More Bang for the Buck: Integrating Green Infrastructure into Existing Public Works Projects

Tuesday, May 6th, 2014
1:00 – 2:30pm EST

Speakers:
Charlotte Katzenmoyer, City of Lancaster, PA
Matthew J. Millea, Onondaga County, NY

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Webcast Agenda

– Introduction

– Charlotte Katzenmoyer,
  Director of Public Works, City of Lancaster, PA

– Q&A session

– Matthew J. Millea,
  Deputy County Executive for Physical Services, Onondaga County, NY

– Q&A session

– Wrap up
Now to our speakers!
Speaker Contacts

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EPA Technical Assistance Report:  The Economic Benefits of Green Infrastructure
http://water.epa.gov/infrastructure/greeninfrastructure/gi_support.cfm

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GREEN IS THE NEW COLOR FOR STORMWATER

MORE BANG FOR THE “GREEN” BUCK: INTEGRATING GREEN INFRASTRUCTURE INTO EXISTING PUBLIC WORKS PROJECTS

Charlotte Katzenmoyer
Director of Public Works
THE CITY OF LANCASTER – OVERVIEW

- Incorporated in 1742 as a borough and in 1818 as a City
- Served as the temporary National Capital during the Revolution
- ~60,000 residents in the 2010 census
- 7.34 square miles
- Historic building stock (median home age of 100 years)
- One of 770 combined sewer communities in US
- Surrounded by some of the most productive non-irrigated farmland in the U.S.
THE CHALLENGE
750 million gal. polluted stormwater discharge

= 1150 Olympic-sized swimming pools

"Lancaster is in violation of the AO, and needs to address these deficiencies as soon as possible. Violation of the terms of the AO may result in further EPA enforcement action for violation of the order and for the underlying violations including, but not limited to, imposition of administrative penalties, 33 U.S.C § 1319(g), and/or initiation of judicial proceedings that allow for civil penalties of up to $37,500 per day, 33 U.S.C § 1319 (b) and (d), for each day of violation."

Cost of Solutions Are Significant

Previous Solution

$300 Million
Gray Infrastructure

Proposed Solution

$140 Million
Green Infrastructure

Doing Nothing is Not an Option
45% OF THE CITY IS SERVED BY COMBINED SEWERS, NEWER AREAS BY SEPARATE STORM SEWER AREAS.
IMPERVIOUS AREA
= 48% OF CITY

- Building: 41%
- Roadway: 25%
- Parking Lot: 32%
- Railroad: 2%
CURRENT EFFORTS FOCUS ON EARLY ACTION AND CONTINUOUS IMPROVEMENT

Maximize existing infrastructure for CSO Capture

- Pumping station upgrades, screening, etc.
- $20 M since 2001
- $17 M bond issue in 2011 for additional upgrades

Lead by Example: Modify current/proposed capital projects to incorporate GI

Secure funding for demonstration projects

Develop plan to scale up for city-wide implementation

Review all City ordinances to incorporate/require GI for redevelopment

Develop stormwater website

Conduct community education/outreach

Look ahead and develop incentives for private sector participation (i.e. stormwater utility)
THE GREEN INFRASTRUCTURE BENEFIT CALCULATOR PROJECTS FUTURE BENEFITS FOR CSO AND MS4 AREAS

<table>
<thead>
<tr>
<th>Impervious Area Type</th>
<th>Impervious Area</th>
<th>Green Technology</th>
<th>Impervious Area Managed</th>
<th>Total SW Runoff (MG/yr)</th>
<th>Annual Runoff Reduction</th>
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</thead>
<tbody>
<tr>
<td>Roads / Alleys</td>
<td>529</td>
<td>Green Streets</td>
<td>30%</td>
<td>159</td>
<td>513</td>
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<tr>
<td>Parks</td>
<td>241</td>
<td>Park Improvements / Greening</td>
<td>85%</td>
<td>17.0</td>
<td>19</td>
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<td>Sidewalks</td>
<td>124</td>
<td>Disconnection, Porous Pavement</td>
<td>35%</td>
<td>43.3</td>
<td>120</td>
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<tr>
<td>Parking Lots</td>
<td>648</td>
<td>Porous Pavement, Bioretention</td>
<td>20%</td>
<td>130</td>
<td>628</td>
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<tr>
<td>Flat Roofs</td>
<td>218</td>
<td>Vegetated Roofs / Disconnection</td>
<td>15%</td>
<td>32.7</td>
<td>212</td>
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<tr>
<td>Sloping Roofs</td>
<td>654</td>
<td>Disconnection/Rain Gardens</td>
<td>25%</td>
<td>164</td>
<td>635</td>
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<tr>
<td>Street Trees</td>
<td>N/A</td>
<td>Enhanced Tree Planting</td>
<td>N/A</td>
<td>45.1</td>
<td>44</td>
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<td>Public Schools</td>
<td>175</td>
<td>Green Schools</td>
<td>75%</td>
<td>38.4</td>
<td>50</td>
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<td>Various (Ordinance)</td>
<td>1274</td>
<td>First-Flush Ordinance</td>
<td>50%</td>
<td>637</td>
<td>1236</td>
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<td><strong>Total</strong></td>
<td><strong>1,265</strong></td>
<td></td>
<td></td>
<td><strong>3,752</strong></td>
<td><strong>1,053</strong></td>
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</table>

Pollutant Load Reductions

* Based on the midpoint pollutant concentrations in USEPA’s CSO Report to Congress, 2001

- Manage over 1,200 Acres of Impervious Area
- Capture over 1 Billion Gallons of Stormwater Runoff over the long term
6TH WARD PARK PLAN – EXTENDING THE BENEFIT OF THE PLAYCOURT

B. Revised Sketch Without Formerly Proposed Frederick Street Connection and with Fewer Proposed Pathways (September, 2008)
6TH WARD PARK RE-DEDICATION CEREMONY
BRANDON PARK

4 Million Gallons / year reduction in runoff volume
$0.15 / gal
BRANDON PARK – WABANK ST. CURB EXTENSIONS
BRANDON PARK
PARKING LOTS
MIFFLIN STREET PARKING LOT

265,000 Gallons / year reduction in runoff volume
$0.10 / gal
PLUM STREET PARKING LOT

511,000 Gallons / year reduction in runoff volume
$0.17 / gal
<table>
<thead>
<tr>
<th>Parking Lot</th>
<th>Drainage Area</th>
<th>GI Area</th>
<th>Capture Volume</th>
<th>Capital Costs with Contingency</th>
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</thead>
<tbody>
<tr>
<td>Plum Street</td>
<td>23,402</td>
<td>4,680</td>
<td>511,000</td>
<td>$89,862</td>
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<tr>
<td>Dauphin</td>
<td>20,582</td>
<td>4,516</td>
<td>411,000</td>
<td>$61,822</td>
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<tr>
<td>Penn</td>
<td>22,758</td>
<td>4,219</td>
<td>455,000</td>
<td>$60,749</td>
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<tr>
<td>Mifflin</td>
<td>13,242</td>
<td>1,324</td>
<td>265,000</td>
<td>$27,013</td>
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<tr>
<td>TOTAL</td>
<td>1,642,000</td>
<td></td>
<td></td>
<td>$239,446</td>
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</tbody>
</table>

COST PER GALLON = $0.14/gallon
GREEN ROOFS

Over 100,000 square feet of green roofs in Lancaster City.
Green Streets & Alleys
Pavement Condition Summary by Functional Class
Using Descriptive Terms - All Streets

Green Street Focus

PMP Focus

Percentage of Network

Pavement Condition Index

Very Poor (0 to 20) Poor (20 to 35) Marginal (35 to 45) Fair (45 to 55) Good (55 to 70) Very Good (70 to 85) Excellent (85 to 100)
FIRST GREEN ALLEY
ALLEY 148 GREENED FOR 10% ADDITIONAL COST

+ CAPTURES 200,000 GALLONS PER YEAR

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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<tr>
<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>
</tr>
<tr>
<td><strong>Total Weighted Average</strong></td>
<td><strong>$20.32</strong></td>
<td><strong>$22.37</strong></td>
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<tr>
<td>Additional Green Cost ($/SF)</td>
<td>---</td>
<td>$2.05</td>
</tr>
<tr>
<td>Additional Green Cost (%)</td>
<td>---</td>
<td>10%</td>
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</table>

Conventional reconstruction (8-inch reinforced concrete)

Green alley retrofit (permeable pavers with infiltration trench)
5 MPH reduction in average traffic speed
The Lancaster Brewing Company “Beer Garden” is Coming!
Ever wonder where all the rain and snow goes after a storm?
Water that rains down washes over streets, lawns, parking lots and off of roofs, like the one over your head, and eventually into storm drains (the grates you see on sidewalks and streets). Along the way, the water gets really dirty from things like litter, pet waste, chemicals, oils and car fluids.
While some of it can be cleaned up at a treatment center, some of that dirty water ends up in our creeks, ponds and lakes like the Conestoga River, and eventually flows all the way to the Chesapeake Bay!
Each year, 750 million gallons of polluted water from Lancaster City ends up in the Bay. That’s a lot of dirty water! What if we could keep it clean?!

There are lots of ways we can all help recycle water.
And one of those ways is right here where you are eating—the cool Public Artwork outside this restaurant, called “Lancaster’s Gateway Bundle.”
When rain falls or snow melts on the roof, it flows right into the giant "bucket" (called a cistern) attached to the building. The cistern catches that water before it flows through the drains into the rivers. It can hold 750 gallons of water (that’s enough to fill your bathtub over 30 times!)
And guess what? Not only do we keep that dirty water from going into our rivers and streams, that water can be used to water the plants in the restaurant’s garden outside.

Now that’s cool!
URBAN TREE CANOPY

Current: 28%

Potential: 45%

Goal: 40%
INNOVATIVE FINANCING USING SRF
### STATUS

Summary of Green Infrastructure Program Implementation Status as of 03/28/14

<table>
<thead>
<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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</thead>
<tbody>
<tr>
<td>Constructed / Under Construction</td>
<td>44</td>
<td>891,000</td>
<td>20</td>
<td>17,146,000</td>
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<tr>
<td>In Design for Construction</td>
<td>12</td>
<td>530,000</td>
<td>12</td>
<td>7,798,000</td>
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<tr>
<td>Conceptual Designs (non-PV/GGP)</td>
<td>26</td>
<td>696,000</td>
<td>16</td>
<td>8,358,000</td>
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<tr>
<td>PENNVEST Concepts</td>
<td>25</td>
<td>555,000</td>
<td>13</td>
<td>11,360,000</td>
</tr>
<tr>
<td>Growing Greener Plus Concepts</td>
<td>1</td>
<td>14,000</td>
<td>0.3</td>
<td>280,000</td>
</tr>
<tr>
<td>In Project Planning</td>
<td>51</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>159</td>
<td>2,686,000</td>
<td>62</td>
<td>44,942,000</td>
</tr>
</tbody>
</table>

$3.64$ M in grants used to date
Matched by $3.7$ M in local/city funds
PAYING FOR IT!
IMPERVIOUS AREA FEE ANALYSIS

Number of Properties

- Single Family: 77%
- Commercial: 21%
- Industrial: 1%
- Non-Profit: 1%
- Institutional: 0.25%
- Government: 0.32%

Number of ERUs

- Single Family: 17%
- Commercial: 50%
- Industrial: 19%
- Non-Profit: 3%
- Institutional: 6%
- Government: 5%
Rates and charges assume medium level of service ($4,800,000 annual program)
And rate of $7.74/1,000 square feet/quarter
IMPLEMENTING A RATE STRUCTURE WITH FOUR “TIERS” BASED ON IMPERVIOUS AREA.

The GIAC recommends:

- Tier 1 (0-999 sq. ft.): $19, 11%
- Tier 2 (1,000-1,999 sq. ft.): $23 to $32, 11%
- Tier 3 (2,000-2,999 sq. ft.): $4, 26%
- Tier 4 (≥3,000 sq. ft.): $12, 52%

Percentages refer to percent of all properties.

Rates are estimated first year fees per quarter, for Medium Level of Service, at $31/1000 sf/yr, or $7.50/1000 sf/qu.

For example – average fee per quarter:
- Residential: $10
- Commercial: $139
COMMUNITY EDUCATION AND OUTREACH

SAVE IT!
YOUR WATER.
YOUR MONEY.
YOUR CITY.

What’s the Problem? | What Can I Do? | Benefits | Local Projects | Resources | What’s New? | FAQs

WATER HEROES

Chestnut Hill
For Doreen Landis, Chestnut Hill Cafe’s owner, Lancaster City’s stormwater problem hits home. Literally.

BABY STEPS:
I’ve got 5 minutes,
What can I do?
Take a shower instead of a bath

BIG STEPS:
I’ve got 5 hours,
What can I do?
Install a rain barrel

GIANT STEPS:
I’ve got 5 days,
What can I do?
Install a green roof

Your Water.
Your Money.
Your City.

Lancaster, you can help
SAVE IT!

Lancaster City needs to save 750 million gallons of water annually from entering its combined sewer system to preserve clean drinking water, avoid costly fines and continue to build a healthy, vibrant community. Join our list serve and stay informed!

Enter your email
LESSONS LEARNED OR KEYS TO SUCCESS

• Garner political or high level leadership support early in process
• Start the public education or “setting the stage” from the get go – MESSAGE, MESSAGE, MESSAGE – test the messaging and hone as you proceed.
• Lead by example – NOT “do as I say, not as I (don’t) do”!
• Use stakeholders from all affected rate paying classes and geographical representation on a GI advisory group
• Use demonstration projects to rally neighbors around the issues and garner their support of the overall program
• Figure out your funding strategies; use the GI to leverage other funding; and stretch the limited dollars and resources that we all face – INTEGRATED INFRASTRUCTURE
• Grants, grants, grants!
• Include 3 years of maintenance in contract as part of rain gardens since there is a high mortality rate
• Do NOT underestimate the value of educating the public throughout the process
QUESTIONS?

CONTACT INFORMATION

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717-291-4739
Thank you.

Please visit SavetheRain.us

For Updates:
@SavetherainUS & @MJMillea_OC
Save The Rain
Clean The Lake

Every drop counts. We can all make a difference.

Save the Rain

Onondaga County

www.savetherain.us
No one had an iPhone seven years ago....

We didn’t even know we needed one....
Onondaga County, New York

- 8 CSO sewersheds
- 7,660 acres
- 49 CSOs
- 380 million gallons/year CSO
Why Are We Saving The Rain?
MUNICIPAL SEWER & WATER

A BETTER WAY FORWARD

Onondaga County, N.Y., turns to green infrastructure improvements to alleviate CSOs

PAGE 10
There Was A Better Way To Clean Up Onondaga Lake Than Building Three More of These
The Gray
Smart Gray Investments Made Green Possible
= $173 Million

Metropolitan Waste Water Treatment Facility (90 MGD)
Advanced Amonia and Phosphorous Removal

Gray Projects = $150 Million
- Harbor Brook Interceptor (ARRA)
Gray Projects = $150 Million

- Harbor Brook Interceptor (ARRA)
- Midland Conveyance (CSO 044)
- Clinton Storage Facility
- Harbor Brook Storage Facility and Conveyances
- Sewer separation projects (022/045)
- Facilities Planning
- Floatable Control
- Remaining CSO Facilities Plan
LOWER HARBOR BROOK CSO STORAGE FACILITY

VIEW FROM NORTHEAST
Clinton Sewershed - Six Million Gallons Subsurface Storage

$77.8 Million

Construction Start - 09/15/2011
The Gray

The Green

Clinton Sewerage - 60 Million Gallons Subsurface Storage
$77.8 Million

What Have We Been Up To Since 2000?
Been up to since 2008?

The Green
“To work in sustainability is to work in complexity,” PATRICIA URQUIOLA
Our Journey Begins:
A Plan Developed:
# Onondaga County Department of Water Environment Protection

## Green Infrastructure Program Summary

<table>
<thead>
<tr>
<th>Program Type Roll-up (6)</th>
<th>Area / Impervious Source (1)</th>
<th>Primary Green Infrastructure Technology (2)</th>
<th>Implementation Strategy (5)</th>
<th>Who</th>
<th>How Much</th>
<th>Progress to Date</th>
<th>Where are We Going?</th>
</tr>
</thead>
<tbody>
<tr>
<td>01-Streets</td>
<td>Residential/Commercial Roads/Boulevards</td>
<td>Green Streets</td>
<td>Road and Utility Improvement/Redevelopment</td>
<td>City DPW</td>
<td>36%</td>
<td>176,118</td>
<td>14,027,563</td>
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<tr>
<td></td>
<td>Highways</td>
<td>Dry Well/Anthrax Lines Brackets</td>
<td>New York DOT Road Infrastructure &amp; Reconstruction Program</td>
<td>New York DOT</td>
<td>36%</td>
<td>176,118</td>
<td>14,027,563</td>
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<td></td>
<td>Median/Traffic Islands</td>
<td>Bioretention</td>
<td>Road and Utility Improvement/Redevelopment</td>
<td>City DPW</td>
<td>36%</td>
<td>176,118</td>
<td>14,027,563</td>
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<td></td>
<td>Sidewalks</td>
<td>Permeable Pavement</td>
<td>Sidewalk Construction with new detail</td>
<td>City DPW</td>
<td>36%</td>
<td>176,118</td>
<td>14,027,563</td>
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<tr>
<td>Streets/ROW (Arboretum)</td>
<td>Canopy Study Planting Plan</td>
<td>Canopy Study Planting Plan</td>
<td>Canopy Study Planting Plan</td>
<td>Canopy Study Planting Plan</td>
<td>36%</td>
<td>176,118</td>
<td>14,027,563</td>
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<tr>
<td>02-Parks &amp; Open Space</td>
<td>Parks (Including adjacent Streets)</td>
<td>Disconnection into Park</td>
<td>Develop Park Green Plan</td>
<td>Parks</td>
<td>36%</td>
<td>176,118</td>
<td>14,027,563</td>
</tr>
<tr>
<td></td>
<td>Stream Inflow Removal</td>
<td>Use natural area &amp; drainage to reduce/eliminate inflow</td>
<td>Dilute Drainage Area, monitor &amp; update model</td>
<td>Parks</td>
<td>36%</td>
<td>176,118</td>
<td>14,027,563</td>
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<td></td>
<td>Stormwater Areas (e.g. IRRs)</td>
<td>Constructed Wetlands</td>
<td>Constructed Wetlands</td>
<td>CCWEP</td>
<td>36%</td>
<td>176,118</td>
<td>14,027,563</td>
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<td>03-Parking</td>
<td>Parking Lot</td>
<td>Permeable Pavement</td>
<td>Vacant Land Strategy</td>
<td>Parks</td>
<td>3%</td>
<td>2,701,023</td>
<td>4,183,162</td>
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<td>04-Public Facilities</td>
<td>Public Schools</td>
<td>Permeable Pavement</td>
<td>City/County</td>
<td>City/County</td>
<td>6%</td>
<td>1,504,578</td>
<td>2,501,789</td>
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<td></td>
<td>County Facilities</td>
<td>Green Roof, Capture Rainwater</td>
<td>City/County</td>
<td>City/County</td>
<td>6%</td>
<td>1,504,578</td>
<td>2,501,789</td>
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<td>05-Roofs</td>
<td>Flat Roofs</td>
<td>Green Roof</td>
<td>Facilities</td>
<td>Facilities</td>
<td>6%</td>
<td>1,504,578</td>
<td>2,501,789</td>
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<tr>
<td>06-Impervious Area Data</td>
<td>Residential Roofs/Driveways</td>
<td>Disconnection</td>
<td>Model Calibration to Measured DNL/Flow</td>
<td>CH2M HILL</td>
<td>14%</td>
<td>28,800,000</td>
<td>0</td>
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<td>07-Voluntary</td>
<td>Residential Roofs</td>
<td>Green Roof</td>
<td>Residential</td>
<td>Residential</td>
<td>5%</td>
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<td>Parking Lots</td>
<td>Permeable Pavement</td>
<td>Residential</td>
<td>Residential</td>
<td>5%</td>
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<td></td>
<td>Commercial/Industrial</td>
<td>All</td>
<td>Commercial/Industrial</td>
<td>Commercial/Industrial</td>
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<td>08-Green Improvement Fund (GIF)</td>
<td>All</td>
<td>All</td>
<td>All</td>
<td>All</td>
<td>5%</td>
<td>1,132,000</td>
<td>1,252,500</td>
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<td>09-Ordinance</td>
<td>All</td>
<td>All</td>
<td>All</td>
<td>All</td>
<td>19%</td>
<td>3,870,767</td>
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<td>10-Impervious Area Based Rate Incentive</td>
<td>All</td>
<td>All</td>
<td>All</td>
<td>All</td>
<td>1%</td>
<td>0</td>
<td>0</td>
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<td>11-Non GIF Incentive</td>
<td>All</td>
<td>All</td>
<td>All</td>
<td>All</td>
<td>5%</td>
<td>305,000</td>
<td>188,000</td>
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</tbody>
</table>

*In progress*

*Total CSO Reduction (gal) 247,000,000 100% 40,568,498 37,257,149 -169,174,353*
A Plan Evolves:
Storm Water Management Model

More than doubled SWMM inputs
More than doubled SWMM inputs
Subcatchment/Soil Standard Overlay
CSOshed Priority Map
We Started By Asking, "What if..."
## County Facilities
**Greening the Civic Strip Utilizing Multiple Green Infrastructure Technologies**

<table>
<thead>
<tr>
<th>Location</th>
<th>Green Technology</th>
<th>Impervious Drainage Area (SF)</th>
<th>Estimated CSO Volume Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Court House</td>
<td>Vegetated Roof, Bioretention</td>
<td>20,100</td>
<td>290,203</td>
</tr>
<tr>
<td>Civic Center</td>
<td>Vegetated Roof</td>
<td>6,100</td>
<td>88,072</td>
</tr>
<tr>
<td>War Memorial</td>
<td>Cistern System</td>
<td>68,600</td>
<td>990,444</td>
</tr>
<tr>
<td>Convention Center</td>
<td>Vegetated Roof, Bioretention</td>
<td>20,300</td>
<td>293,090</td>
</tr>
<tr>
<td>Convention Center Parking Lot</td>
<td>Pavement Removal/Bioretention</td>
<td>58,700</td>
<td>847,508</td>
</tr>
<tr>
<td>Sheriff's Office HQ</td>
<td>Vegetated Roof</td>
<td>9,650</td>
<td>139,326</td>
</tr>
<tr>
<td>Criminal Court House</td>
<td>Vegetated Roof, Porous Parking Lot</td>
<td>15,100</td>
<td>218,013</td>
</tr>
<tr>
<td>Public Safety Building</td>
<td>Vegetated Roof</td>
<td>15,100</td>
<td>218,013</td>
</tr>
<tr>
<td>Justice Center</td>
<td>Vegetated Roof</td>
<td>11,550</td>
<td>196,628</td>
</tr>
<tr>
<td>Steam Station</td>
<td>Vegetated Roof</td>
<td>22,400</td>
<td>323,410</td>
</tr>
<tr>
<td>Community Plaza</td>
<td>Porous Parking Lot</td>
<td>30,750</td>
<td>523,491</td>
</tr>
<tr>
<td>County Parking Lot</td>
<td>Porous Parking Lot</td>
<td>29,000</td>
<td>418,701</td>
</tr>
<tr>
<td>Convention Center Parking Lot</td>
<td>Porous Parking Lot</td>
<td>53,200</td>
<td>768,099</td>
</tr>
<tr>
<td>County Parking Lot</td>
<td>Porous Parking Lot</td>
<td>3,400</td>
<td>49,089</td>
</tr>
<tr>
<td>County Parking Lot</td>
<td>Bioretention</td>
<td>43,000</td>
<td>620,832</td>
</tr>
<tr>
<td>County Parking Lot</td>
<td>Porous Parking Lot</td>
<td>53,940</td>
<td>918,280</td>
</tr>
<tr>
<td>Convention Center Parking Lot</td>
<td>Porous Parking Lot</td>
<td>95,950</td>
<td>1,633,462</td>
</tr>
<tr>
<td>Convention Center Garage</td>
<td>Downspout Diversion to Bioretention</td>
<td>72,500</td>
<td>1,046,752</td>
</tr>
<tr>
<td>S. Townsend St. Median</td>
<td>Pavement Removal/Bioretention</td>
<td>6,650</td>
<td>96,012</td>
</tr>
<tr>
<td>S. Townsend St. Median</td>
<td>Enhanced Street Trees</td>
<td>20,520</td>
<td>252,988</td>
</tr>
</tbody>
</table>

**TOTAL** 656,510 9,932,412
Not So Good
Getting Better
On-Center Surface Lot
Further Action Needed: The Save the Rain website will continue to act as the primary public outreach method for all of the Save the Rain green projects. However, targeted outreach will occur in more highly populated and sensitive areas to inform the public of the project.

Project Metrics Summary

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bid Price</td>
<td>$529,040</td>
</tr>
<tr>
<td>Change Order Total (as of 12/31/11)</td>
<td>$149,778.39*</td>
</tr>
<tr>
<td>Total Project Cost (as of 12/31/11)</td>
<td>$529,040</td>
</tr>
<tr>
<td>Total CSO Reduction</td>
<td>1,676,000 gallons</td>
</tr>
<tr>
<td>Cost per CSO Reduction</td>
<td>$0.32 per gallon</td>
</tr>
</tbody>
</table>

*Asphalt Thickness Change Order to be paid for out of OC Facilities Management Budget
What About Green Streets, Do You Have Any Of Those?
Water Street Gateway Project - Before
Viewing towards the Northwestern Corner of E. Water St. and S. State St. The old gym bldg is shown here with a greenhouse, a section of greenroof and solar panels on its rooftop, and the Water Street is shown as a green street for stormwater management.
Green Infrastructure 2011
Signature Projects

Treatment Wetland and Restoration Project
Public Private Partnerships
Green Improvement Fund
It Takes Many Hands to Save the Rain
Strategic Partnerships:
The Connective Corridor
City DPW Road Recon
FACT SHEET
Oneida Street
Road Reconstruction

Project Description: The Oneida Street Road Reconstruction Project exemplifies the continued partnership between the City of Syracuse and Onondaga County through the Save the Rain Program. The City of Syracuse had planned to reconstruct Oneida Street in 2013, and Onondaga County partnered with the City to construct an underground infiltration trench system prior to the road reconstruction. This project was constructed by the City’s contractor under their annual Street Structures contract, providing further cost savings for both City and County.

Oneida Street was the second road reconstruction project to be completed in the CSO 037 area in 2013, along with the South Clinton Street project. The combined stormwater capture of these two projects significantly decreases the overflow from CSO 037.

The underground infiltration trench on Oneida Street is four and a half feet wide and eight feet deep located between existing underground utilities. Stormwater is fed to the infiltration trench via pre-existing street catch basins with filter inserts and then infiltrates into the ground. The infiltration trench system on this project captures approximately 1,464,000 gallons annually.
Green Parks!
Levenworth Park
A Key Component: Education & Outreach
Outreach Partners:
- Environmental Finance Center @ SU
- Baltimore Woods
- Onondaga Environmental Institute
- Onondaga Earth Corps
- Atlantic State Legal Foundation
- SUNY ESF
SAVE THE RAIN CLEAN WATER FAIR
TAKE FACILITY AND GREEN INFRASTRUCTURE SITE TOURS
RAIN BARREL WORKSHOPS • EDUCATIONAL EXHIBITS
ENTERTAINMENT AND ACTIVITIES FOR KIDS • FREE FOOD

learn, explore, discover!

SEPT. 22 • 9AM-2PM • AT THE
ONONDAGA COUNTY
DEPARTMENT OF WATER ENVIRONMENT PROTECTION
650 HIWATHA BLVD., SYRACUSE NY

TO LEARN MORE, VISIT: SAVETHERAIN.US/2012FAIR
www.SaveTheRain.us

Steal These Projects!
We Are Committed to Open Sourcing Our Program

@SaveTheRainUS
The "Save the Rain" program is a comprehensive stormwater management plan intended to reduce pollution to Onondaga Lake and its tributaries. During wet weather events, stormwater flows into the local sewer system, causing heavy flow periods that can overload the system.

Water from the roof of the Carrier Dome to be captured & reused
The university last month received a $1.35 million state grant to install a system to collect the rainwater that runs off the fabric roof of the Carrier Dome, the 43,255-seat arena where SU's basketball, football and other teams play. Approximately 800,000 of the 6.6 million gallons...
(read more)
Asset Management: Program Innovation
# 2222847 - Porous Pavement Vacuuming Lot # 3

**Work Description**

- **WO:** 2222847
- **Report Date:** 1/31/2012 10:38:41 AM
- **Reported By:** HJOHNS
- **Supervisor:** PCENTO
- **Asset:** 15199
- **Location:** 10714
- **Job Plan:** 5384

## 2222847 Porous Pavement Vacuuming Lot # 3

**Equipment**
- 15199 Porous Asphalt Parking Lot

**Location**
- 10714 E-06 City Lot # 3 Oswego Blvd.

<table>
<thead>
<tr>
<th>Task</th>
<th>Task Description</th>
<th>Equipment Description</th>
<th>Location Description</th>
<th>WO #</th>
<th>Meas. Point</th>
<th>Value</th>
<th>Date</th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Safety set-up: Set up safety perimeter. Ensure that no cars are parked in the lot and that the parking lot is closed/not accessible to the public. Public notice announcing lot closing needs to be posted per City/County standards of notification.</td>
<td>Porous Asphalt Parking Lot</td>
<td>E-06 City Lot # 3 Oswego Blvd.</td>
<td>2222848</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Inspect: Visually inspect porous pavement for damage, including holes, cracks, pavement slippage and areas of standing water. Inspect status of aggregate between voids in porous pavement to see if additional replacement aggregate is needed. Record.</td>
<td>Porous Asphalt Parking Lot</td>
<td>E-06 City Lot # 3 Oswego Blvd.</td>
<td>2222849</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Prepare site for vacuuming: Remove (by hand) bulky debris and waste materials from surface of porous pavement that may block/dog vacuum hose (i.e. litter, tree branches, wire, car parts) prior to using vacuum. Use a rigid street broom to loosen debris</td>
<td>Porous Asphalt Parking Lot</td>
<td>E-06 City Lot # 3 Oswego Blvd.</td>
<td>2222850</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>Vacuum: Vacuum porous pavement per the vacuum manufacturer recommendations. Follow all steps in the Operation Checklist for the specified vacuum.</td>
<td>Porous Asphalt Parking Lot</td>
<td>E-06 City Lot # 3 Oswego Blvd.</td>
<td>2222851</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>Engage the Water Feature/ Water Dust Control Option of the vacuum (or equivalent on specific vacuum model).</td>
<td>Porous Asphalt Parking Lot</td>
<td>E-06 City Lot # 3 Oswego Blvd.</td>
<td>2222852</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>Drive the vacuum over the porous pavement, operating at a slow speed setting not greater than 5 to 10 miles per hour. Overlap the edges of the vacuum runs and make two passes over the entire porous pavement area.</td>
<td>Porous Asphalt Parking Lot</td>
<td>E-06 City Lot # 3 Oswego Blvd.</td>
<td>2222853</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Save the Rain: Green Infrastructure Program
Maintenance Report Log

PM Task Name: ________________________

Truck Number: ________________________  Weather Conditions: ________________________

Location Name: ________________________  Location Address: ________________________

Task Code: ____________________________  Task Description: ____________________________

Task Start Date: ________________________  Task End Date: ____________________________

Labor Personnel Name: ____________________

Tools Used (List Maximo Iter): ____________________

Material Used (List Maximo I): ____________________

Porous Pavement Maintenance: ____________________

POROUS PAVEMENT VACUUM:

Vacuum Type/Manufacturer: ____________________  Hour Meter Start: __________

Hour Meter End: __________  Number of Passes: ____________________

Vacuuming Notes: ____________________

POROUS PAVEMENT DEBRIS ANALYSIS (Please submit photos if necessary)

Weight of Material (in bag) or Approx. Amount of Material in Bag (x/x): ____________________

Description of Vacuumed Materials: ____________________

Notes about Vacuumed Materials: ____________________

POROUS PAVEMENT POWER WASHING DETAILS (Please submit photos if necessary)

Power Washer Type/Manufacturer: ____________________
We’ve Come A Long Way In Four Years....
GREEN EFFORTS WIN RECOGNITION

FEDERAL GOVERNMENT SINGLES OUT SYRACUSE AND ONONDAGA COUNTY AS ENVIRONMENTAL LEADERS

Four places of the local effort

By Matt Warner

Four places of the local effort

By Matt Warner

CLOSING THE CREEK

One of many green spaces along the canal.

Greening a red zone

A park near my home

Conserving energy

North, South, East, West, and
canals are all that's needed.

Obama at Facebook shows rising status of social media

Federal Regulations Fuel Complaints at Hearing Chaired by Buerkle
Rooftops to Rivers II:
Green strategies for controlling stormwater and combined sewer overflows

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Joan Davine
Natural Resources Defense Council

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Emily Clifton, Low Impact Development Center
Larry Levine, Natural Resources Defense Council
Rebecca Hammer, Natural Resources Defense Council

NRDC
The Earth's Best Defense
SYRACUSE, NEW YORK

A CASE STUDY OF HOW GREEN INFRASTRUCTURE IS HELPING MANAGE URBAN STORMWATER CHALLENGES

TYPES OF GREEN INFRASTRUCTURE USED: Green roofs, rain barrels/cisterns, permeable pavement, rain gardens, vegetated swales, street trees, green streets, planter boxes

In 2009, when Onondaga County gained federal court approval of its new Save the Rain program, Syracuse became the first community in the United States with a legal requirement to reduce sewage overflows with green infrastructure. The county’s strategy integrates both green and gray approaches to meet binding CSO targets phased in over nine years. Green infrastructure investments, totaling nearly $80 million, will account for nearly two-thirds of future CSO reductions. The program is funded with a combination of sewer fees and low-interest loans and grants from the state. The county has installed a number of demonstration projects and expects to complete at least 50 projects by the end of 2011. To encourage green infrastructure on private property, the county has launched a comprehensive public outreach and education program and provides financial incentives in the form of a direct grant program and rain barrel giveaways. There is currently no retention standard for new development or redevelopment, but the county is working with the city of Syracuse on a new ordinance that may include such a standard.
UNITED STATES WATER PRIZE
National Green Infrastructure Summit: October 2013
The Results: Remarkable
A Cleaner More Vibrant Lake
Figure III-6. Summer (June to September) average total phosphorus concentration in the upper waters (0-3 meters) of Onondaga Lake, 1990–2012.
What’s Next?
The trail will crest the old Allied waste beds.
Learning and innovation go hand in hand. The arrogance of success is to think that what you did yesterday will be sufficient for tomorrow - William Pollard
We are allowed to get smarter... - Matt Millea
Thank you.

Please visit SavetheRain.us

For Updates: @SavetherainUS & @MJMillea_OC