wait for the microphone; state your name and affiliation
Upcoming MPC Roundtables

• Smart Systems, Resilient Regions
  – Tuesday, May 20, 2014

• Progress on the GO TO 2040 Comprehensive Plan
  – Thursday, May 29, 2014

• Register now at metroplanning.org
Thank you!

Please return your completed survey.