

# DEMYSTIFYING THE STORMWATER MANAGEMENT FEE: IMPLEMENTING A STORMWATER FEE TO PAY FOR INTEGRATED STORMWATER SOLUTIONS



January 28, 2016  
3 Rivers Wet Weather

# 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)
- Surrounded by some of the most productive non-irrigated farmland in the U.S.
- Environmental Justice Community





# Lancaster's Clean Water Act History

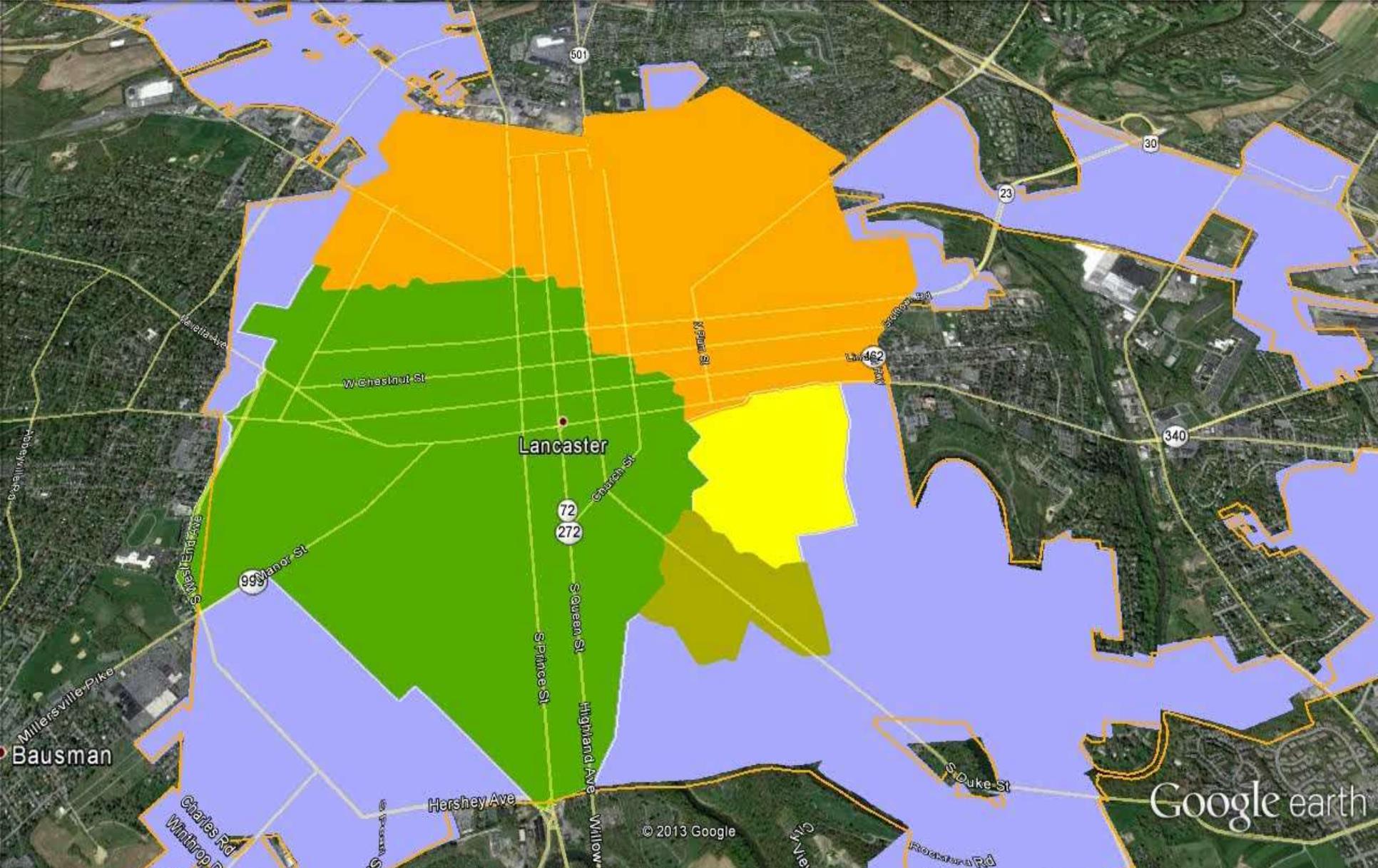
# We are not alone! Many municipalities have combined sewer overflows (CSOs).



## US EPA:

- 772 CSO Communities
- Approximately 40 million people

# 45% Combined, 55% Separate Storm Sewers





**"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**



**Proposed Solution**



**Doing Nothing is Not an Option**

**Doing Nothing is Not an Option**



# Multiple Clean Water Challenges Require An Integrated and Equitable Solution

- CSO Discharges
- MS<sub>4</sub> Permits
- TMDLs: Chesapeake Bay Requiring 60% reduction in nutrients by 2017
- Integrating these efforts and implementing them consistently can greatly reduce CSO discharges and nutrients from the urban area such as MS<sub>4</sub> Communities

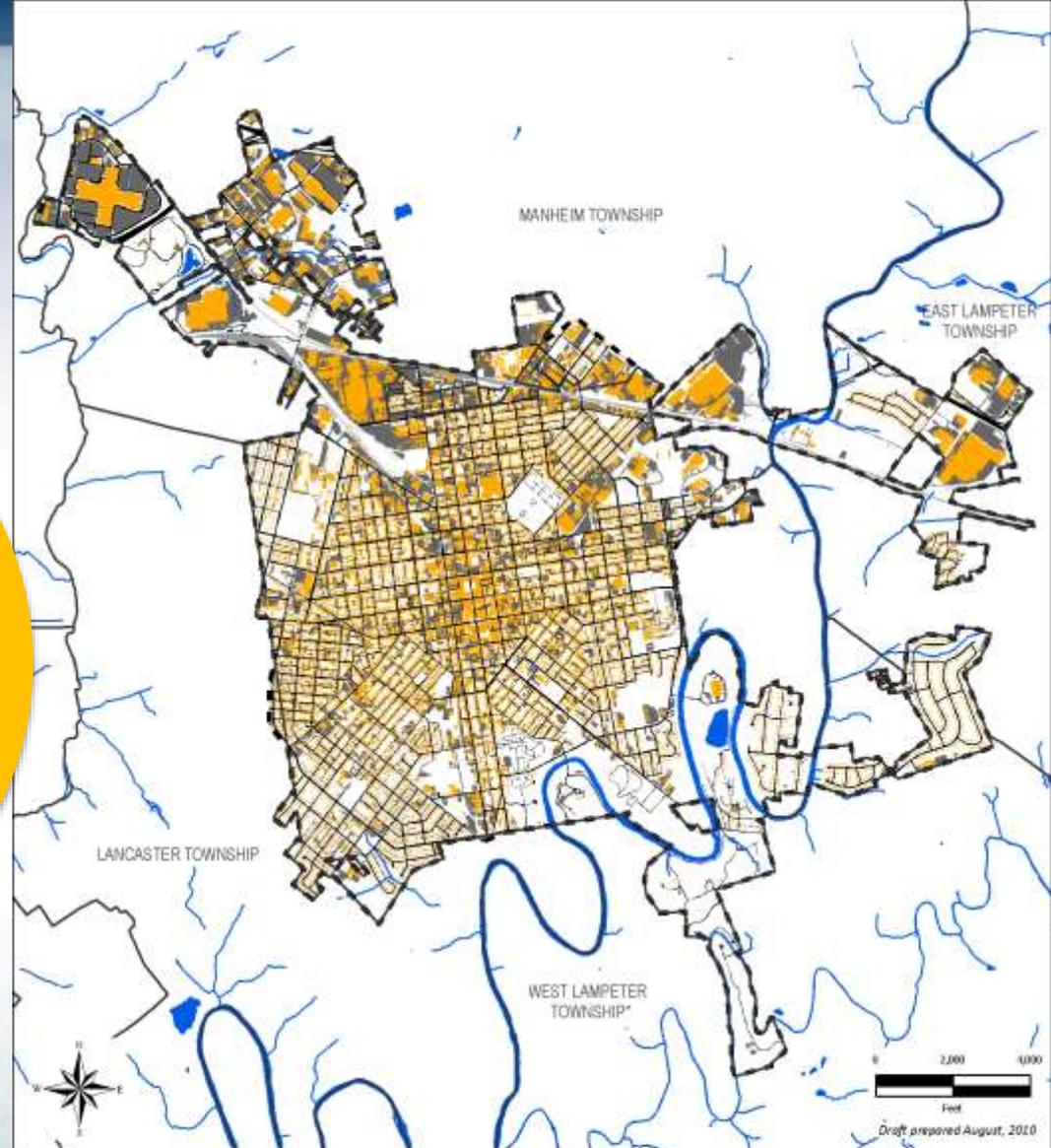
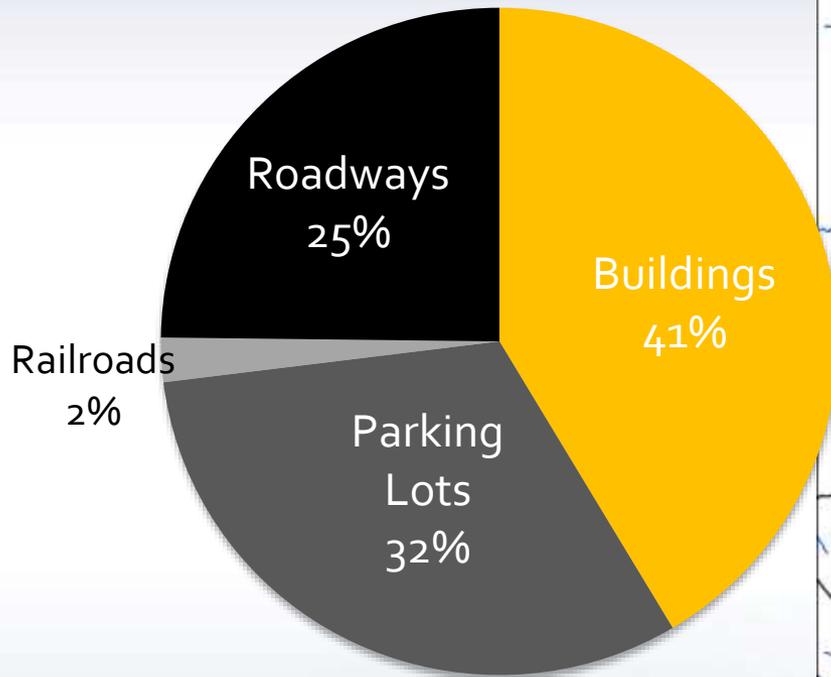


Part VII

## Environmental Protection Agency

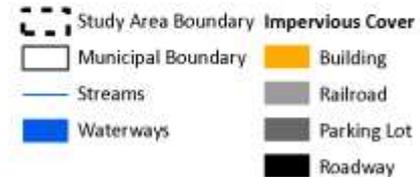
Combined Sewer Overflow (CSO) Control Policy; Notice

# 48% of the City is Impervious Cover



City of Lancaster  
Green Infrastructure Plan

Impervious Area  
Classification



# The Green Infrastructure Benefit Calculator Projects Future Benefits for CSO and MS4 Areas

Table 5-11 – Green Infrastructure Calculator for long-term (approximately 25-year) period

Impervious Area / Impervious Source Area Type	Impervious Contributing Area (acres)	Impervious Percent	Green Infrastructure Project / Technology	Assumed Percent of Impervious Area Managed	Impervious Area Managed (acres)	Total SW Runoff (MG/yr)	Assumed BMP Volume Reduction	Average Runoff Reduction	Runoff Reduction (MG/yr)
Roads / Alleys	529	100%	Green Streets	30%	159	513	1.0	86%	132.4
Parks	241	8%	Park Improvements / Greening	85%	17.0	19	1.0	86%	14.2
Sidewalks	124	100%	Disconnection, Porous Pavement	35%	43.3	120	1.0	86%	36.1
Parking Lots	648	100%	Porous Pavement, Bioretention	20%	130	628	2.0	97%	121.3
Flat Roofs	218	100%	Vegetated Roofs / Disconnection	15%	32.7	212	1.0	86%	27.3
Sloping Roofs	654	100%	Disconnection/Rain Gardens	25%	164	635	1.0	86%	136.5
Street Trees	N/A	N/A	Enhanced Tree Planting	N/A	45.1	44	0.3	49%	21.5
Public Schools	175	29%	Green Schools	75%	38.4	50	1.0	86%	32.0
Various (Ordinance)	1274	100%	First-Flush Ordinance	50%	637	1236	1.0	86%	531.6
<b>Total</b>					<b>1,265</b>	<b>3,752</b>			<b>1,053</b>

**55%**

Pollutant	Average Stormwater Concentration* (mg/l)	Average CSO Discharge Concentration (mg/l)	Pollutant Reduction from Stormwater (lb/yr)	Pollutant Reduction from CSOs (lb/yr)	Total Est. Pollutant Reduction (lb/yr)
Total Suspended Solids (TSS)	1.2	5.5	3,485	24,267	1,457,000
Total Phosphorus (TP)	0.7	13.5	2,033	59,564	27,800
Total Nitrogen (TN)					61,600

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

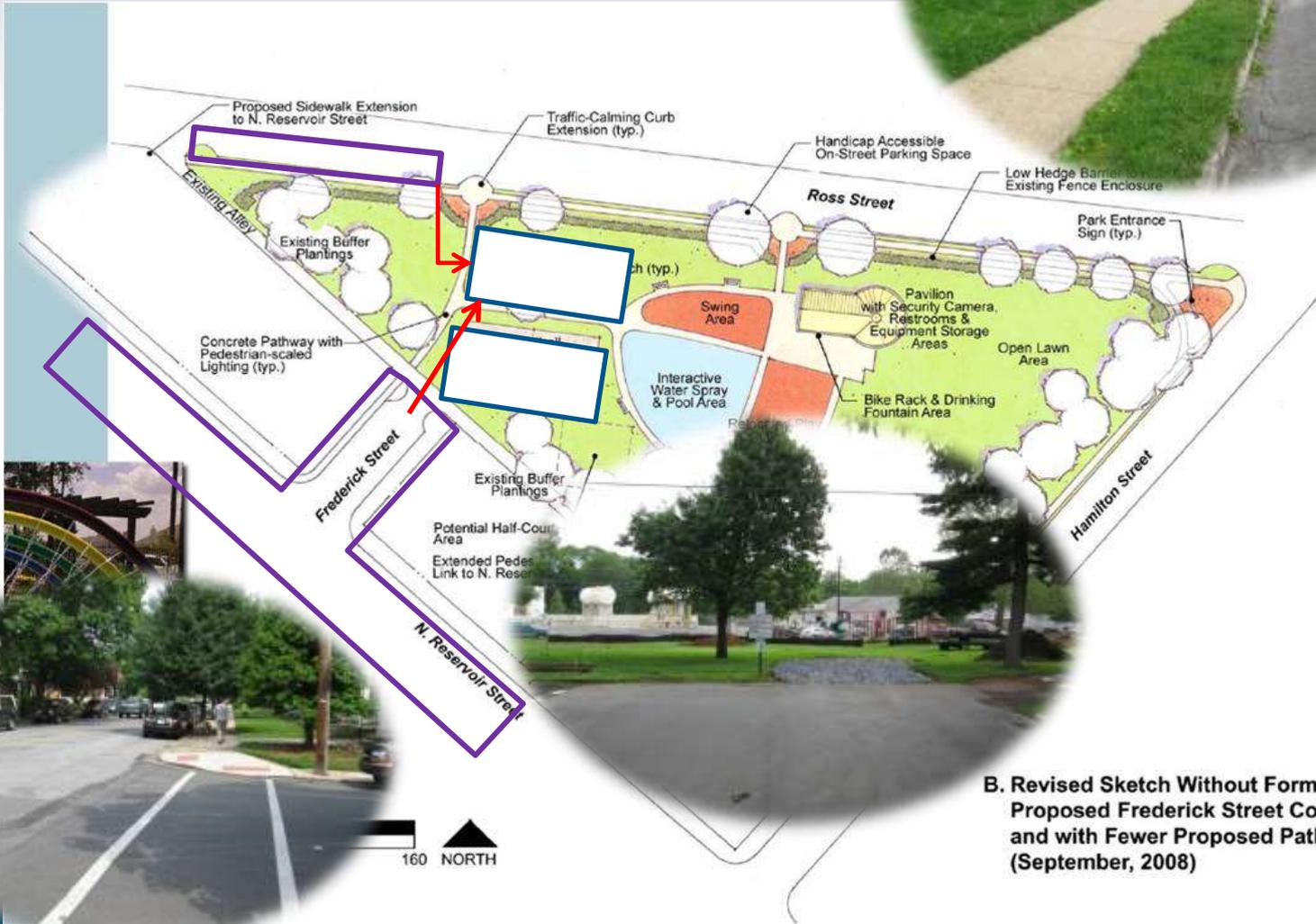
## Pollutant Load Reductions

**25-Year Plan to manage over 1,200 Acres of Impervious Area  
Capture nearly 750 Million Gallons of Stormwater Runoff over the long term**

# Green Parks



# 6<sup>th</sup> Ward Park: Extending the Benefit of the Playcourt



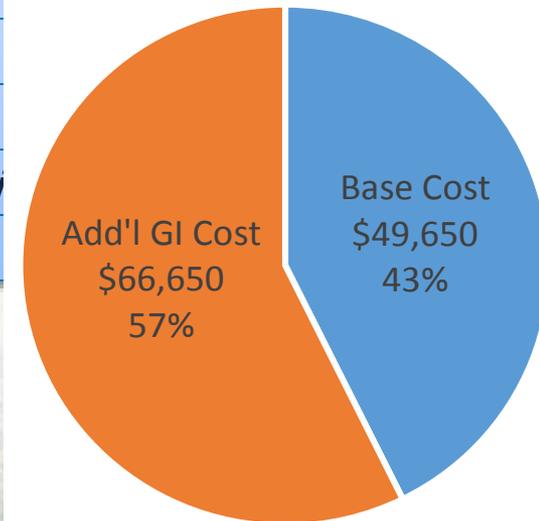
**B. Revised Sketch Without Formerly Proposed Frederick Street Connection and with Fewer Proposed Pathways (September, 2008)**

# 6<sup>th</sup> Ward Park Rededication Ceremony



# First Demonstration Project at 6th Ward Park Reveals High Cost/Benefit

Runoff Reduction	695,000	gallons / yr
Bid	\$ 116,300	
Cost of Court Only	\$ 49,650	
Incremental Cost of GI	\$ 66,650	
<b>Total Cost</b>	<b>\$ 0.17</b>	<b>/gallon</b>
<b>Incremental Cost of GI</b>	<b>\$ 0.10</b>	<b>/gallon</b>
	<i>[43% savings through integrati</i>	
Grey Storage Cost	\$ 0.25-0.30	/gallon



Funding from DCNR, DEP and Chesapeake Bay Stewardship Fund (NFWF)

# Green Parks



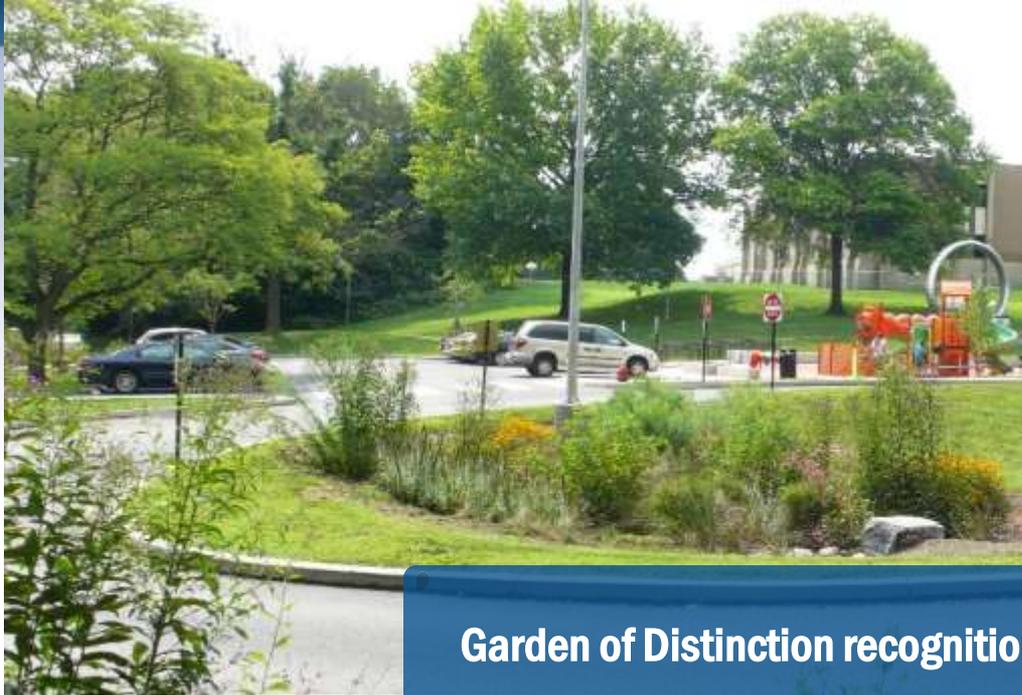
# Brandon Park



**4 Million Gallons / year reduction in runoff volume → \$0.15/gal**

# Brandon Park – Wabank St. Curb Extensions

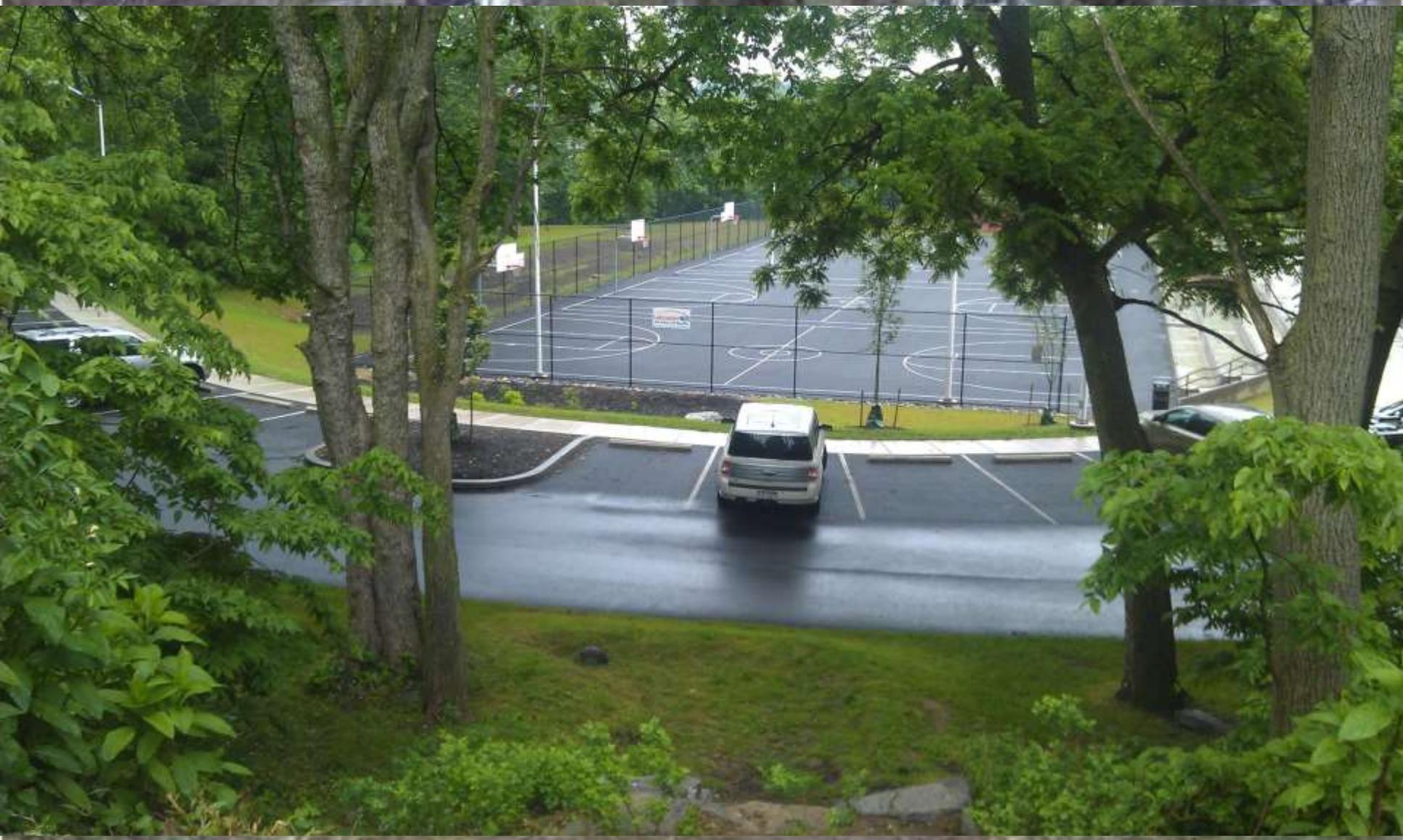




**Garden of Distinction recognition from Pennsylvania Horticultural Society**



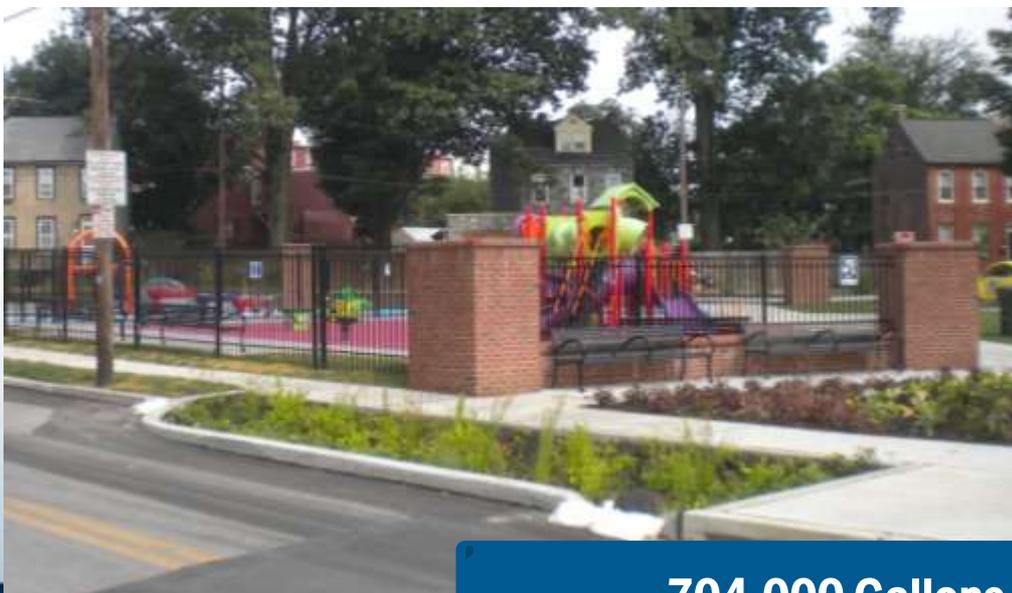
# Brandon Park



# Brandon Park



# Rodney Park



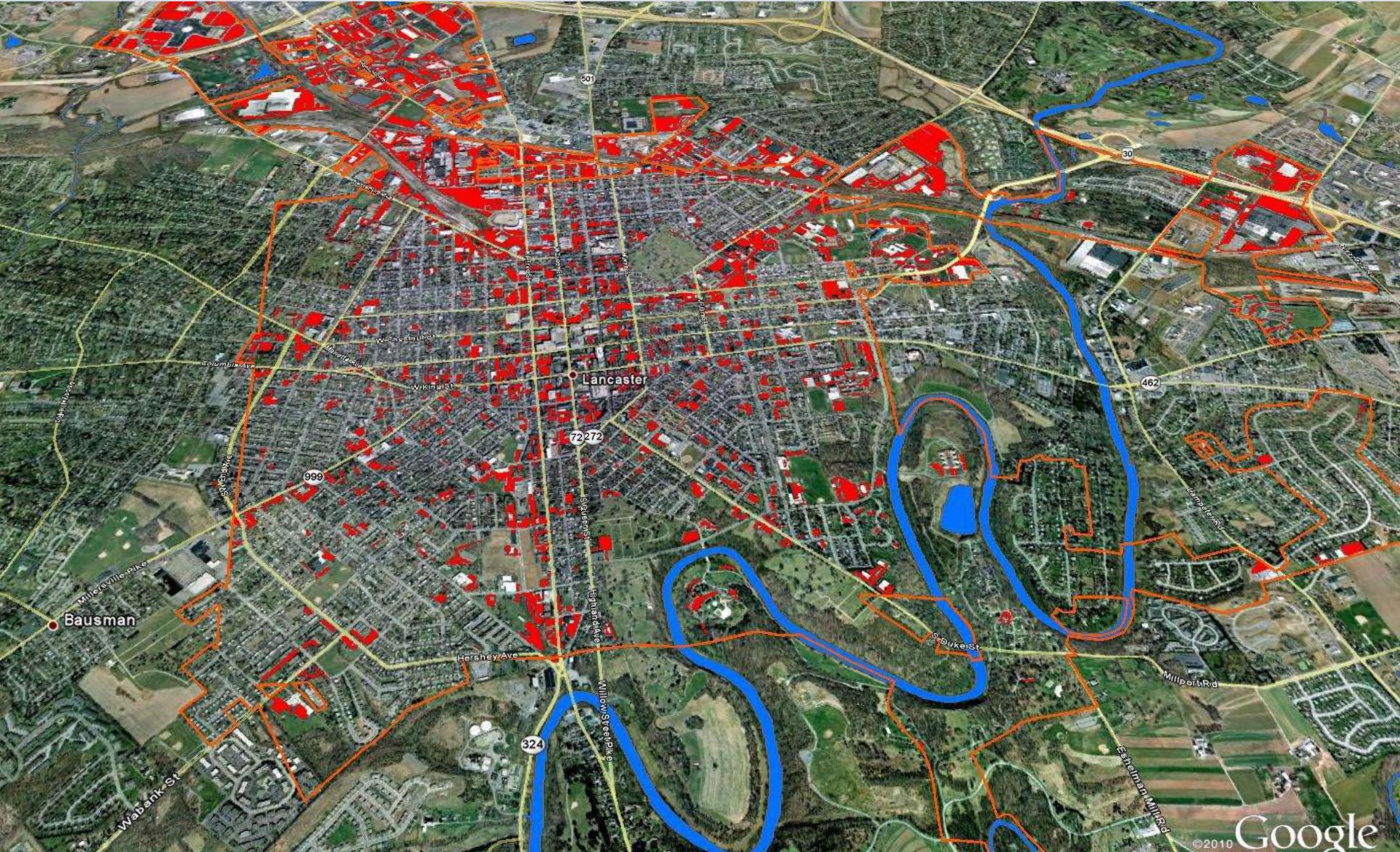
**704,000 Gallons / year reduction in runoff volume**

# Crystal Park



**1,320,000 Gallons / year reduction in runoff volume**

# Parking Lots



# Mifflin Street Parking Lot



**281,000 Gallons / year reduction in runoff volume**

# Plum Street Parking Lot



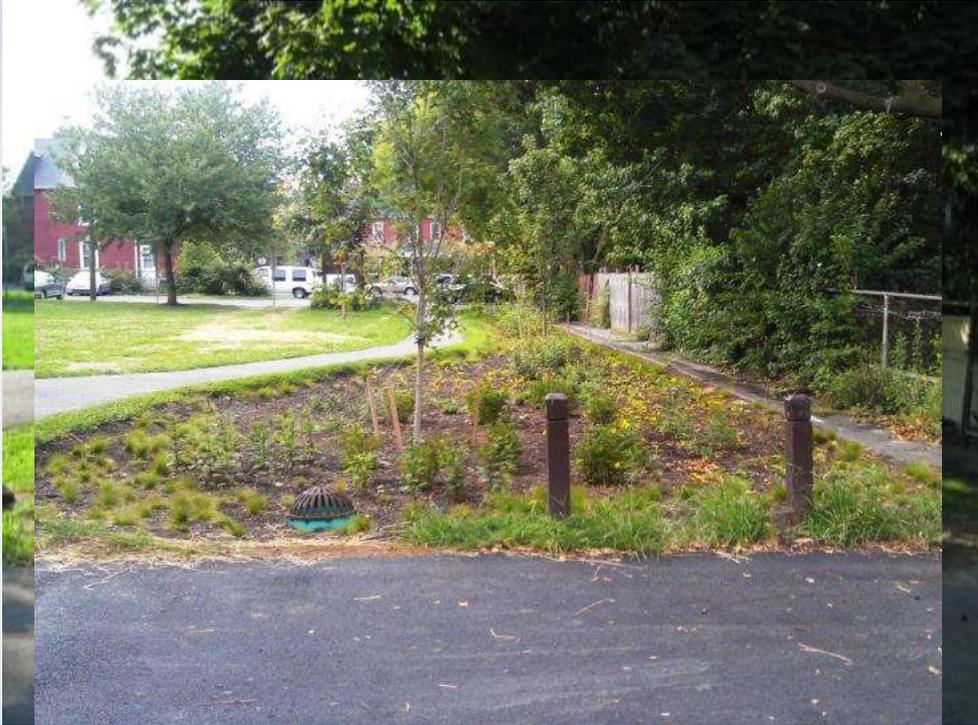
**731,000 Gallons / year reduction in runoff volume**

# Penn Ave Parking Lot



**538,000 Gallons / year reduction in runoff volume**

# Dauphin Street Parking Lot



**452,000 Gallons / year reduction in runoff volume**

# Summary of City-Owned Parking Lot Retrofit Projects

Parking Lot	Drainage Area	GI Area	Capture Volume	Capital Costs with Contingency
Plum Street	23,402	4,680	511,000	\$89,862
Dauphin	20,582	4,516	411,000	\$61,822
Penn	22,758	4,219	455,000	\$60,749
Mifflin	13,242	1,324	265,000	\$27,013
TOTAL			1,642,000	\$239,446

COST PER GALLON = \$0.14/gallon

# Green Roofs

- Over 100,000 sf of green roofs in Lancaster City.
- 10 green roofs in PENNVEST funding planned.
- Approximately 1.5 square foot per person!
- Additional 50,000 sf under design for next year using PENNVEST funds

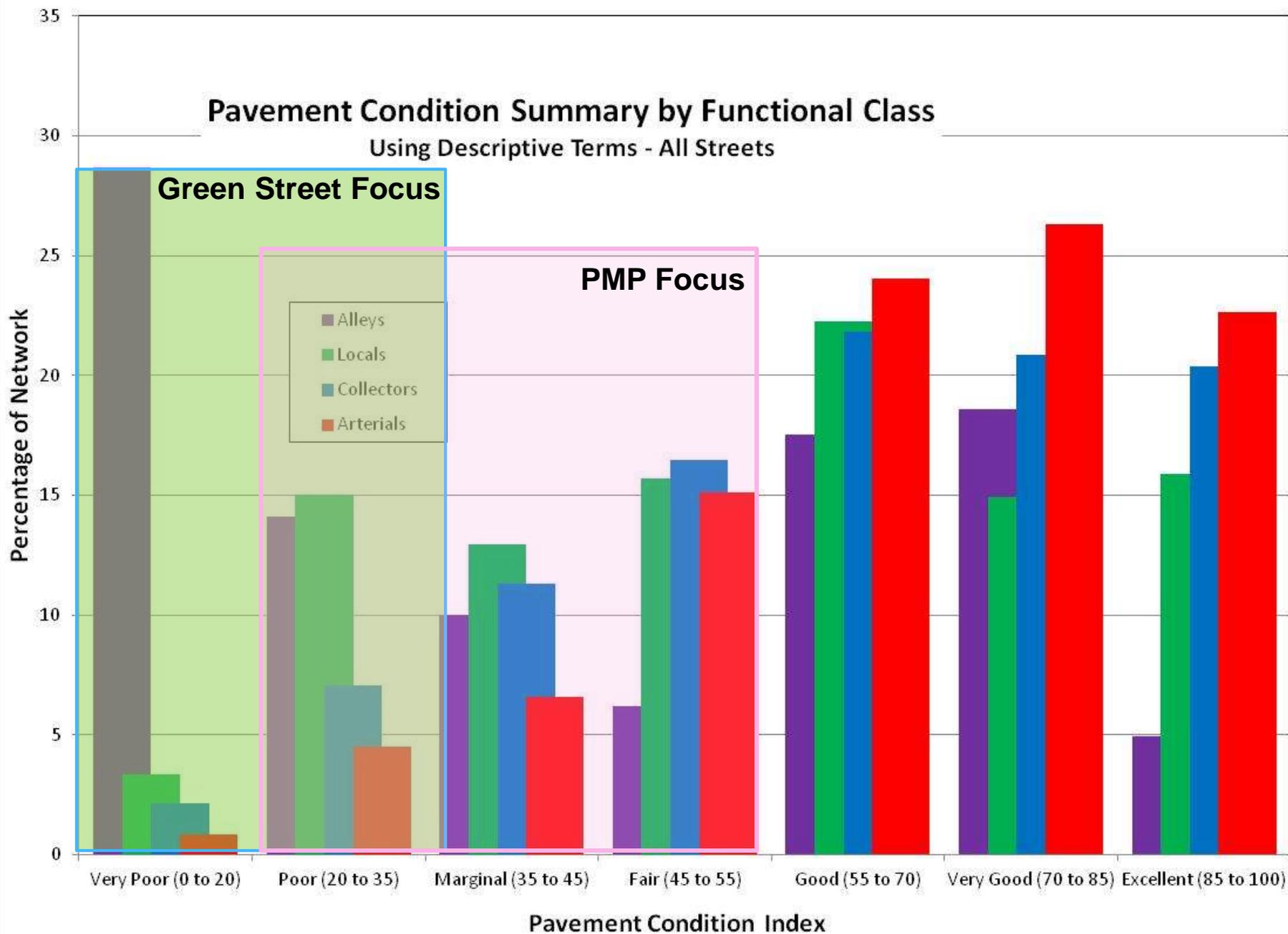


# Pavement Condition Scores Guide Selection of Green Streets & Alleys

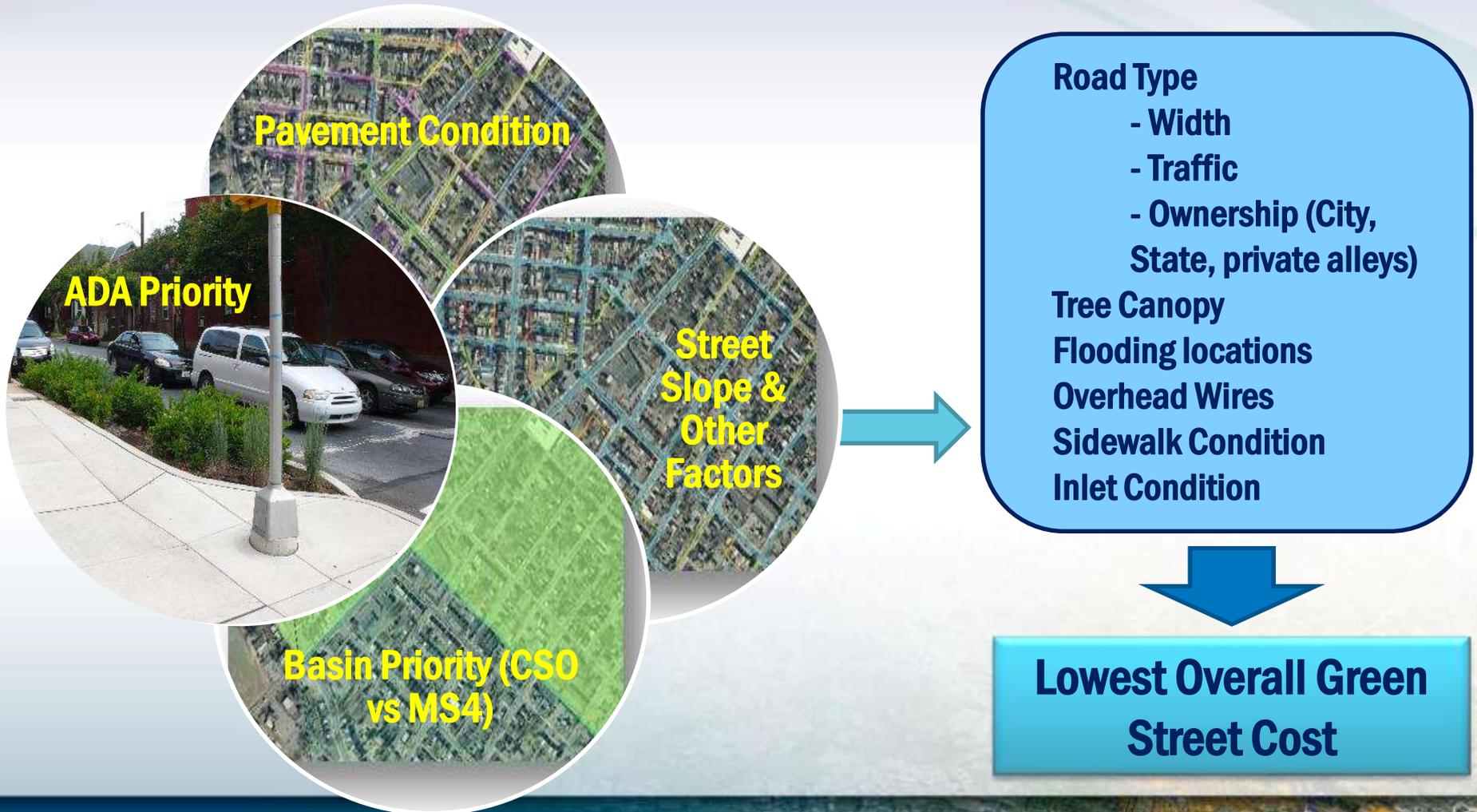


# Pavement Condition Summary by Functional Class

Using Descriptive Terms - All Streets



# Integrated Infrastructure: Finding Cost-Effective Green Streets Opportunities



# 1<sup>st</sup> Green Alley



# Alley 148 Greened for 10% Additional Cost

*Before (July 2011)*

*After (February 2012)*

Component	Conventional Unit Cost (\$/square foot)	Green Unit Costs (\$/SF)
Pavement Removal/Excavation	\$1.08	\$1.08
Crushed Stone w/ geotextile	\$0.35	\$1.39
Pipes/Cleanouts/etc.	---	\$0.82
8-inch reinforced concrete	\$18.89	\$18.89
Permeable Pavers	---	\$19.44
<b>Total Weighted Average</b>	<b>\$20.32</b>	<b>\$22.37</b>
Additional Green Cost (\$/SF)	---	\$2.05
Additional Green Cost (%)	---	10%

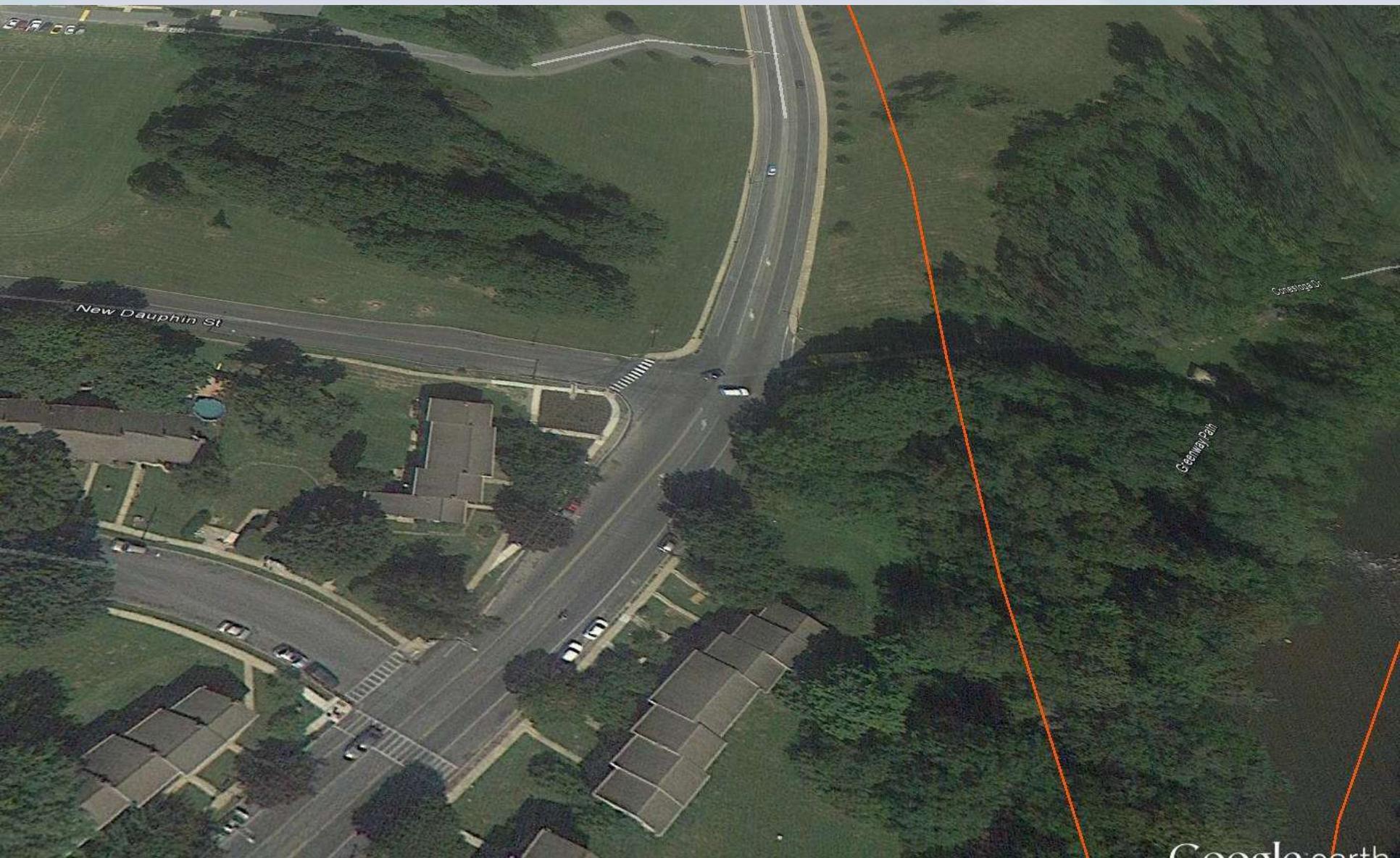


~\$20.30/SF for conventional reconstruction (8-inch reinforced concrete)

~\$22.40/SF for green alley retrofit (permeable pavers with infiltration trench)

**195,000 Gallons / year reduction in runoff volume**

# Broad St & New Dauphin Street Green Street



Project Reference ID	P-121
Project Name	Pavement Removal at New Dauphin and N. Broad St.
GI Prototype Project Type	Alley/Street
Construction Year (Actual)	2012
Impervious Area Contributing (ft <sup>2</sup> )	31,000
GI Area (ft <sup>2</sup> )	3,000
Calculated Estimated Capture Volume (gal/yr)	554,000
Estimated Constructed Cost (Class 3)	\$86,000
Bid GI Construction Cost	\$80,000
Cost / Stormwater Volume (\$/gal)	\$0.14



**550,000 Gallons / year reduction in runoff volume**

# Broad St & New Dauphin Street Green Street



Constructed 2012

# Intersection at Charlotte and Orange Streets

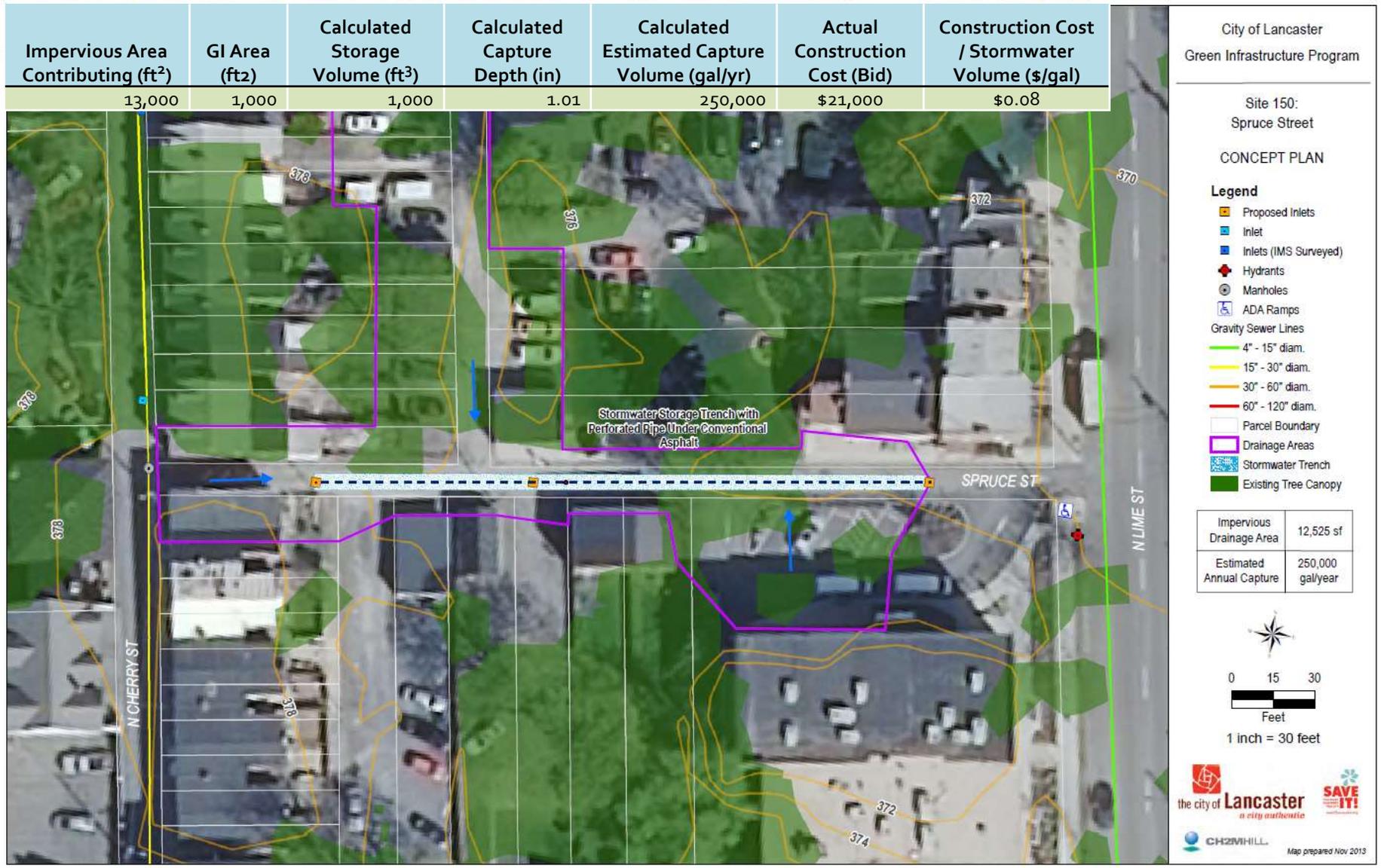


Cost \$0.12/gal

# Orange and Charlotte St



# Integrating with water and sewer upgrades – Greening Spruce Street



# Spruce Street Greening Project (2014)



**250,000 Gallons / year reduction in runoff volume**

# Using Traffic Safety and Transportation Funding to Reduce Accidents *and* Runoff

2014 Governor's Award for Environmental Excellence  
Commonwealth Award and the 2014 *Best Urban BMP in the Bay* Award

5 MPH reduction in average traffic speed!

# Lancaster Brewing Company (Plum and Walnut)

- Dangerous Intersection Conditions
- Adjacent to National Register Historic Building
- Gateway into the City's downtown



# The Lancaster Brewing Company "Beer Garden" is Coming!



# 700 Gallon Cistern Functions As Public Art and Irrigates Planters



# 700 Gallon Cistern Functions As Public Art and Irrigates Planters



# LBC Educational Placemat

**HEY KIDS!**

**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?!

TURN THIS CISTERN INTO YOUR OWN PIECE OF ENVIRONMENTAL ART:

(don't forget to draw all the plants the cistern will help water!)

**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!**

Lancaster's Gateway Bundle

HELP THE RAINDROP FIND ITS WAY TO THE RAIN GARDEN

**SAVE IT!**  
YOUR WASTE. YOUR MONEY. YOUR CITY.  
www.saveitlancaster.org

Lancaster  
PAINTS & SUPPLIES

A+M

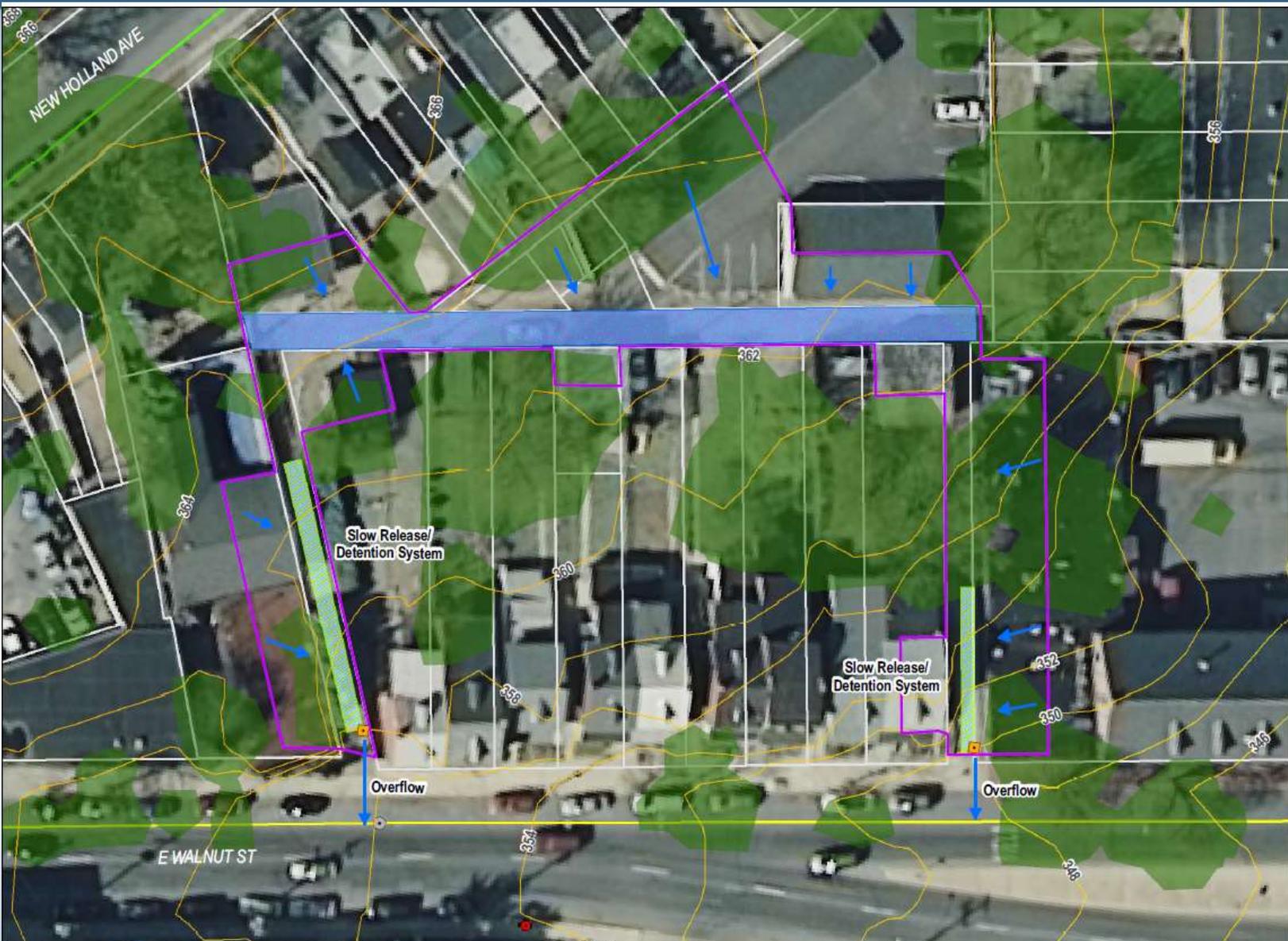
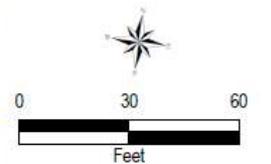
**gsm**  
INDUSTRIAL  
Metal Fabrication & Installation Contractor  
Lancaster, PA

# BREWERY ALLEY - BEFORE



PROPOSED CONCEPT PLAN

- Legend**
- Hydrants
  - Existing Inlets
  - Proposed Inlets
  - Manholes
  - Gravity Sewer Lines
    - 4" - 15" diam.
    - 15" - 30" diam.
    - 30" - 60" diam.
    - 60" - 120" diam.
  - Parcel Boundary
  - Existing Tree Canopy
  - Drainage Areas
  - Slow Release/Detention
  - Porous Pavement

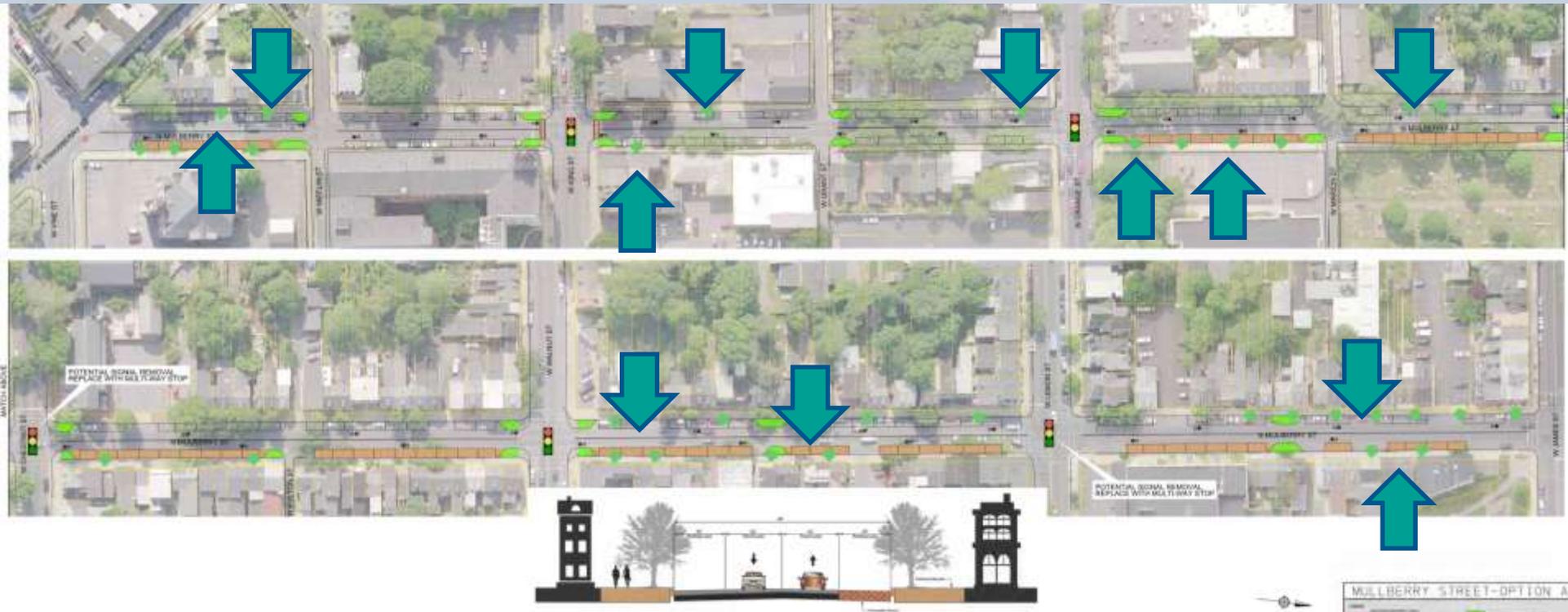


**274,000 Gallons / year reduction in runoff volume from 15,000 sf contributing area**

# BREWERY ALLEY - AFTER



# Mulberry Street Two-Way Conversion Project





# Green Infrastructure Implementation Status

Status	Number of Projects	Impervious Area Managed (sq. ft.)	Impervious Area Managed (acres)	Annual Runoff Capture (Gal/yr)
<b>Constructed / Under Construction</b>	52	1,009,587	23	20,172,000
<b>In Design for Construction</b>	14	943,000	22	17,984,000
<b>Conceptual Designs (non-PV/GGP)</b>	24	640,000	15	12,262,000
<b>PENNVEST Concepts</b>	19	367,000	8	7,033,000
<b>Growing Greener Plus Concepts</b>	1	46,000	1.1	881,000
<b>In Project Planning</b>	52	-	-	-
<b>Total</b>	<b>162</b>	<b>3,005,587</b>	<b>69</b>	<b>58,332,000</b>



**Paying for it!**

# Innovative Public-Private Partnership enables private investments in CWA progress

- \$7M SRF PENNVEST Loan to fund implementation of GI on public & private property
- 45 initial GI/BMP sites
- City pays up to 90% of GI Costs
- Property owner pays remainder and signs on to long-term maintenance agreement
- SW Utility implementation also motivating additional private investment in CWA controls



# 317 N. Mulberry

Impervious Area Contributing (ft <sup>2</sup> )	20,000
GI Area (ft <sup>2</sup> )	2,000
Calculated Estimated Capture Volume (gal/yr)	399,000
Estimated Constructed Cost (Class 3)	\$75,000
Estimated Construction Cost (Class 4)	\$75,000
Bid GI Construction Cost	\$75,000
Cost / Stormwater Volume (\$/gal)	\$0.19
Primary Funding	PENNVEST

- PENNVEST project coordinated with redevelopment
- Challenging coordination/sequencing
- Developer expanded decorative pavers to full driveway
- Captures large neighboring building
- Hosted EPA Press Conference on GI in April 2014





**399,000 Gallons / year reduction in runoff volume**

# Two Dudes Painting Company

Impervious Area Contributing (ft <sup>2</sup> )	17,000
GI Area (ft <sup>2</sup> )	4,000
Calculated Estimated Capture Volume (gal/yr)	295,000
Estimated Constructed Cost (Class 3)	\$93,000
Estimated Construction Cost (Class 4)	\$93,000
Cost / Stormwater Volume (\$/gal)	\$0.32
Primary Funding	PENNVEST



**295,000 Gallons / year reduction in runoff volume**



**TWODUDES**  
PAINTING COMPANY









# Steeple View Lofts

- PENNVEST project coordinated with redevelopment
- Permeable Pavers / Infiltration Trench
- Porous Asphalt / Infiltration Bed

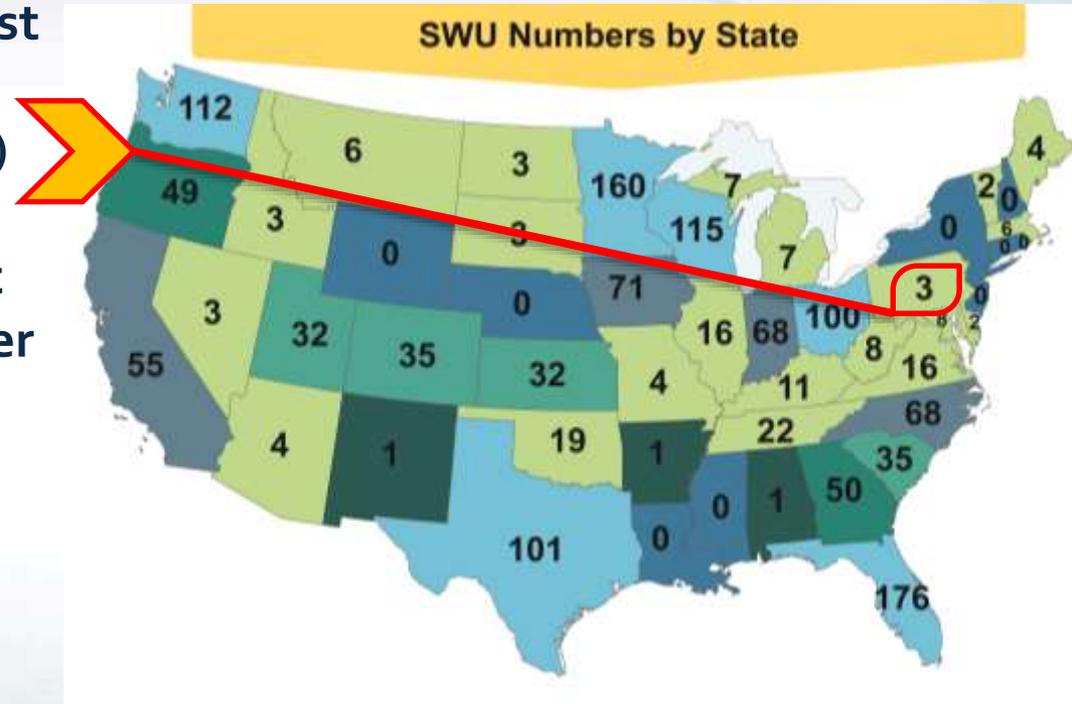
Impervious Area Contributing (ft <sup>2</sup> )	11,000
GI Area (ft <sup>2</sup> )	4,000
Estimated Capture Volume (gal/yr)	237,000
Estimated Constructed Cost (Class 3)	\$76,000
Estimated Construction Cost (Class 4)	\$76,000
Bid GI Construction Cost	\$68,400
Cost / Stormwater Volume (\$/gal)	\$0.29
Primary Funding	PENNVEST



**237,000 Gallons / year reduction in runoff volume**

# Stormwater Utilities are increasing across the country

- > 1,400 stormwater utilities exist across the country\*
- In Pennsylvania, at least five (5) are now collecting revenues: Philadelphia, Meadville, Mount Lebanon, Radnor, and Lancaster
  - City of Lancaster started Feb 2014
- West Chester and six municipalities in Lancaster County have feasibility studies completed



\* Source: Western Kentucky University Stormwater Utility Survey, 2013



## GREEN INFRASTRUCTURE ADVISORY COMMITTEE

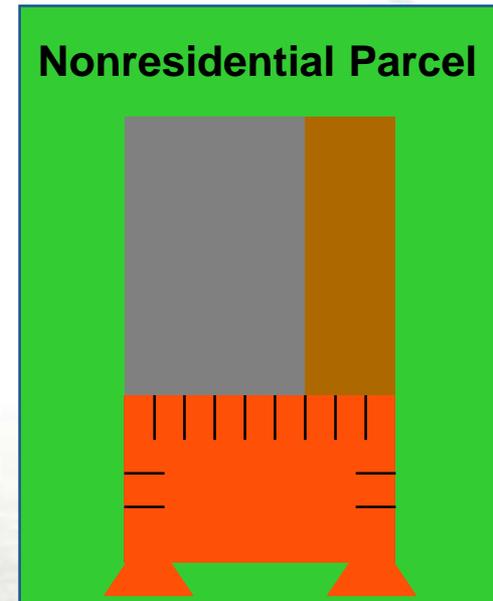
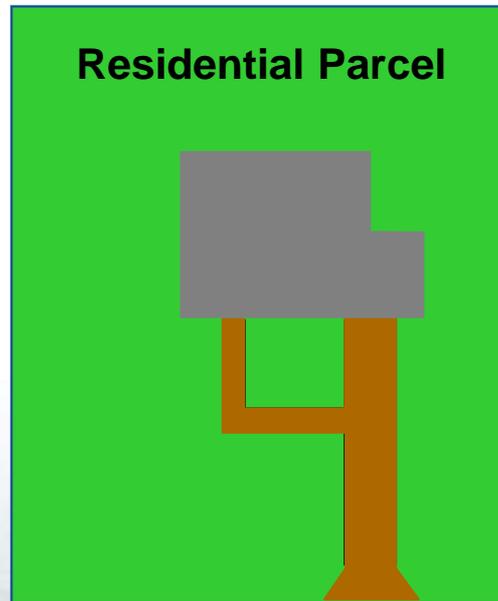
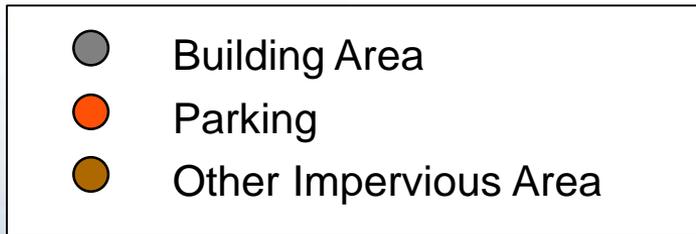
- Included representatives from:
  - business owners,
  - citizens,
  - institutions,
  - environmental groups,
  - state government,
  - Lancaster City government, and
  - Lancaster County government.
- Met 6 times between April and September 2012 on funding options and policy issues



was convened to evaluate fair and equitable ways to fund the City's stormwater program.

■ **Potential funding sources:**

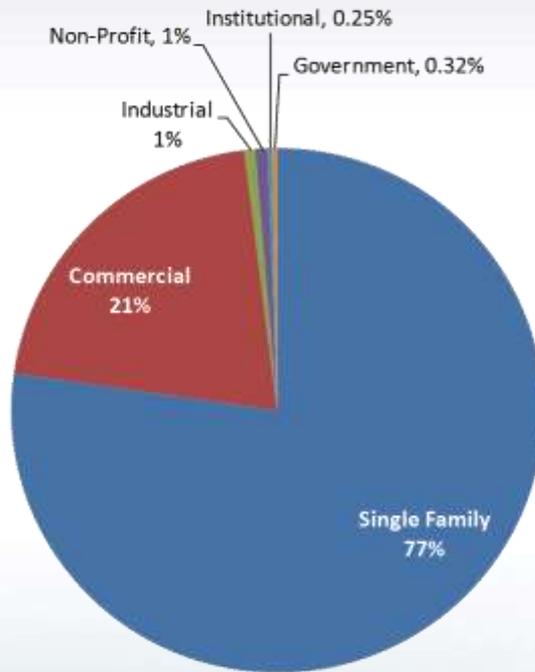
- Increase property taxes
- Raise sewer bills
- Implement a fee based on stormwater runoff



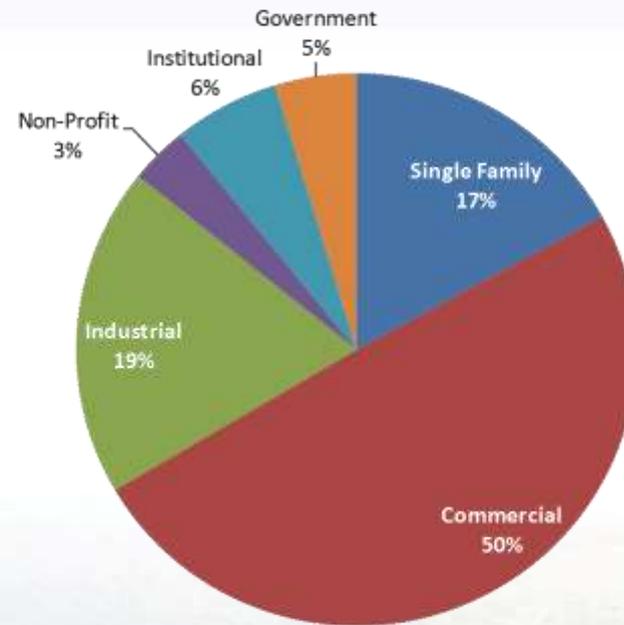
Stormwater runoff is measured by impervious area = roofs and pavement where rain runs off, rather than soaking into the ground

# Impervious Area Fee Analysis

Number of Properties



Number of ERUs



■ Single Family  
■ Non-Profit

■ Commercial  
■ Institutional

■ Industrial  
■ Government

# The Green Infrastructure Committee Studied the Funding Details

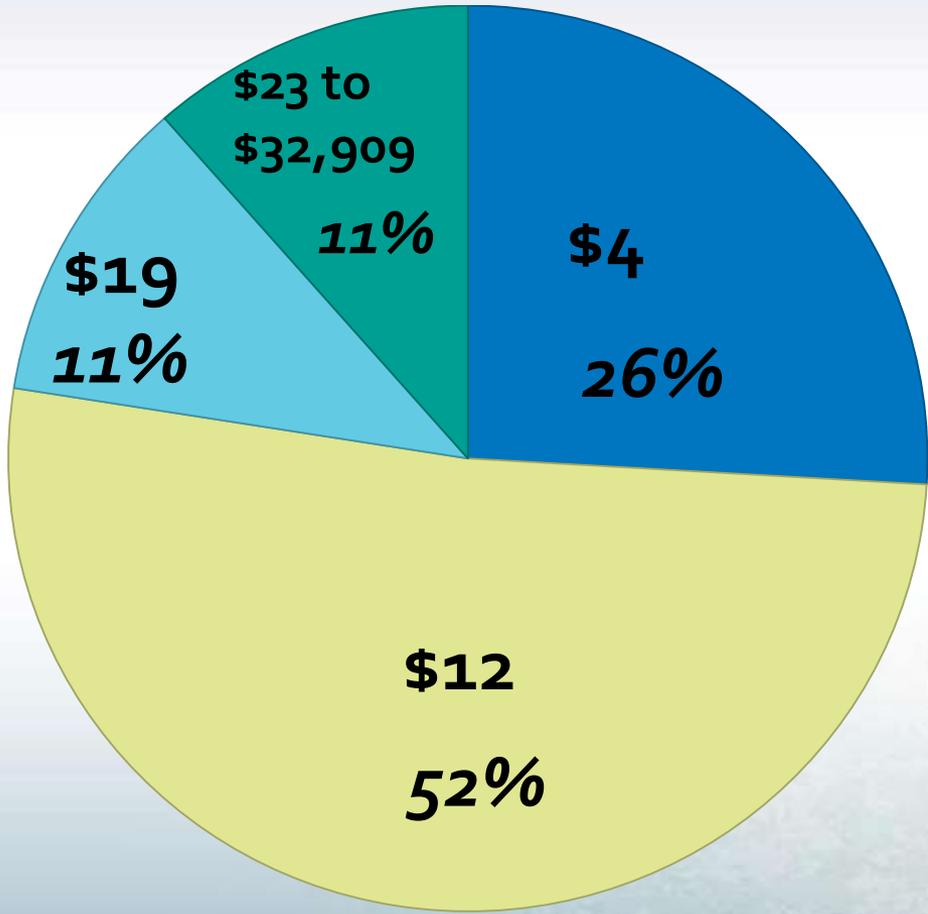
## Level of Service Cost Estimate Summary

	Estimated Annual Costs		
	Low	Medium	High
<b>Operating and Maintenance</b>			
Green Infrastructure*	n/a	\$162,000	\$202,500
Dry and Wet Ponds (inspection)	\$2,300	\$2,300	\$2,300
Street Sweeping	\$168,800	\$168,800	\$234,100
Catch Basin	\$201,000	\$201,000	\$402,000
Storm Drainage	n/a	n/a	n/a
MS4 Implementation	\$451,566	\$536,412	\$612,412
Program Administration	\$142,000	\$219,000	\$296,000
<b>Capital Costs</b>			
Green Infrastructure	\$730,500	\$1,909,100	\$3,652,400
Storm Drainage	n/a	\$1,444,000	\$1,926,000
Catch Basin	\$164,000	\$164,000	\$164,000
<b>Total</b>	<b>\$1,860,266</b>	<b>\$4,806,612</b>	<b>\$7,491,712</b>

GIAC recommended the  
Medium Level of Service

The GIAC recommends:

implementing a rate structure with four "tiers" based on impervious area.



- Tier 1 (0-999 sq. ft.)
- Tier 2 (1,000-1,999 sq. ft.)
- Tier 3 (2,000-2,999 sq. ft.)
- Tier 4 (≥3,000 sq. ft.) ← Actual

Percentages refer to percent of all properties

Rates are estimated first year fees per quarter, for Medium Level of Service

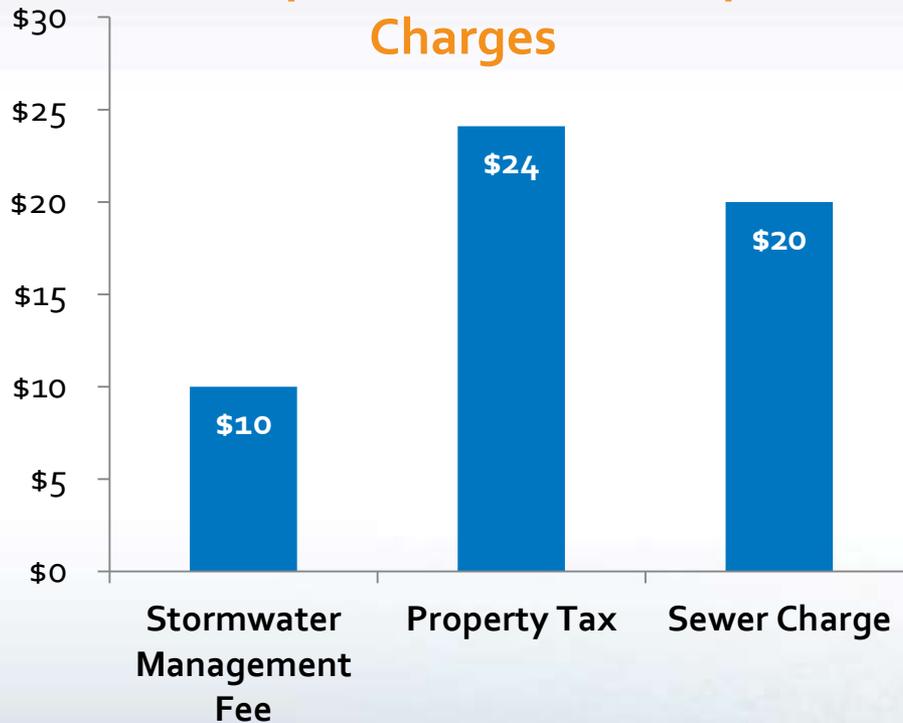
For example – average fee per quarter:  
Residential: \$10  
Commercial: \$139

# Comparison of Charges

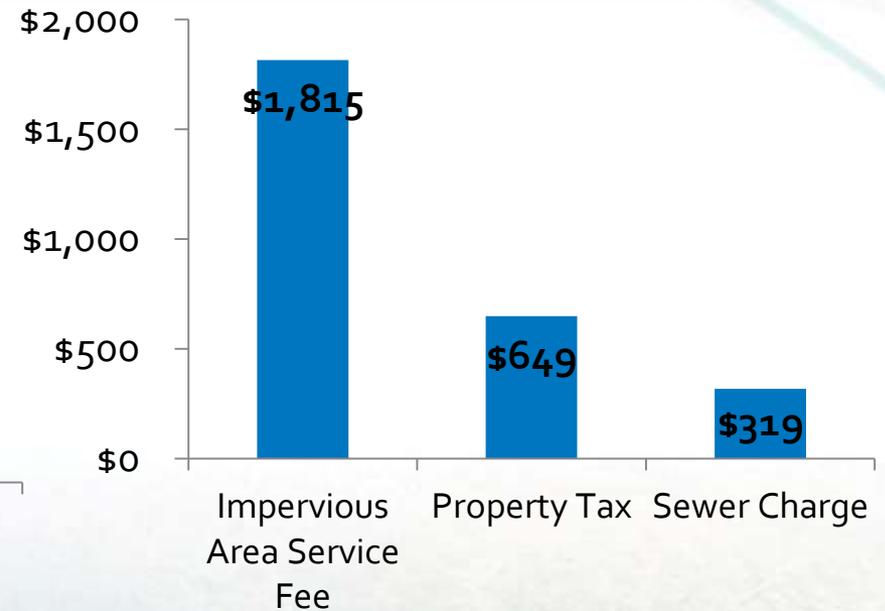
## Average Residential

## Average Industrial

### Comparison of Quarterly Charges



### Comparison of Quarterly Charges

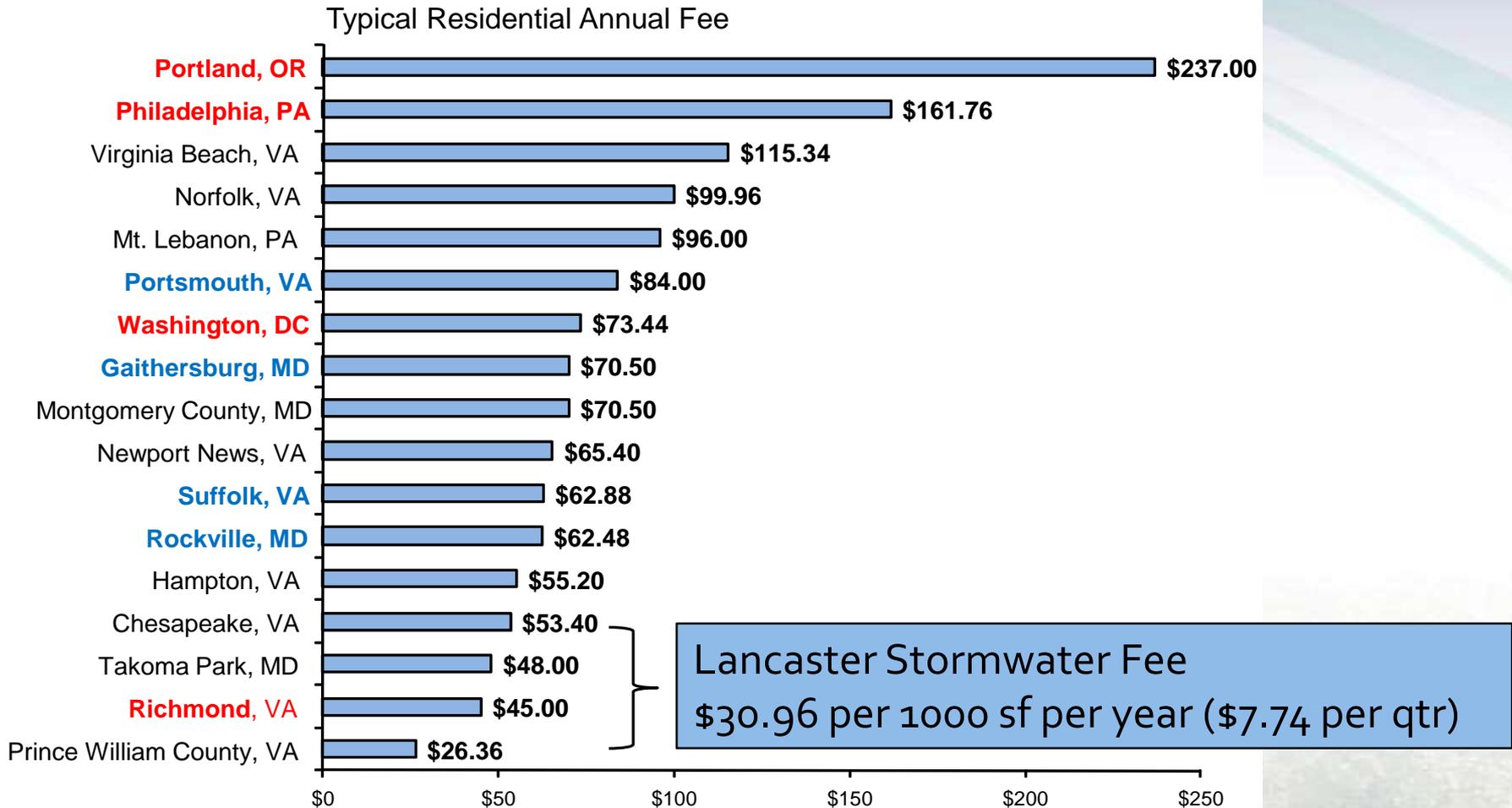


Rates and charges assume medium level of service  
(\$4,800,000 annual program)  
And rate of \$7.74/1,000 square feet/quarter

including an incentive program to provide fee relief.

- **Rebates or Grants** – 1 time assistance with construction cost (PENNVEST)
- **Credits** – a percentage reduction in the annual impervious area fee
  - Total credit applications: 47 received – 40 approved, 3 denied, 4 under review
- **Appeals** – Total appeals received is 116: 58 approved, 50 denied, 2 withdrawn, 5 on hold and 1 under review
- **Benefits:**
  - Help property owners reduce their annual stormwater fee
  - Provide incentive for implementing green infrastructure on private property
  - Provide incentive to maintain facilities

# Typical Residential Stormwater Fees





**YOUR WATER.  
YOUR MONEY.  
YOUR CITY.**

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- [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.



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!

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**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.

# Lessons Learned / 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

- **Ruth Ayn Hocker, P.E.**  
Stormwater Program Manager, City of Lancaster  
[RHocker@cityoflancasterpa.com](mailto:RHocker@cityoflancasterpa.com)  
717-735-0350
- **Charlotte Katzenmoyer**  
Director of Public Works, City of Lancaster  
[ckatzenm@cityoflancasterpa.com](mailto:ckatzenm@cityoflancasterpa.com)  
717-291-4739