



# **INCENTIVES AND REGULATIONS**



# CSO Long Term Control Plan (LTCP)

- **19 Gray Infrastructure Projects**
  - 4 Sewer Separations
  - 13 Storage basins
  - Replacement and expansion of Nightingale Pump Station
  - 1 High-Rate Wet Weather Treatment Facility
- **Green Infrastructure Projects – 17% of Gray Program**
  - Demonstration projects
    - Bioswale/biofiltration
    - Rain garden
    - Pervious alleys
    - Infiltration dry wells and sink holes
- **5 Flood Pump Station Projects** - to abate dry weather overflows

# LTCP Source Control Investments Front-Loaded to Maximize Gray Reductions



- \$47M Green Infrastructure Program
- \$40 M budgeted for first 6 years
- Annual program includes demonstration projects, subsidies, and incentives
- Program includes line items for:
  - Downspout disconnects, rain gardens, rain barrels
  - Green roofs
  - Green streets & dry wells
  - Pervious pavement
  - Urban reforestation
- Adaptive management allows greater investment based on demonstrated performance

**Green Roof**

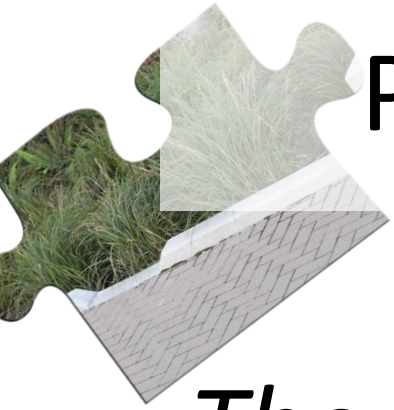


**Green  
“Pervious”  
Alley**



# Program Setup: Objectives

- *2009 Amended Consent Decree Requires Elimination of SSOs and Abatement of CSOs.*
- *Cost of Gray Program Estimated at \$850 Million Dollars*
- *\$47 Million in Green Infrastructure Committed in the LTCP, with an Adaptive Management Approach.*
- *Incentives Provided for Green to Leverage Private Dollars against MSD Funding to Reduce Gray Projects.*



# Program Setup: Objectives

*The Estimated Green Capture Cost Per Gallon is Half of the Gray Counterpart.*



# Program Setup: Mix of Financial Incentives Used by Louisville MSD

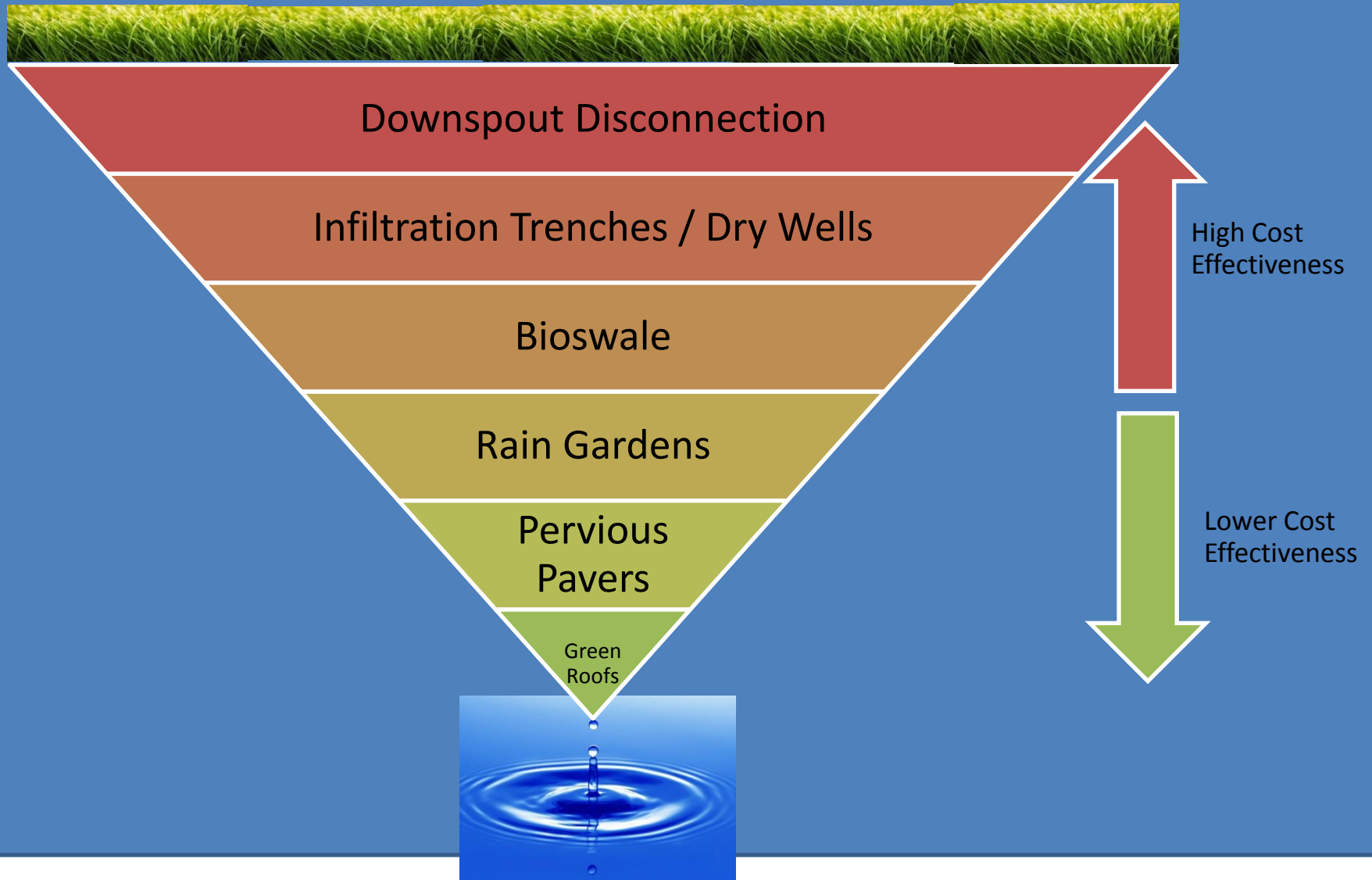
- *Incentives for Green Included in 2011 Rates, Rentals, and Charges Resolution.*
- *Was Passed by Metro Council as a Change to the Storm Water Rate and Credit.*
- *First \$5 Million in Fiscal Year Budget Committed Prior to December 2011.*



# Program Setup: Mix of Financial Incentives Used by Louisville MSD

- *Two Ways That Incentives are Applied :*
  - *Stipend Projects – For Non-Residential Customers for Removing Impervious Surface from the Stormwater Grid. A Ten Year Maintenance Agreement to be Signed, Annual Self-Reporting, MSD Inspections at Random.*
  - *Credits: Up to 50% in Credits on Stormwater Fees, 25% if the Customer Takes the Up-Front Stipend Monies*
- *Ordinance: Changes being made to EPSC Ordinance to Make Green Components Mandatory for New/Re-Development*

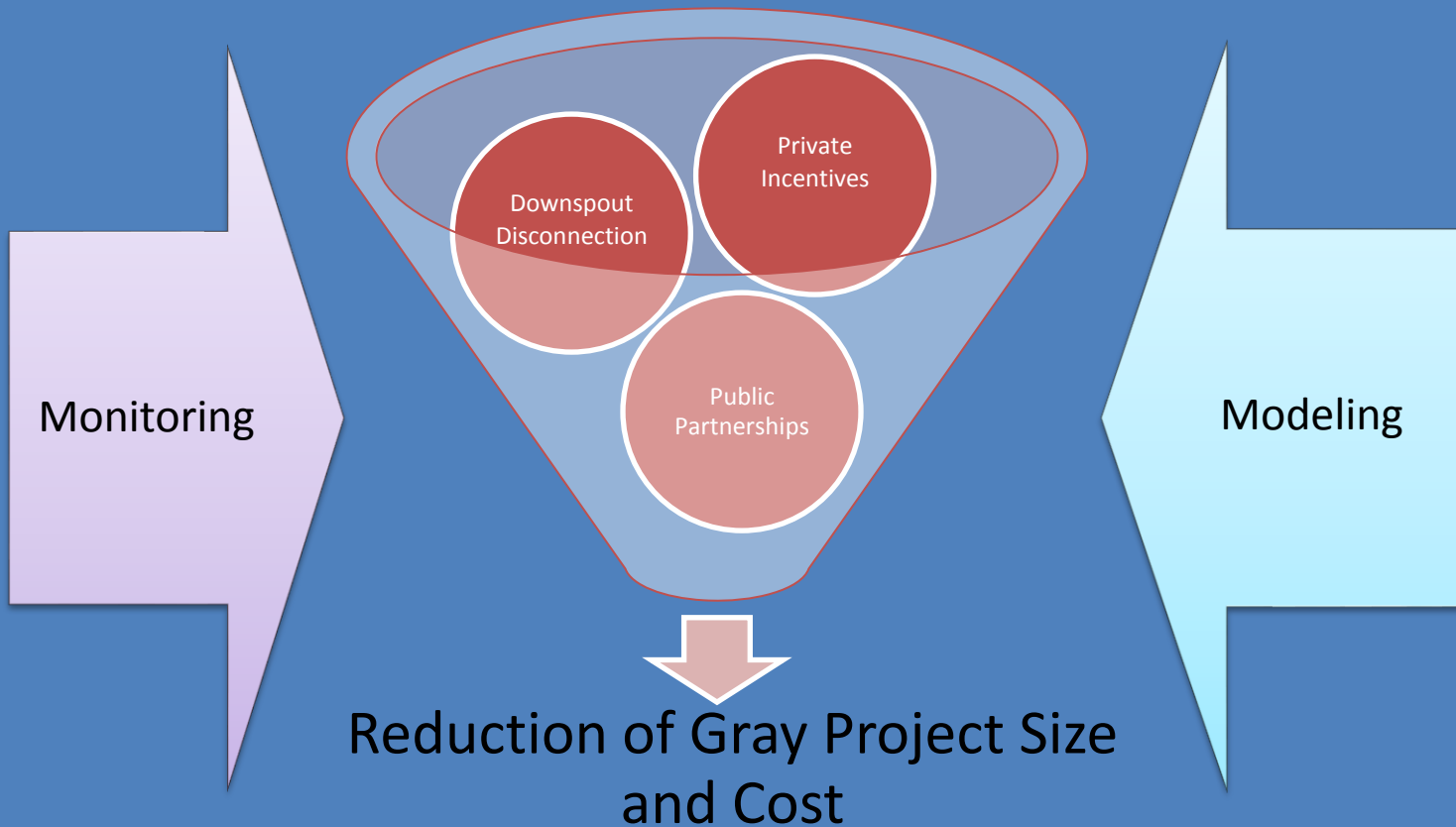
# Right Sizing Strategy - Tools



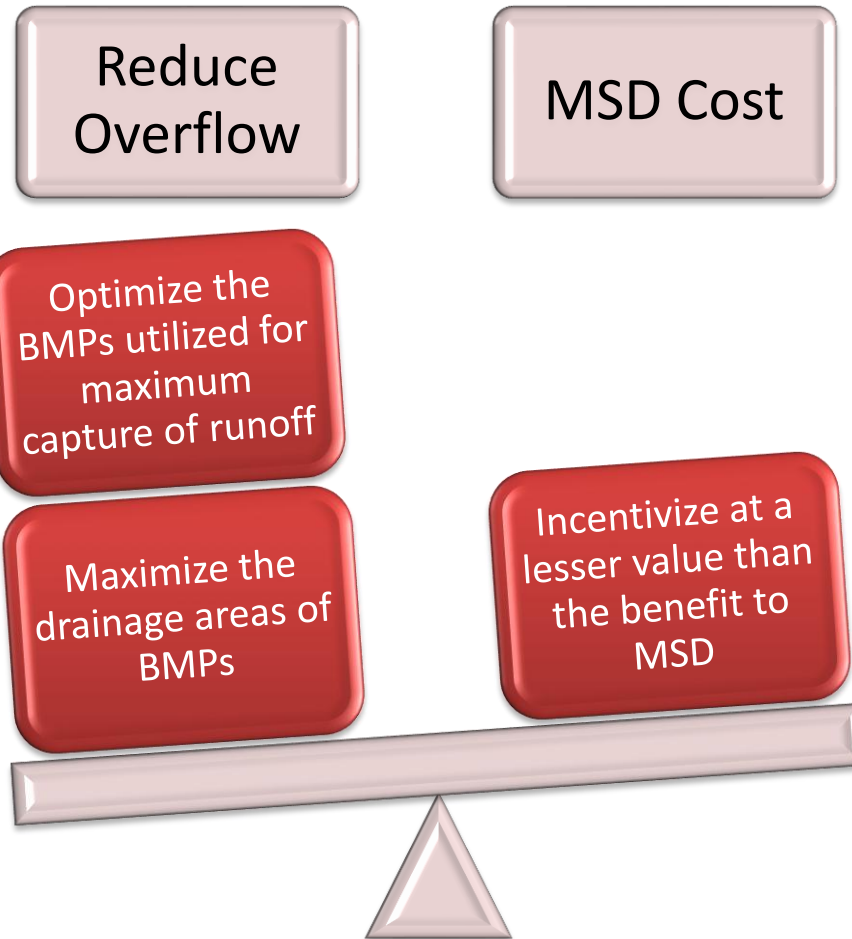


# Right-Sizing Strategy - Tools

## The Funnel of Impervious Area Removal



# Incentives for Private Development



# Utilize Incentives for Incorporation of Green

<b>Green Infrastructure Technique</b>	<b>Unit Value to MSD (\$ / controlled sq.ft.)</b>	<b>75% of Unit Value (\$ / controlled sq.ft.)</b>
<b>Rain Gardens &amp; Bioswales</b>	<b>\$2.00</b>	<b>\$1.50*</b>
<b>Pervious Pavement (Pavers)</b>	<b>\$2.00</b>	<b>\$1.50*</b>
<b>Vegetated Roofs (Tray Systems)</b>	<b>\$3.00</b>	<b>\$2.25</b>
<b>Vegetated Roofs (Intensive Systems)</b>	<b>\$5.00</b>	<b>\$3.75</b>
<b>Infiltration Drains</b>	<b>\$2.00</b>	<b>\$1.50*</b>

**\* Stipend applied to drainage area up to 10 times the size of the BMP**



# Right Sizing Approach

## Reactive

- Programmatic Downspout Disconnection
- Incentive Program Requests
- Incorporation of Green into Existing Plans

## Proactive

- Identify Priority CSO Basins
- Produce Targeted Mailings to Encourage Downspout Disconnection and Private Development Incentives
- Coordinate Public Opportunity Schedules

# Reducing the Impact of Commercial/Industrial Property



- Control 1" of Rainfall Through:
  - Green Roofs
  - Gray Water
  - Permeable Pavement
  - Bioretention Facilities
  - Wetlands



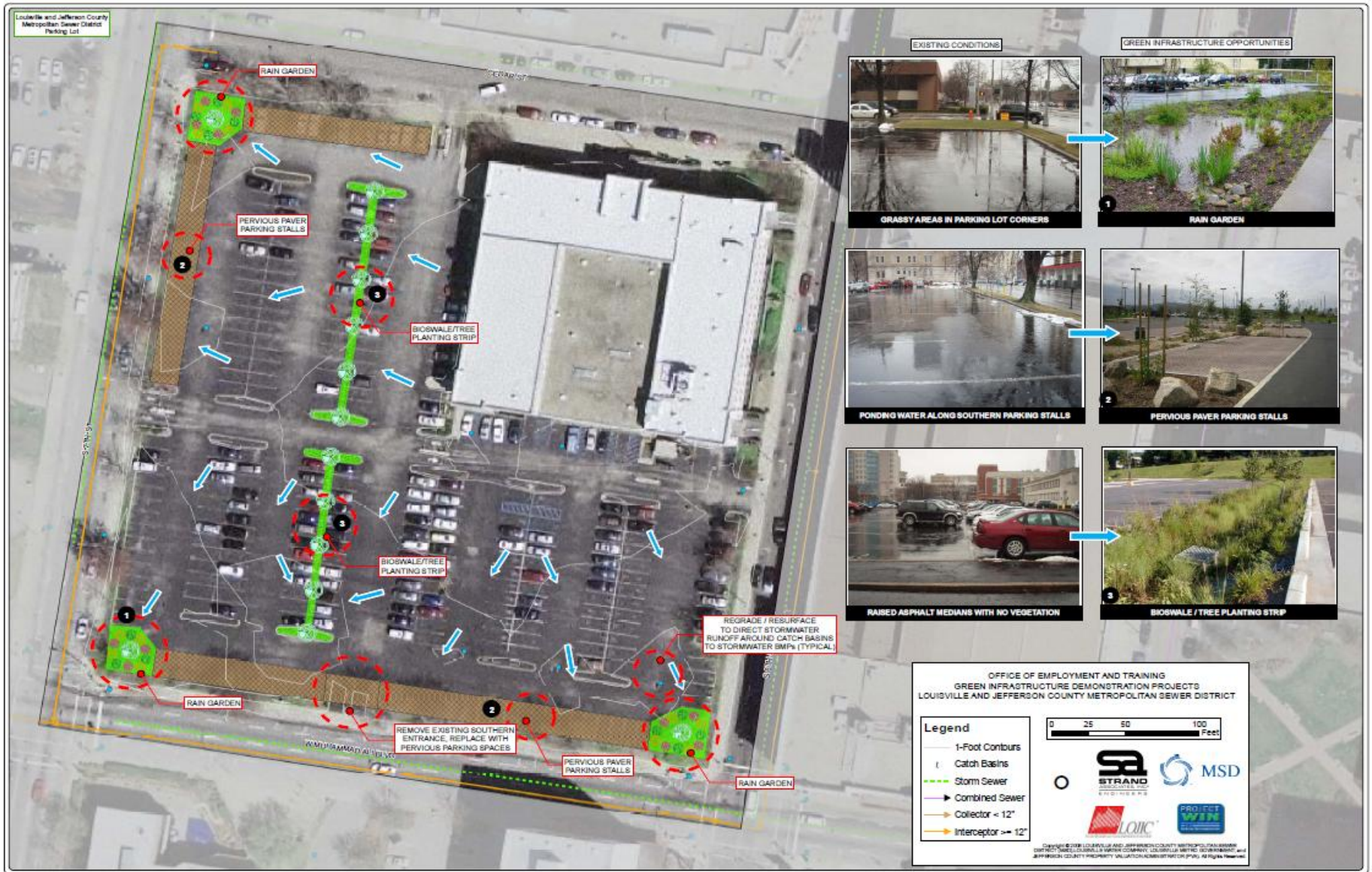


# Program Statistics

- Over 60 Board Approved Incentive Projects
- Reductions of Actual Overflow Estimated (Using Spreadsheet Model) of over 150K Gallons

	MSD Investment	Typical Yearly Gallons Removed	Impervious Area Captured (SF)	Volume Captured (Gallons)	CSO Peak Flow (MGD)	Presumptive Peak Flow Reduction (MGD)	CSO Overflow Volume (MG)	Presumptive CSO Overflow Reduction (Gallons)
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<b>Grand Totals</b>	\$ 13,391,754.44	193,820,081	9,165,299	891,264	3,056	8	87	155,215
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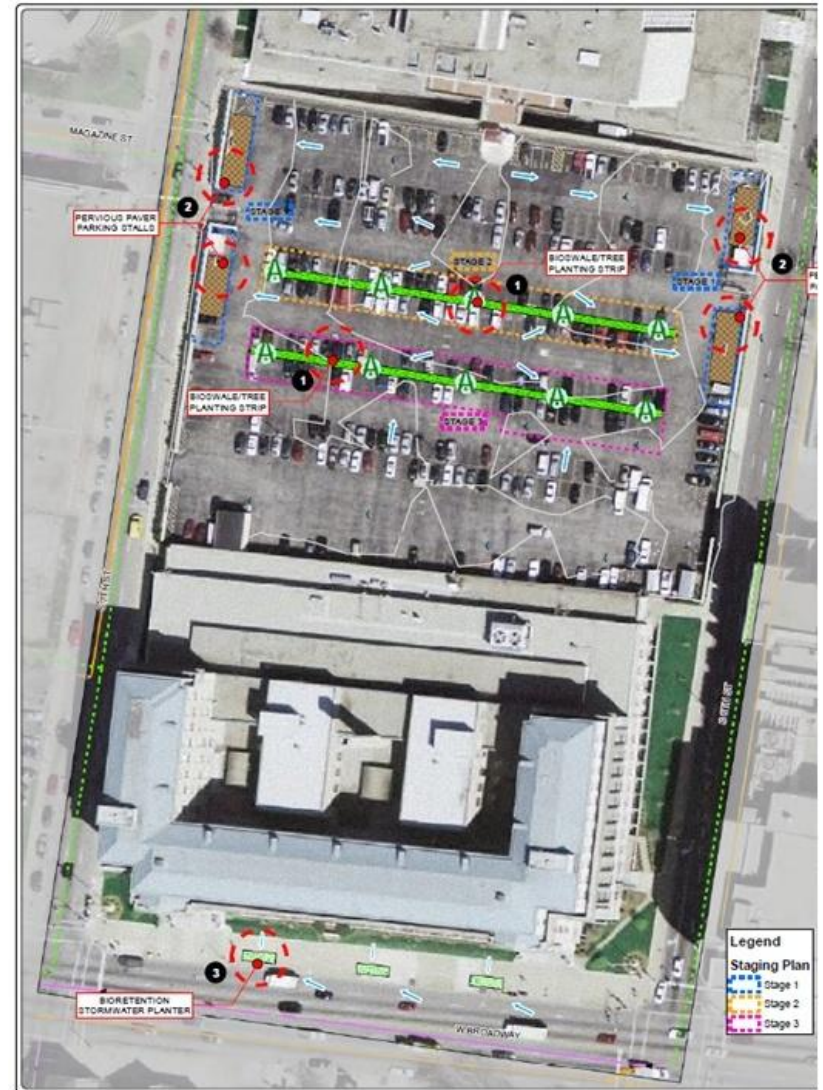


# Multi-Acre Green Infrastructure Projects for Stormwater Reduction



# Mazzoli Federal Building Project

- 90% Stormwater Capture over 2 Acres in a Typical Year
- Approx 28,000 gallons captured per 1-inch event
- 1.2 million gallons captured in a typical rainfall year
- Cost of 20 cents per gallon captured in a typical year







**Legend**

**Sewer Lines**

- SANITARY SEWER
- COMBINED STORM & SANITARY
- FORCE MAIN
- OVERFLOW

**Map Location**

**University of Louisville**  
**Belknap Campus**

Green Infrastructure Performance Assessment  
Conceptual Green Management Practices (GMPs)

Map Created: 3/1/2011

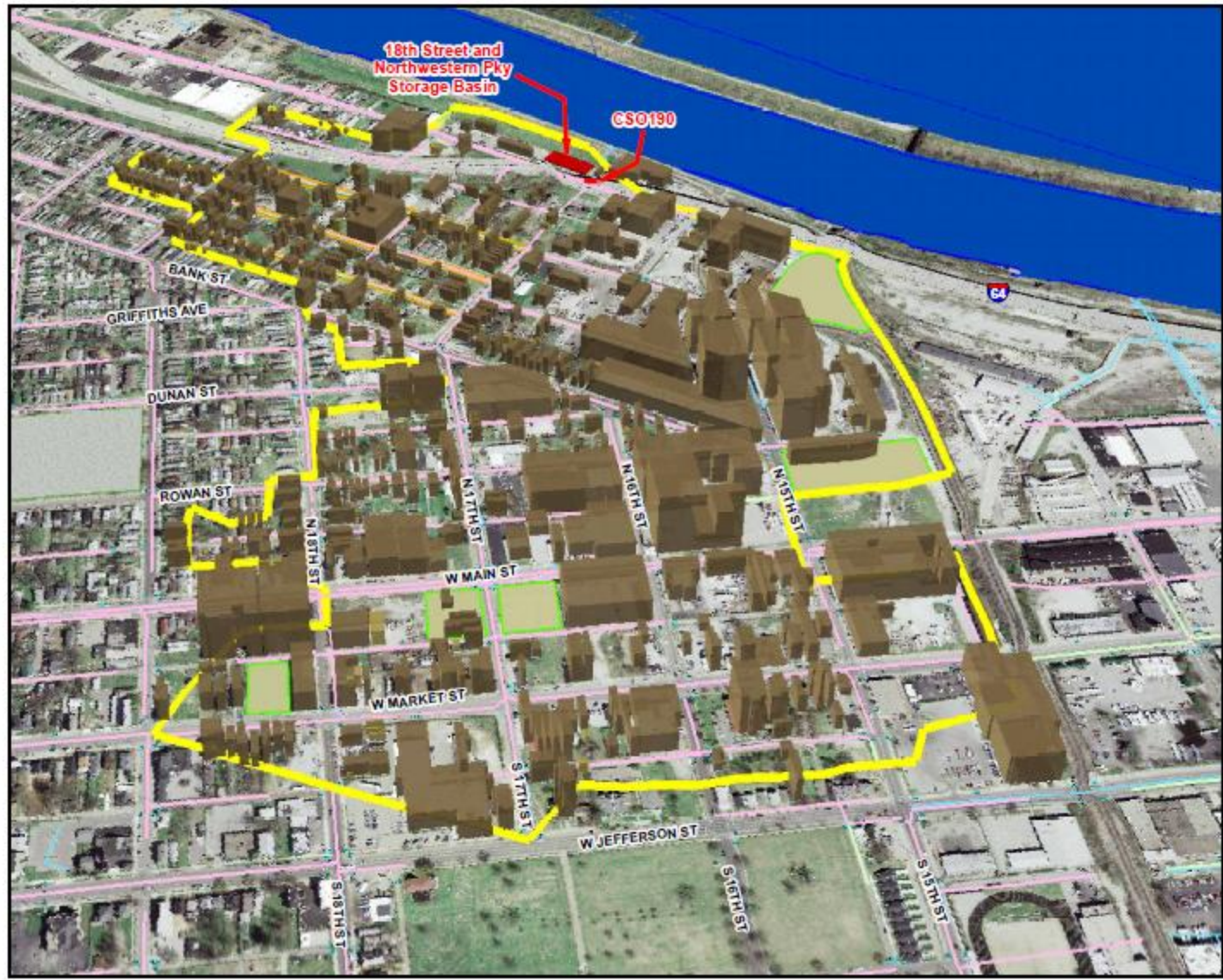
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# Multi-Acre Green Infrastructure Projects for Stormwater Reduction



# University of Louisville

- 100% Stormwater Capture over 100+ Acres in a Typical Year
- Practices Designed for 25- Year Event
- 48 Million Gallons Captured in a Typical Rainfall Year
- Cost of 6 Cents Per Gallon Captured
- Leveraging \$2.5 Million of MSD Incentives Against over \$50 Million in UofL Projects



## CSO190 Priority Basin

1 of 2  
Green Infrastructure Performance Assessment  
Conceptual Green Management Practices (GMPs)  
For Scoping Purposes Only

**CSO Statistics:**

No. of overflows:	49
avg. volume per incident:	733,543 gal
Avg. duration:	5.32 hrs

**Imperviousness: 66% (0% free cover)**

Rooftop:	1,562,067 sq ft	37.5%
Roadways:	1,160,692 sq ft	27.5%
Parking/Sidewalks:	1,471,001 sq ft	34.9%

**Landuse:**

Residential:	1,602,643 sq ft	25.3%
Commercial:	1,002,204 sq ft	15.8%
Industrial:	2,162,663 sq ft	34.1%
Parks/Open Space:	0 sq ft	0%
Vacant:	1,339,043 sq ft	20.9%
Public Space:	262,167 sq ft	12.4%

**Green Concepts:**

**Total Impervious Area: 4,213,624 sq ft**

Public:	Rooftop: 0 sq ft	0%
Parking/Sidewalks:	0 sq ft	0%
Roadways:	1,160,692 sq ft	27.5%
Catch Basins:	212	

**Single Family Residential:**

Rooftop:	463,133 sq ft	11.7%
No. of houses:	350	
Population:	1,137	

\* Per MSD IACP Volume 2, Appendix 3.2.3 Green Opportunity Maps.

- Legend**
- |                               |                           |
|-------------------------------|---------------------------|
| SANITARY SEWER                | Biofiltration/Rain Garden |
| COMBINED STORM & SANITARY     | Green Street              |
| FORCE MAIN                    | Infiltration Gallery      |
| OVERFLOW                      | Permeable Parking         |
| TRUNK LINE/INTERCEPTOR >= 12" | Permeable Pavement        |
| TRUNK LINE/INTERCEPTOR < 12"  | Permeable pavement        |
|                               | Metro Parks               |



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## CSO130 Priority Basin

Green Infrastructure Performance Assessment  
 Conceptual Green Management Practices (GMPs)  
 For Scoping Purposes Only

### CSO Statistics:

No. of overflows: 9  
 avg. volume per incident: 60,330 gal  
 Avg. duration: 2.52 hrs

**Imperviousness: 72% (2% tree cover)**  
 Rooftop: 356,003 sq ft 39.6%  
 Roadway: 217,155 sq ft 24.2%  
 Parking/Sidewalks: 323,462 sq ft 36.1%

**Landuse:**  
 Residential: 299,519 sq ft 24.2%  
 Commercial: 306,833 sq ft 25%  
 Industrial: 400,091 sq ft 32.3%  
 Parks/Open Space: 0 sq ft 0%  
 Vacant: 75,816 sq ft 6.1%  
 Public Space: 103,271 sq ft 12.4%

### Green Concepts:

**Total Impervious Area: 895,702 sq ft**

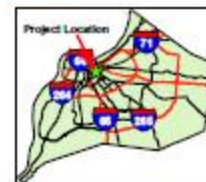
**Public:** Rooftop: 0 sq ft 0%  
 Parking/Sidewalks: 0 sq ft 0%  
 Roadway: 217,155 sq ft 24.2%  
 Catch Basins: 32

**Single Family Residential:**  
 Rooftop: 75,016 sq ft 8.6%  
 No. of houses: 81  
 Population: 81

\*For MSD IACP Version 2, Appendix 3.2.6 Green Opportunity Maps

### Legend

Sewer Lines by Type	Conceptual GMPs
SANITARY SEWER	Stormwater/Rain Garden
COMBINED STORM & SANITARY	Green Street
FORCE MAIN	Infiltration Gallery
OVERFLOW	Permeous Parking
TRUNK LINE/INTERCEPTOR < 12"	Permeous Pavement
TRUNK LINE/INTERCEPTOR > 12"	Permeable Pavement
	Metro Parks



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# Results

- Rates, Rentals, and Charges Modified on August 1, 2011
- MS4 Permit Requires Green Infrastructure Practices to be Mandated by Ordinance in 2012.
- Over 60 Projects Incentivized from Beginning of Program with an Estimated 204K Gallons of Overflow Reduction, and nearly 1 Million Gallons of Storm Water Capture.



# Lessons Learned

- It's All Low Hanging Fruit, or Else We Wouldn't Spend Money on It.
- The Greenest Thing is the Most Cost Effective Thing.
- Partnerships are Critical to Program Success.
- Put Teeth in Your Agreements – and Make it a Long Term Investment.
- We HAVE to Figure out Maintenance.
- Plan on Needing Program Resources.



# Extra Slides