Innovations in the Use of Stormwater BMPs
A Retrospective Assessment of LID Requirements in South Portland, ME

Fred Dillon ~ South Portland Stormwater Program Coordinator
Steve Puleo ~ South Portland Community Planner

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Presentation Overview

• Brief Summary of Municipal SW Regulations
• Brief Summary of Municipal SW Programs in NNE
• SW Management & WQ Protection
• MS4 Program in Maine
• South Portland’s SW Management Approach
• Q&A / Discussion
Basic Regulatory Framework

- CWA
- NPDES
  - Wastewater
  - Stormwater
MS4* Program Elements

*Municipal Separate Storm Sewer System*
Municipal SW Management in NNE*

**MAINE**
- Bangor
- Lewiston
- Portland
- South Portland

**NEW HAMPSHIRE**
- Dover
- Portsmouth
- Exeter
- Manchester

**VERMONT**
- Burlington
- South Burlington
- Essex Junction

*Based on interviews w/ SW program managers from regulated communities*
SURVEY GOALS

• Better understand how communities prioritize SW program activities & needs

• Discover the role local regulations play in SW management

• Identify barriers to Low Impact Development (LID) implementation

• Identify effective SW management approaches
Municipal SW Management in NNE

FINDINGS: *most responses reactive*

- Many communities adopt standards that mirror state / fed regs
- Few go “above & beyond” (e.g., lower project disturbance thresholds to trigger SW controls)
- Only a few cases where LID is required
- Very few incentives to designate growth zones or promote density given high SW retrofit costs (~$100K/acre IC)
IMPLICATIONS

• There’s still lots of dirty water (i.e., surface waters not meeting WQ standards despite considerable efforts to date)

• Water will continue to be dirty (i.e., not meet WQ standards) unless / until something changes in the way we manage SW
“Stormwater runoff from the built environment remains one of the great challenges of modern water pollution control, as this source of contamination is a principal contributor to water quality impairment of waterbodies nationwide.”
1. SW program needs (almost) always > revenue

2. There's still lots of dirty water

3. Water will continue to be dirty unless / until

   something changes in the way we manage SW

Wadeable Streams Assessment: A Collaborative Survey of the Nation's Streams (EPA 841-B-06-002 Dec06)
SW Management & WQ Protection

- Changes in Runoff Quality & Quantity
- Source / Load Reductions
- Behavioral Change & Implementation of SW Controls
- Changes in Attitudes, Knowledge & Awareness
- SW Program Activities (i.e., permit compliance)

Local Requirements for Development / Redevelopment

Evaluating the Effectiveness of Municipal Stormwater Programs (EPA 833-F-07-010, Jan. 2008)
Municipal SW programs can only do so much; therefore...

Local land use policies @ site level & w’shed scale are critically important

- Address perceived conflict between SW regs & Smart Growth
- Encourage use of LID
EPA found that the higher-density scenarios generate less stormwater runoff per house at all scales and time series build-out examples.

“LID may be neutral on growth, but there is no excuse for LID to remain neutral on sprawl.”

Martin Dreiling – Taking a Stance on Sprawl

### Scenario A
- **1 acre parcels**
- 1,000 houses built on 1,000 acres produce:
- 1,000 acres x 1 house x 18,700 ft³/yr of runoff = 18.7 million ft³/yr (140 million gallons) of stormwater runoff
- Site: 20% impervious cover
- Watershed: 20% impervious cover

### Scenario B
- **1/4 acre parcels** (67% less runoff)
- 1,000 houses built on 250 acres produce:
- 250 acres x 4 houses x 6,200 ft³/yr of runoff = 6.2 million ft³/yr (46 million gallons) of stormwater runoff
- Site: 38% impervious cover
- Watershed: 9.5% impervious cover

### Scenario C
- **1/8 acre parcels** (74% less runoff)
- 1,000 houses built on 125 acres produce:
- 125 acres x 8 houses x 4,950 ft³/yr of runoff = 4.95 million ft³/yr (37 million gallons) of stormwater runoff
- Site: 65% impervious cover
- Watershed: 8.1% impervious cover

**BOTTOM LINE**
HOW & WHERE STUFF GETS BUILT REALLY MATTERS
MS4 Program in Maine

- Five year general permit deriving from CWA/NPDES
- In effect in ME since 2003
- 2013-18 draft permit now out for public review
- Currently 30 Municipalities
  - Bangor Area (BASWG)
  - Lewiston-Auburn
  - Portland Area (ISWG)
  - Southern Maine
MS4 Program in Maine

- Municipal stormwater regulations in Maine originate from federal Clean Water Act
- DEP has delegated authority to administer stormwater program
- SW BMPs required for projects that disturb an acre or more
- Municipalities must comply with state/federal regs and can go “above and beyond”
### Goibg “Above & Beyond” in SoPo

#### Review & Assessment of SW Standards

<table>
<thead>
<tr>
<th>Applicability Standards</th>
<th>(1) Post-Construction SW Plan</th>
<th>(2) Basic SW Management Plan</th>
<th>(3) Drainage Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 27-1536(b) All Reviews are Approved by the Planning Board</td>
<td></td>
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<tr>
<td>Site Plan that disturbed 15,000 SF or more and/or Major Subdivisions</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Site Plan that proposes 1,000 SF of new construction and between 5,000 SF to 15,000 SF of disturbance; or Minor Subdivisions</td>
<td></td>
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</tr>
<tr>
<td>Non-conforming Lots of Record which are less than 5,000 SF and/or have less than 50 ft Street Frontage or a building permit expansion of principal structures</td>
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</tbody>
</table>
Post-Construction SW Standards

- Requires management of quantity & quality for **ALL** SW by either:
  - Providing MaineDEP Ch. 500 SW permit; or,
  - Providing for the treatment for 0.5” runoff from 90% of new IC and 0.2” runoff from **ALL** disturbed pervious areas

- SW management must use Low Impact Development (LID) BMPs

- Treatment standards must comply with Ch. 10 Maine DEP Stormwater Manual & SoPo LID Manual
Basic SW Standards

- Requires the management of quantity & quality for **ALL** SW runoff by either:
  - Meeting the "basic" standards of MDEP Ch. 500 SW Rules; or,
  - Treating 0.5” runoff from 90% of new IC and 0.2” runoff from **ALL** disturbed pervious areas

- SW management must use Low Impact Development (LID) BMPs.

- Treatment standards must comply with Ch. 10 Maine DEP Stormwater Manual of SoPo LID Manual
Going “Above & Beyond” in SoPo

Basic SW Standards
Drainage Plan

- Must demonstrate that proposed improvements will minimize SW volume leaving site
- Consider location of improvements and minimize the amount of IC on the site
- SW management must use Low Impact Development (LID) BMPs.
- Treatment standards must comply with Ch. 10 DEP Stormwater Manual of SoPo LID Manual
Going “Above & Beyond” in SoPo

Drainage Plan

Rain garden

Foundation drain

Subsurface detention
## Going “Above & Beyond” in SoPo

<table>
<thead>
<tr>
<th>Additional Legal Requirements</th>
<th>Post-Construction SW Plans</th>
<th>Basic Management SW Plans</th>
<th>Drainage Plans For NCLR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legal Easements to Discharge on to City owned properties</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Drainage Maintenance Agreement</td>
<td>✔</td>
<td>✔</td>
<td>✔ Per WRP request</td>
</tr>
<tr>
<td>SW Management Plan and Inspection log</td>
<td>✔</td>
<td>✔</td>
<td>✔ Per WRP request</td>
</tr>
<tr>
<td>Council Approvals for the Use of City’s Facilities</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>DEP Ch. 500 permit and “Other Applicable” Standards</td>
<td>✔ If required by DEP</td>
<td>✔ Appendix B standards</td>
<td></td>
</tr>
<tr>
<td>Approval to discharge into the MS4</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Certified SW Inspection Report prior to the issuing Certificate of Occupancy</td>
<td>✔</td>
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</tr>
</tbody>
</table>
## Going “Above & Beyond” in SoPo

<table>
<thead>
<tr>
<th>Compliance Requirements</th>
<th>Post-Construction SW Plans</th>
<th>Basic Management SW Plans</th>
<th>Drainage Plans (NCLR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annually Inspection, Maintenance, and Repair</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Annual Inspection Report required by July 15th</td>
<td>✓</td>
<td></td>
<td>✓ Bi-annually per WRP request</td>
</tr>
<tr>
<td>“Qualified” 3rd Party Inspection of BMP’s</td>
<td>✓ If SW system required a DEP Permitted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electronic File the Record Drawing (Geo-referenced)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Standards for Easements &amp; ROW’s</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Material Standards</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Waivers of Standards</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Modifications of Stormwater Discharge Standards</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
Going “Above & Beyond” in SoPo
### Stormwater Treatment Costs (4/28/2014)

<table>
<thead>
<tr>
<th></th>
<th>Estimated Cost of the Project</th>
<th>Estimated Cost of the SW System</th>
<th>Impervious Cover Treated in square feet</th>
<th>Treatment Cost per Acre</th>
<th>Treatment Cost per square feet</th>
<th>SW Facilities % of Project Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average of 44 Projects requiring a PB Approval DEP/LCWMD Permitted</td>
<td>$4,509,869</td>
<td>$389,922</td>
<td>199,747</td>
<td>$96,849</td>
<td>$2.22</td>
<td>22.01%</td>
</tr>
<tr>
<td>Averages of 25 Projects requiring a PB Approval</td>
<td>$913,100</td>
<td>$38,408</td>
<td>12,865</td>
<td>$86,258</td>
<td>$1.98</td>
<td>5.26%</td>
</tr>
<tr>
<td>Averages of All 69 Projects Approved since May 2009</td>
<td>$2,869,237</td>
<td>$229,582</td>
<td>114,503</td>
<td>$92,018</td>
<td>$2.11</td>
<td>14.37%</td>
</tr>
</tbody>
</table>
• LID guidance document for small projects (< 1 acre)
• Internet-based from the City’s webpage
• Informative, easily accessible & understandable to laypeople (but also w/ design specs)
  ➢ Extensive graphic orientation
  ➢ Links to existing materials (no need to reinvent the wheel)
Why Worry About Stormwater?

The City of South Portland must comply with state and federal regulations to reduce the harmful effects of stormwater runoff. In response to these regulations, the City established Stormwater Management Performance Standards in April 2009 and more recently was awarded funding from Casco Bay Estuary Partnership to develop a web-based Stormwater Management Manual.

This manual, posted here on the City’s website, is intended to serve as a helpful resource for new development or redevelopment projects on smaller parcels (< 1 acre). It includes an introduction to stormwater, why it is so important to South Portland, what permit requirements small projects face, and detailed guidelines on how to meet those requirements while effectively protecting South Portland’s valuable water resources.

Please contact Fred Dillon at Water Resources Protection, 347-4136 or fdillon@southportland.org, for comments or questions on this project.
Going “Above & Beyond” in SoPo

LID / BMP TYPES (for simplicity of what works in constrained soils)

Voluntary
• Rain Gardens
• Rain Barrels
• Drip-Edge Filters
• Downspout Disconnection
• Soils Restoration

Drainage Plans
• Soils Restoration
• Rain Gardens
• Rain Barrels
• Drip-Edge Filters
• Downspout Disconnection
• LID concepts

SW Mngmt Plans
• Surface Soil Filter
• Below Grade Filter System (if space is limited)
• Gravel Wetland
• Storage and Reuse System
• Soils Restoration
• LID Concepts
• Proprietary Systems*

Honorable Mentions
• Porous Asphalt
• Porous Concrete
• Green Roofs

* Most with but some without external performance evaluation certification
Going “Above & Beyond” in SoPo

City of South Portland Soil Drainage Classes
(Potential Infiltration Capacity for LID Systems)
Q&A / Discussion

Fred Dillon
SW Program Coordinator
City of South Portland
PO Box 9422
South Portland, ME 04116-9422
(207) 347-4138
fdillon@southportland.org

Steve Puleo
Community Planner
City of South Portland
496 Ocean Street
South Portland, ME 04106
(207) 767-7648
spuleo@southportland.org