

Green Infrastructure-A New Approach to Floodplain and Stormwater Management

Presenter:
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WHAT-WHERE-HOW-WHY?

- **What is Green Infrastructure?**
- **Where is it being used in other communities?**
- **How can it benefit floodplain and stormwater management?**
- **Why? How can Green Infrastructure help my community?**

Green Infrastructure

Defined as:

- Natural and managed green areas in both urban and rural settings,
- Strategic connection of open green areas,
- Treating rainwater as a resource and not as trash to be discarded as quickly as possible,
- Transforming “grey” infrastructure to green through restoration of watersheds to slow and store water, and
- Providing multiple benefits for people.

What else is Green Infrastructure?

- Helping communities come closer to attaining the CWA standards
- Public Perception (sustainable cities)
- Ability to Leverage State and Federal Program Dollars
- Opportunity to “marry” multiple public work efforts (streetscaping, sidewalks, parks, floodplain & stormwater management)

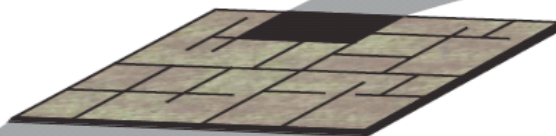
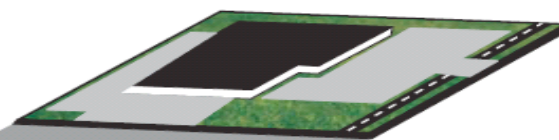
SITE LEVEL

Where can BMPs be incorporated into typical sites?

Which are most effective locally?

What density is required to meet performance objectives?

Constructability and Cost



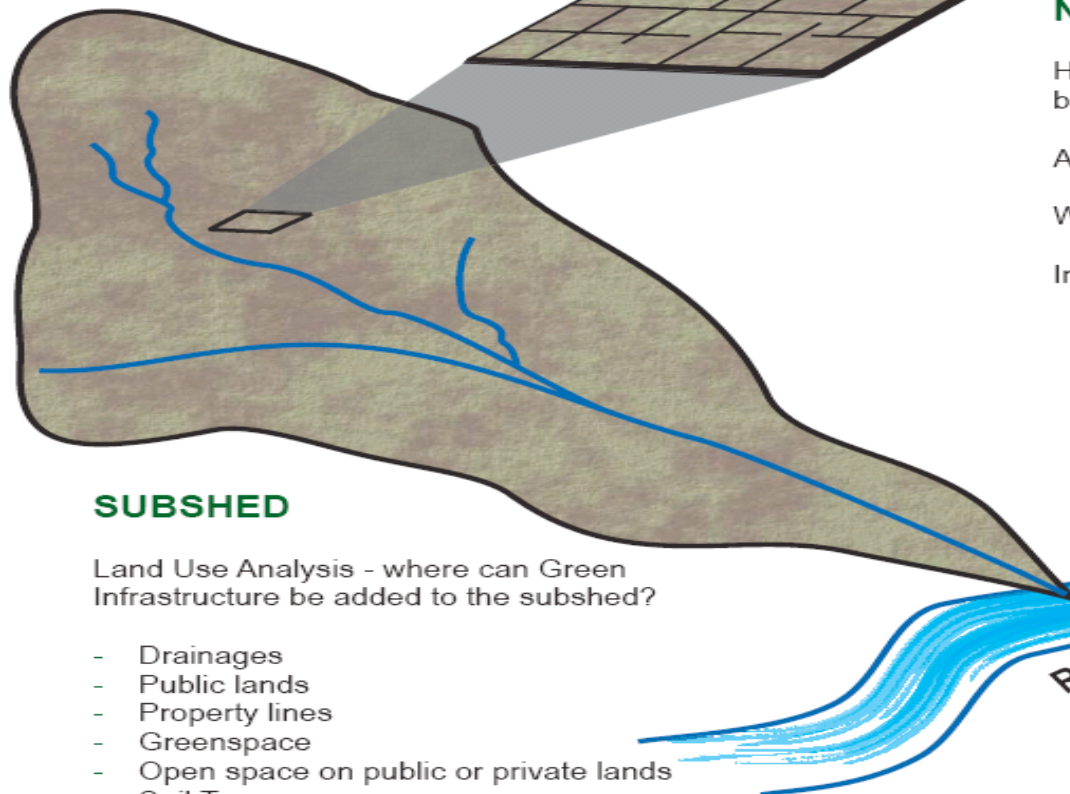
NEIGHBORHOOD

How to scale up from the site level to city blocks?

Available public space

Working with private property owners

Incentives



SUBSHED

Land Use Analysis - where can Green Infrastructure be added to the subshed?

- Drainages
- Public lands
- Property lines
- Greenspace
- Open space on public or private lands
- Soil Types

Hydrologic Studies - what density of BMPs will make a difference?

Receiving Stream

REGIONAL ISSUES

Political Cooperation

Community Acceptance

Consistent Policies, Ordinances

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An aerial photograph of a suburban neighborhood. The image shows a network of roads, including a central vertical road and several horizontal and curved roads. Property lines are overlaid on the image, dividing the area into numerous lots. Most lots contain houses with varying roof colors (brown, grey, red). Some lots have swimming pools. The text "Where can rain soak in?" is centered over the image in a white font with a dark background.

Where can rain soak in?

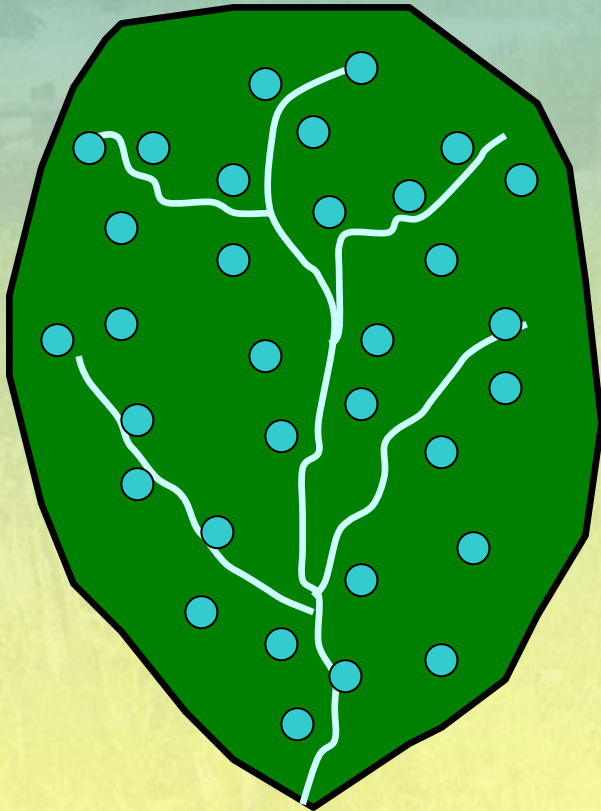
Q - How Do We Protect Our Streams?

A - Manage How Stormwater Runs Off the Landscape

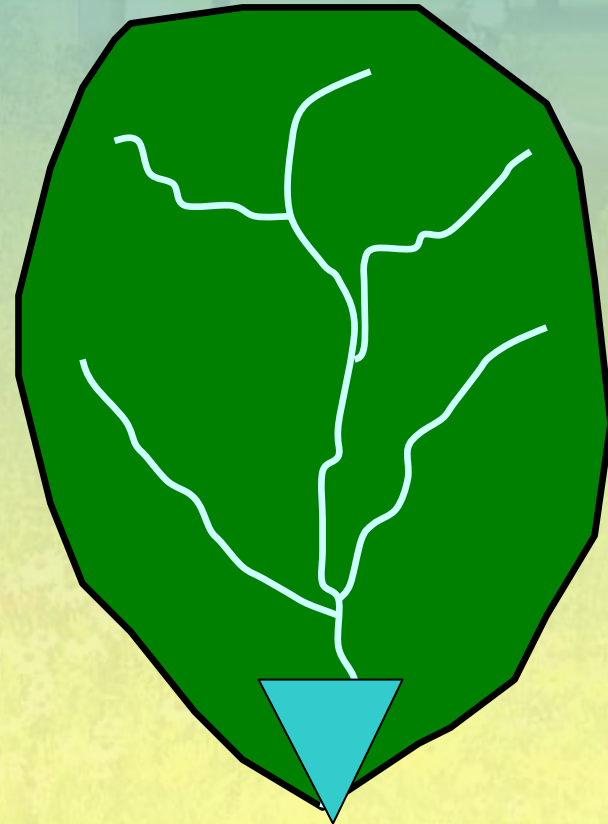


Photo: Rusty Schmidt

Distributing Stormwater Controls Close to Runoff Sources



**Distributed
Stormwater Features**



**Regional
Traditional Techniques**

Green Roof Applications



Pervious Infrastructure



Rain Gardens & Bio-Infiltration Devices



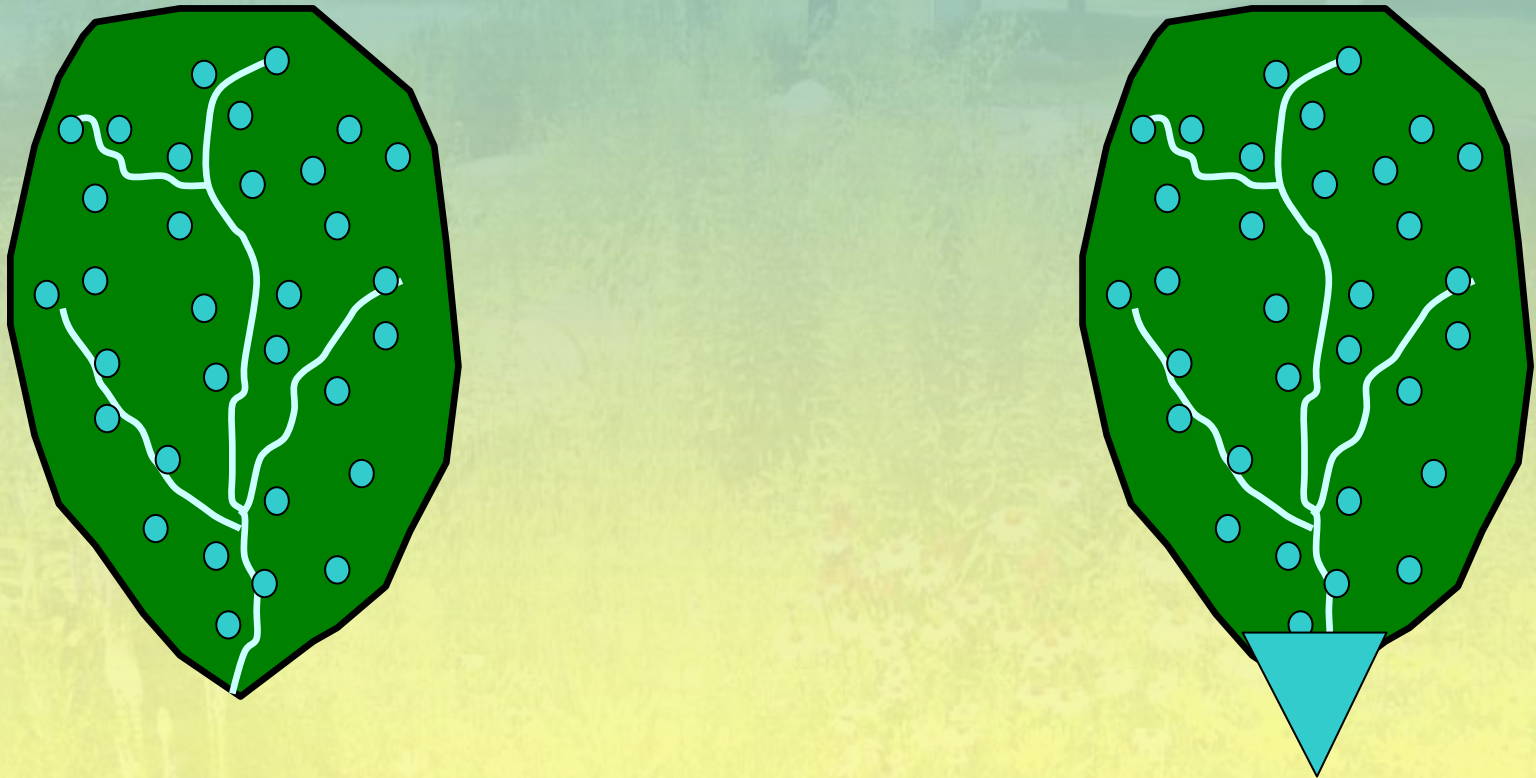
Green Infrastructure Implementation

Impervious Land Uses



Where can the stormwater go?

Green Infrastructure Implementation



Appropriately located Green Infrastructure can decrease peak flow.

Green Infrastructure Implementation

Impervious Land Uses



Change land use characteristics without changing the land use.

Site Specific Application



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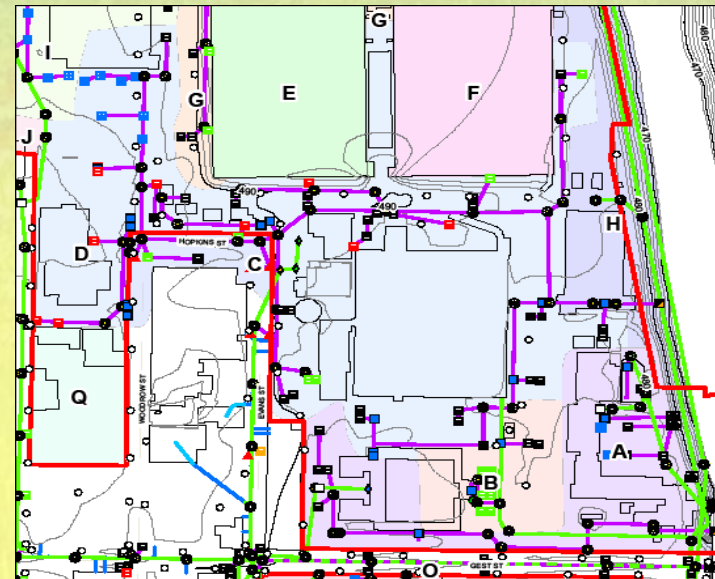


Next Steps for MSDGC



**Quantifying Green
Roof Application in
CSO Sewersheds**

**Quantifying Rain Garden
Performance in CSO
Sewersheds**



Neighborhood Application

Burnsville, MN

**Residential
Neighborhood**

**Rain Garden Retrofits
Long-Term Monitoring**

AFTER



BEFORE



Photos Courtesy of Rice Creek Watershed District

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Burnsville, MN

Paired Study of Residential Street Runoff Control

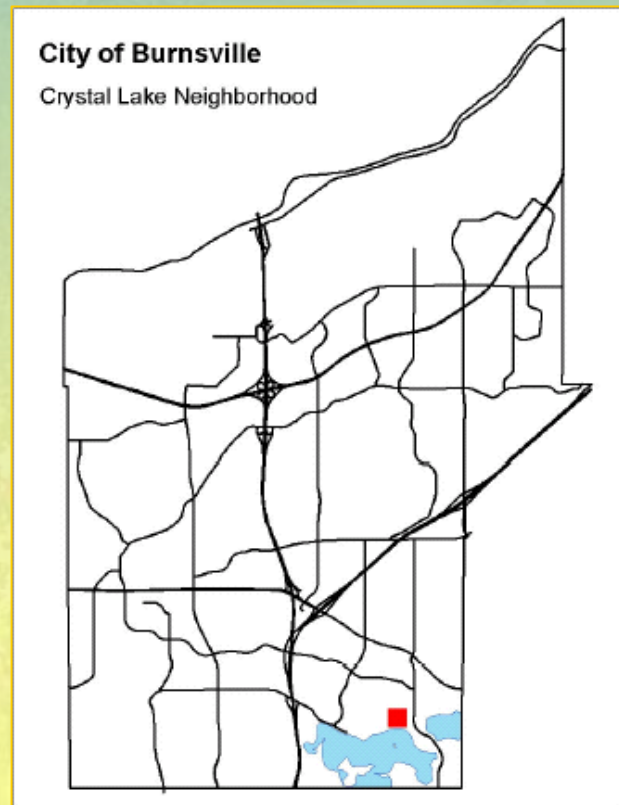
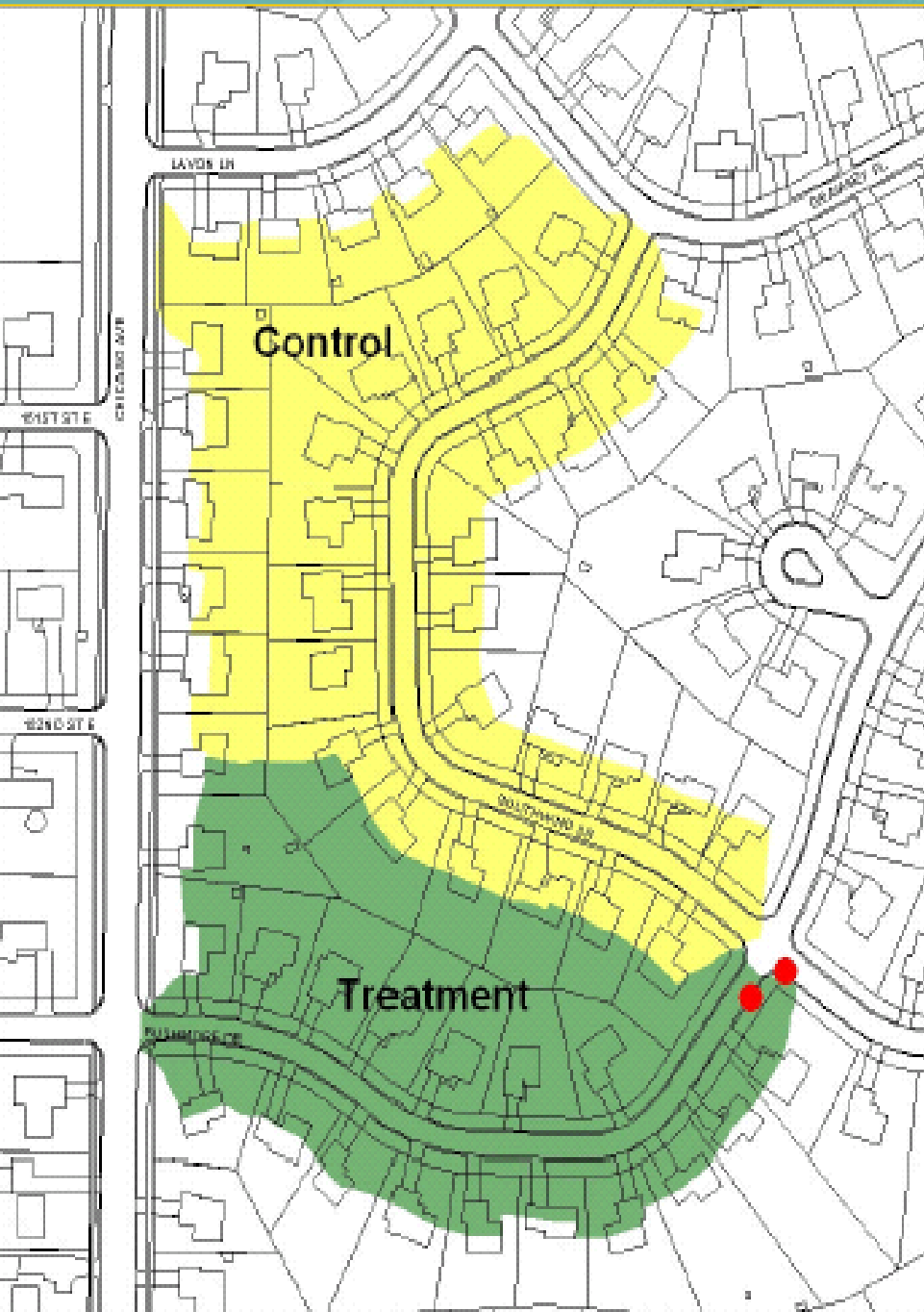


Diagram courtesy of the City of Burnsville, MN from
their Burnsville Stormwater Retrofit Study

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17 Rain Gardens Installed

Burnsville, MN

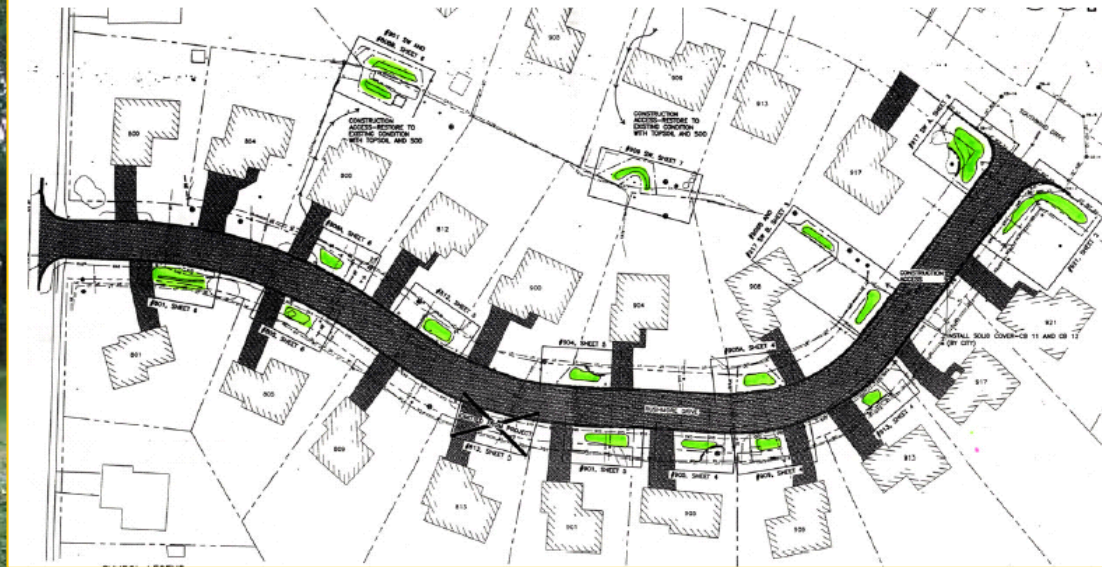


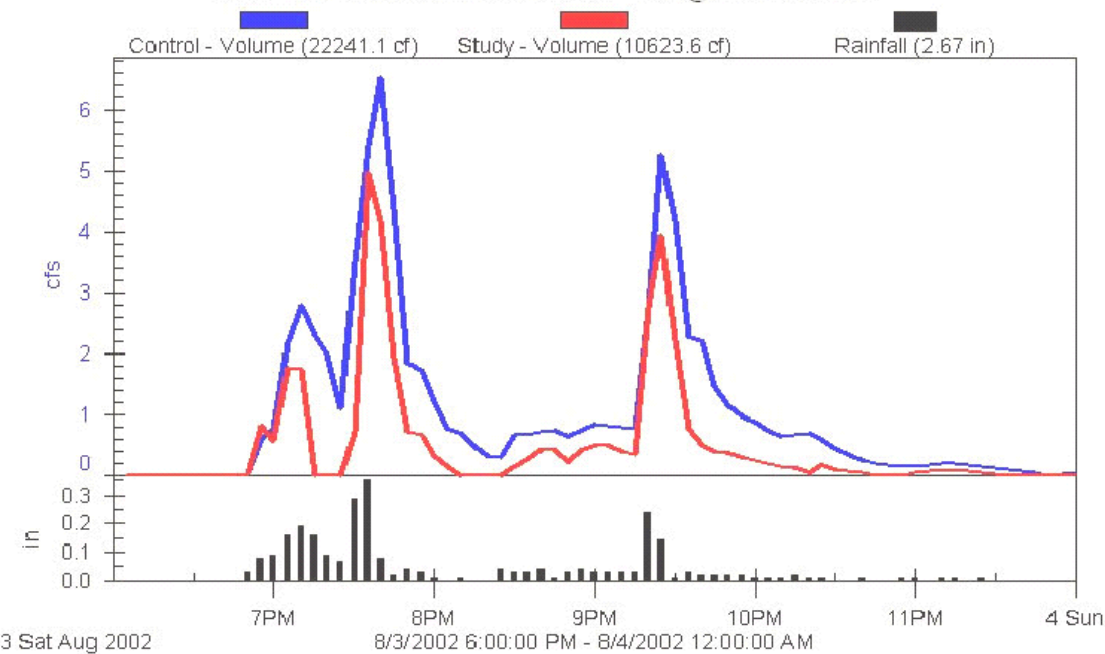
Diagram courtesy of the City of Burnsville, MN from their
Burnsville Stormwater Retrofit Study

5.3 acres treated and 7.5 acres controlled
Average treated lot < .5 acres

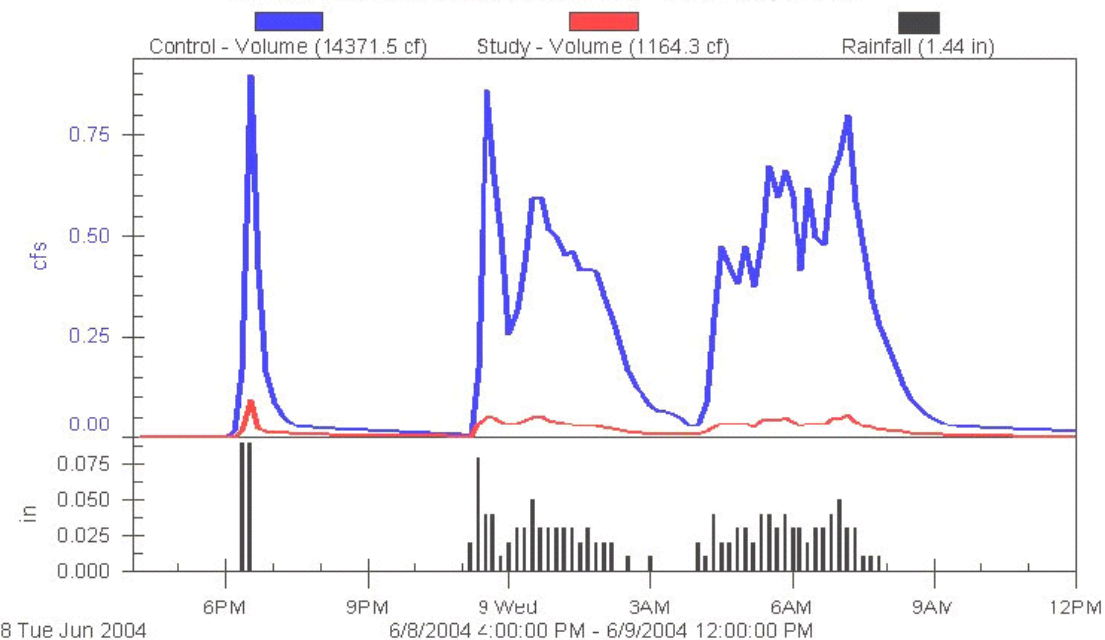
Average total rain gardens < 1 acre

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Pre-Construction Runoff - August 3, 2002



Post-Construction Runoff - June 8, 2004



Burnsville, MN

Blue: Control

Red: With Rain Gardens

Diagram courtesy of the City of Burnsville, MN from their Burnsville Stormwater Retrofit Study

GREEN INFRASTRUCTURE MITIGATION



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Rain Garden Reserve - A Cuyahoga Falls Community Conservation Rainscape

Arbor Day Dedication 4/25/08

Cuyahoga Falls Rain Garden Implementation



**Cuyahoga Falls, Ohio
Hazard Mitigation Project**

Goals

- Create a **“First of its Kind”** FEMA Mitigation site
- **Municipal scale** rain garden
- **Educate** the public
- **Design model** for rain garden initiative for the city
- **Balances security and openness**
- **Low impact/low maintenance**
- Use **innovative design measures**

Maintenance, Safety and Site Details

- The City's Building & Grounds Department will maintain the site
- Fencing/vegetative screening
- Security lighting (solar bollards)
- Narrow walk way (permeable sidewalk)
- Signage
- Patrolling
- No benches
- Congregation and loitering will not be encouraged

Next Steps-Monitoring Performance

- Developing suggested techniques for monitoring performance
- Considering a green infrastructure concept plan for the entire city.
- What types of green infrastructure makes sense for our community?



Regional Applications

Large Cities Initiatives



GreenCityBlueLake



10,000
Rain
GardenS



Opportunities, Incentives & Regulatory

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Kansas City, MO

- Educating the public about water quality, sewer and stormwater concerns
- Promoting green solutions
- Encouraging funding for required sewer and stormwater improvements

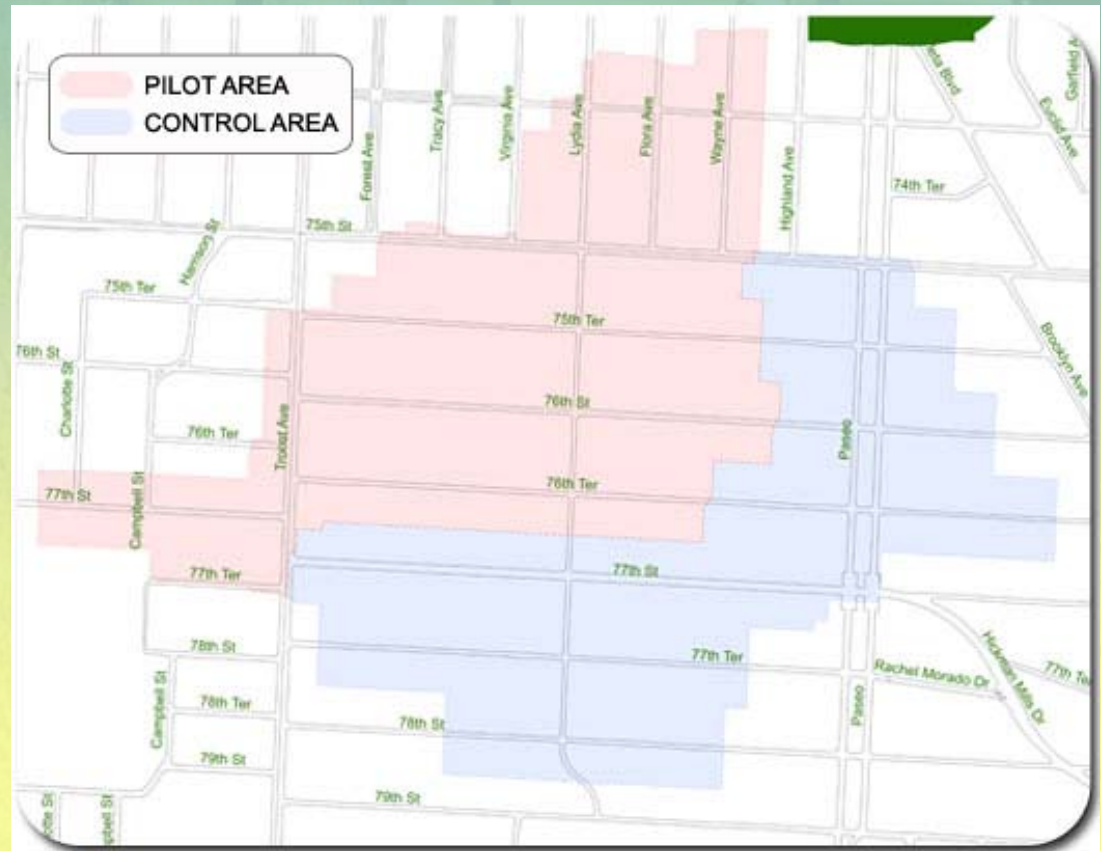
10,000
Rain
GardenS

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Next Steps for Kansas City

TARGETGREEN

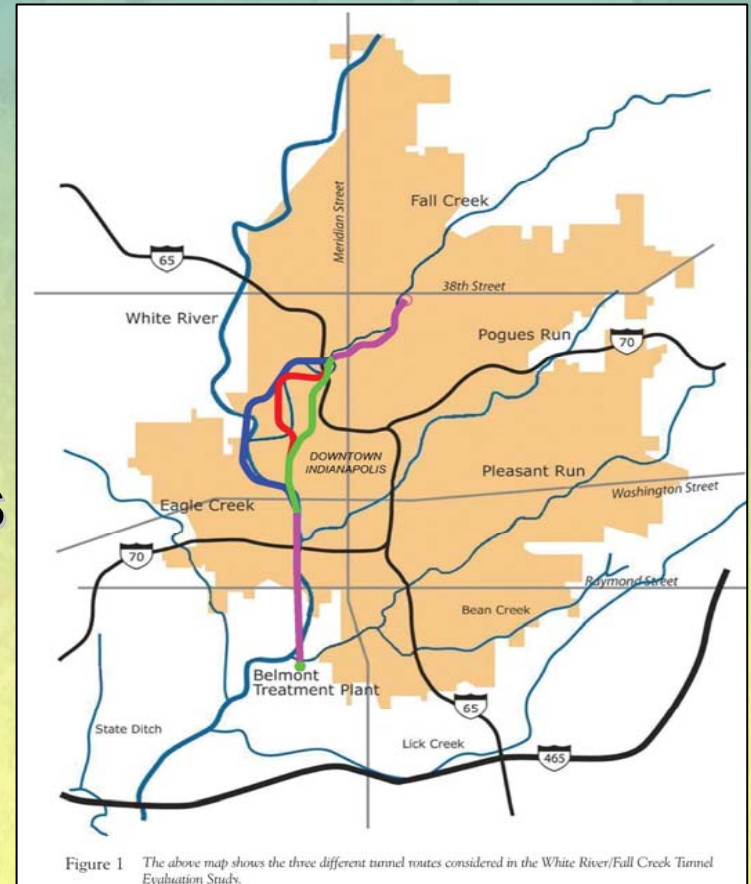
Solutions for Your Community



Estimated Reduction of \$20 million

Indianapolis, Indiana

- Incorporate Green Infrastructure
- Determine Benefits
- Promoting Green Solutions
- Cost Effective Sense



The intent of this program is not to implement green infrastructure at any cost, rather to implement green infrastructure that is cost effective!

Ft. Wayne, Indiana



- Rain Garden (Green Infrastructure Initiative)
- Promoting green solutions for homeowners and providing training
- Investing in Educational Modules for K-12 to incorporate into the existing educational system

Questions



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