Green Street Stormwater Management Plan

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City of Milwaukee

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MILWAUKEE

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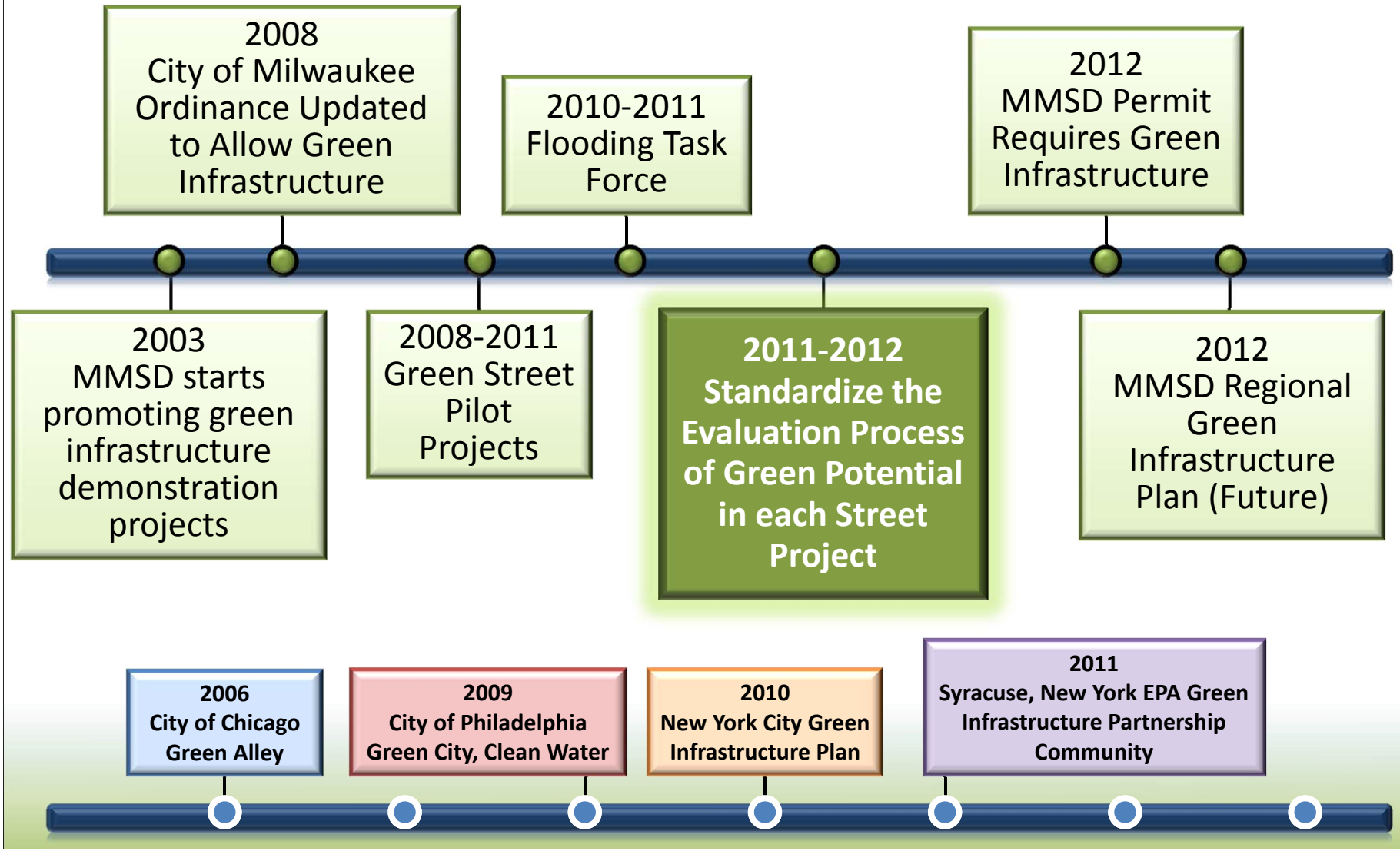
WISCONSIN COASTAL MANAGEMENT PROGRAM

MILWAUKEE OFFICE OF ENVIRONMENTAL SUSTAINABILITY

CITY OF MILWAUKEE 1846 DEPT. OF PUBLIC WORKS

Green Infrastructure History in Milwaukee

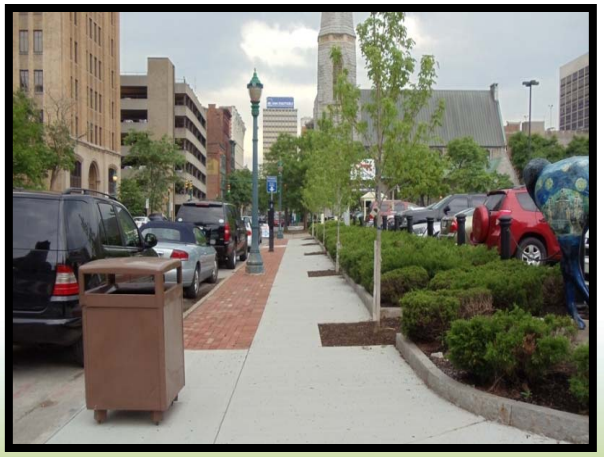
Emerging National trend over the last 10 years



What is a Green Street?

- Manages stormwater in the street right-of-way
- Fresh look at typical design protocols
- Utilize green space where available
- Incorporate innovative pavement types
- Green Streets provide benefits without sacrificing roadway function





Green Street Features

Vegetated Areas

- Median
- Terrace
- Adjacent Open Spaces

Pavement

- Street
- Parking Lane (recommended)
- Alleys (recommended)

Trees

- Trees with drainage components

Why Green Streets?

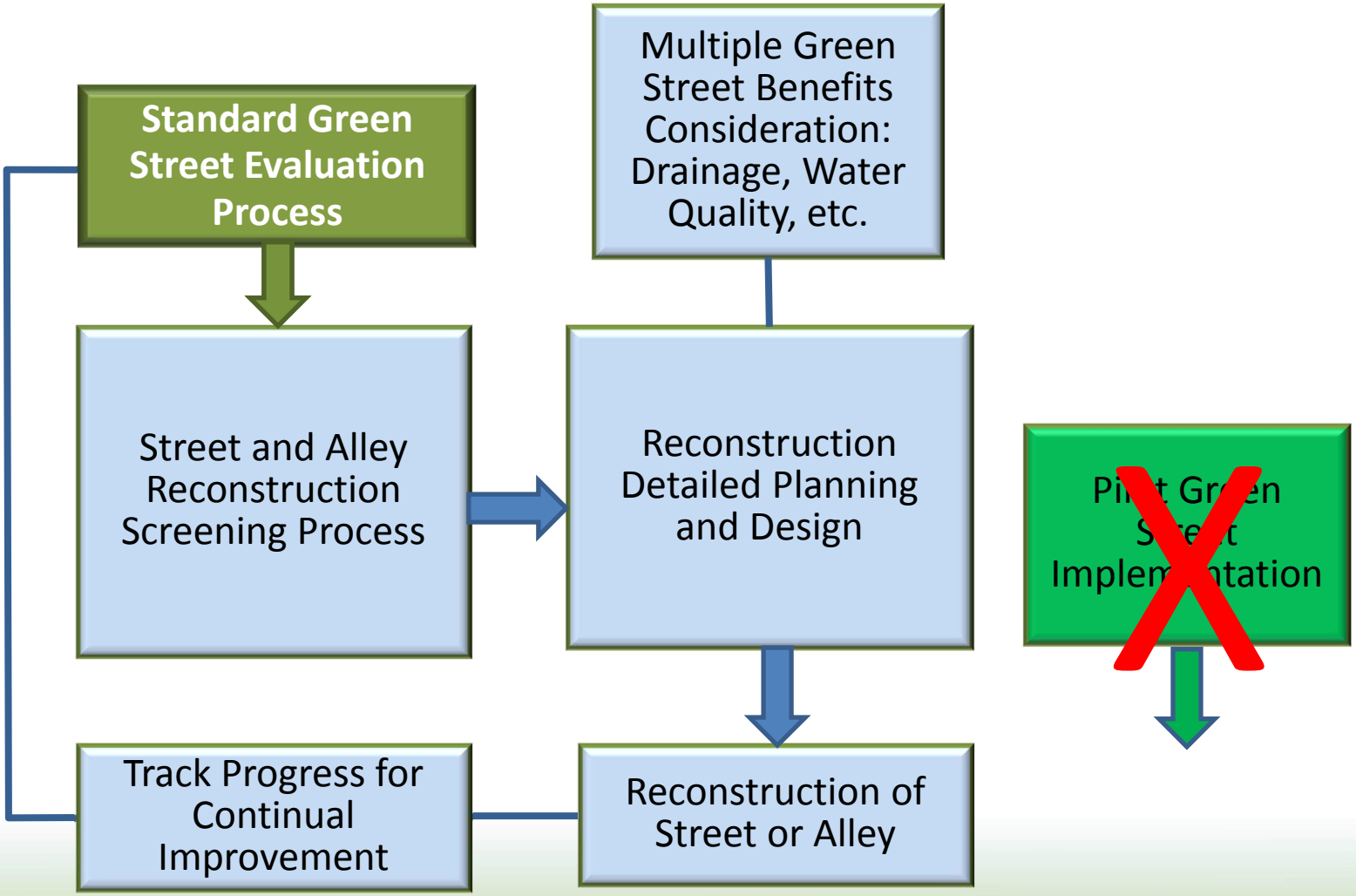
- Streets represent 20-25% of the total urban area
- Measurable water quality and drainage benefits
- DNR Permit compliance
- Opportunities for collaboration and partnerships
- Aligns with City's Green Team and Flooding Task Force recommendations
- Can be incorporated into the standard street design processes



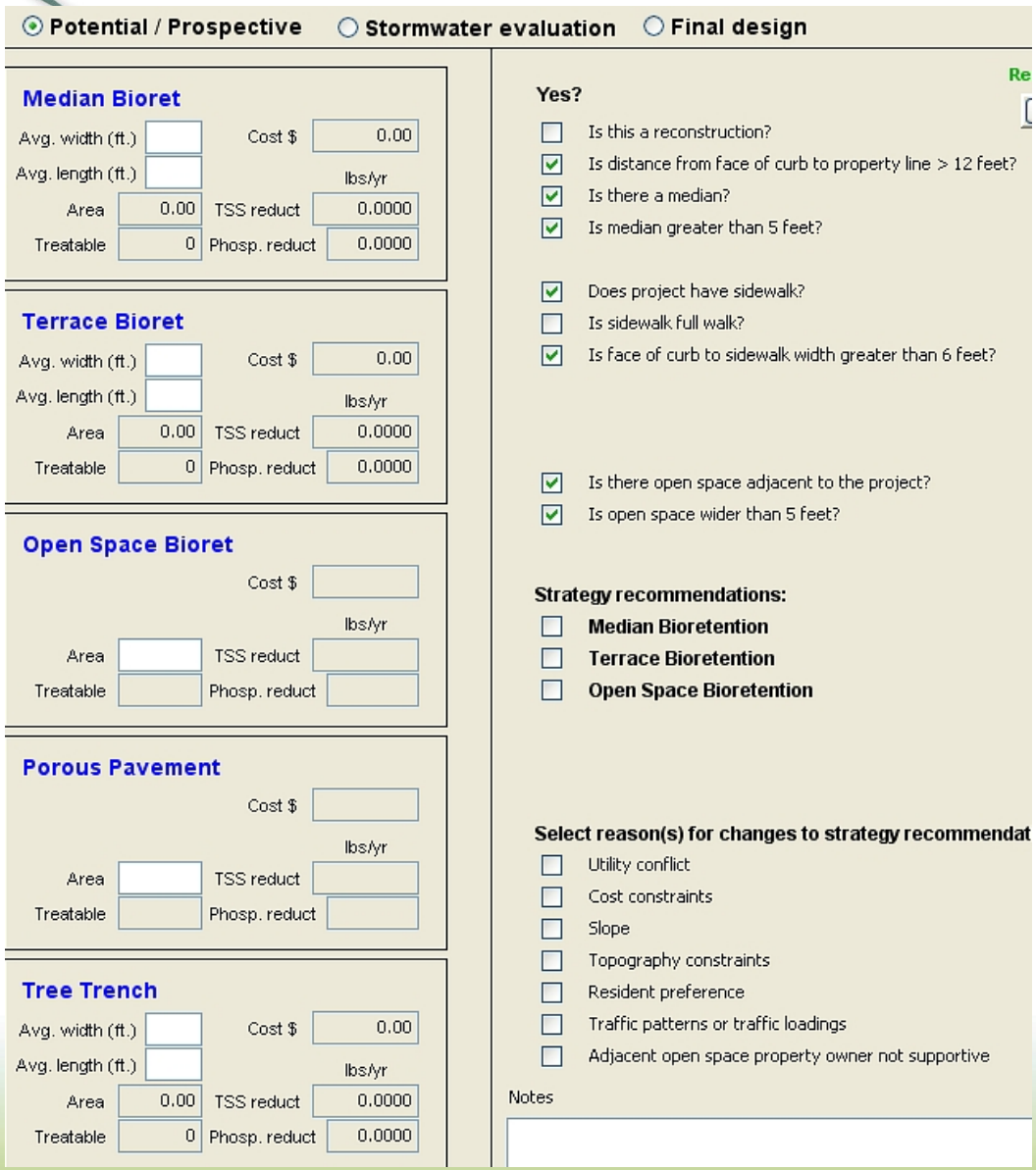
Why a Green Street Standard?

- Framework to Provide Consistent Guidance Across DPW
- Improve Drainage
  - 2010 Flooding Task Force
  - Provides decentralized storage and infiltration
  - Opportunity in highly urbanized area
- Reduce the Cost of Implementation
  - Retrofits are costly
  - Integrating into the planning and design process provides cost savings
    - Realizes 20 to 40 percent cost savings
  - Multiple benefits with comparable cost to traditional controls
- Achieve Multiple Benefits
  - Help City adapt to climate change
  - Improved air and water quality
  - Reduced heat island effect
  - Improved neighborhood aesthetics
  - Improved drainage

Green Street Evaluation Built Into the Standard Design Process



Reviewing Street Candidates



- Add screening criteria into city's street database

- Positive Criteria include wide medians, wide terraces, availability of adjacent land, etc

- Negative criteria include utility conflicts, steep slopes, etc

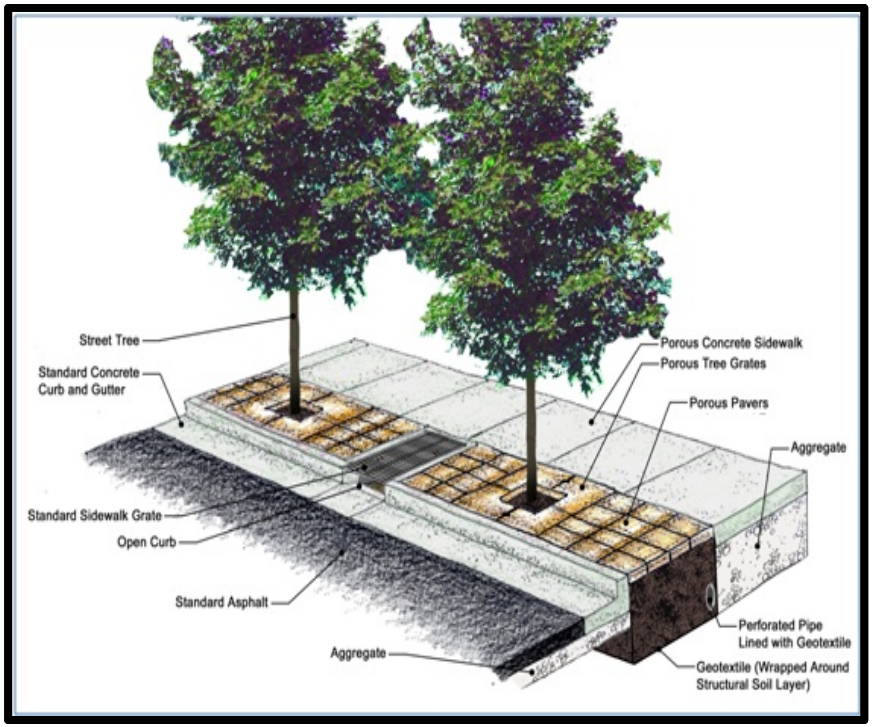
Top Green Street Opportunities:
Bioretention in Median

(2012) Green Street Median
W. Grange Ave. (Howell to Freeway)
Milwaukee, WI

(2010) Green Street Median
Grange Ave.
Milwaukee, WI

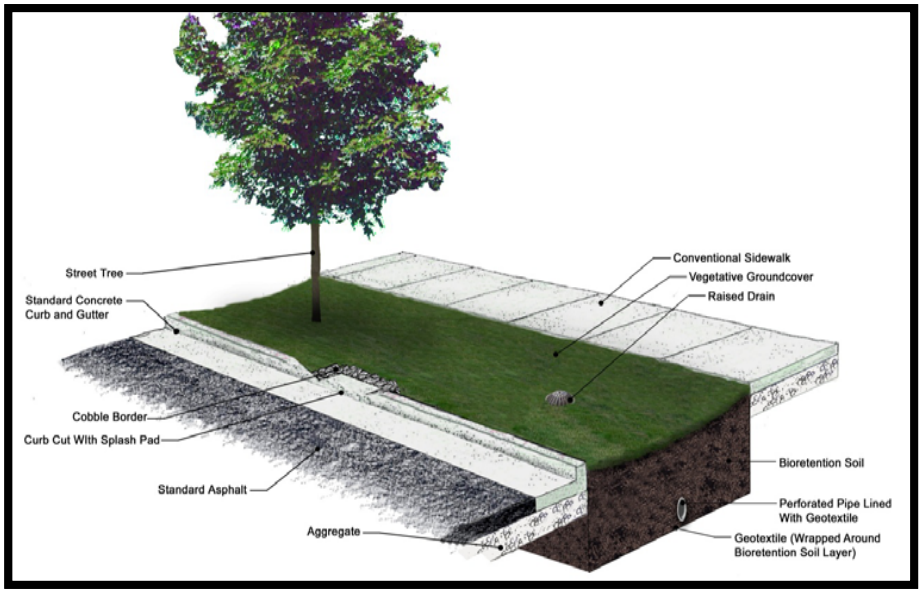
Top Green Street Opportunities:
Tree Trenches

Urban street with tree trench and bioretention, Syracuse, NY

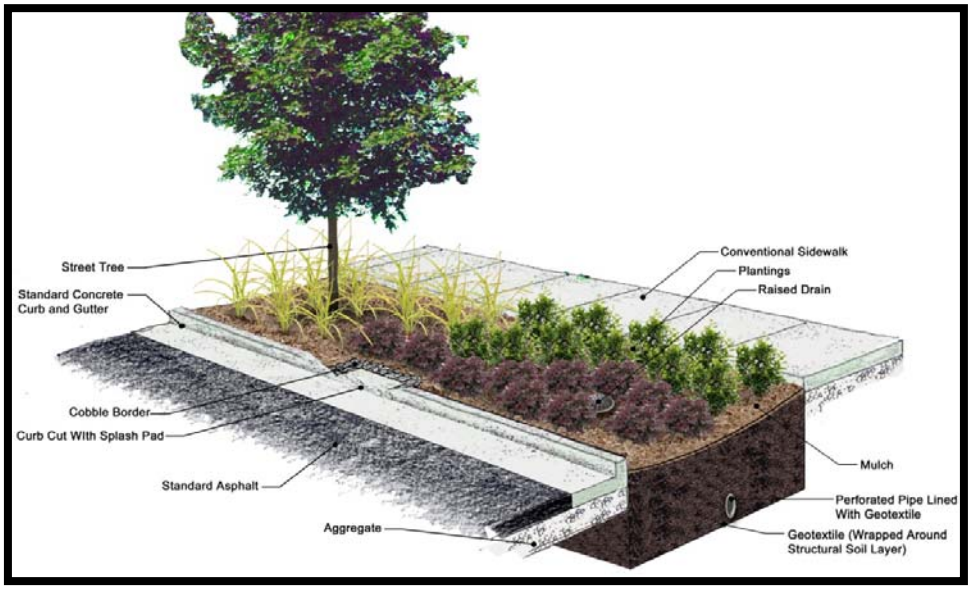


Conceptual tree trench components

Option Limited by Terrace Width:
Bioretention in Terrace Grass or Natural Landscaping



Typical cross section of a bioretention facility with an underdrain, overflow, and tree and grass plantings



Typical cross section of a bioretention facility with an underdrain, overflow, and native plantings

Green Street Opportunity:
Example: Bioretention & Tree Trench in Highly Urban Street—Cincinnati, OH

Cost Effective Maintenance Strategy

- First two years of maintenance included in construction contract
- Switch maintenance from mowing to landscape maintenance
- Periodic observation to verify performance as expected
- Vacuum sweeping for porous pavement requires new equipment, but sweeping frequency is no greater than what already occurs

Green Street Policy Summary

- Utilize right-of-way for multiple benefits
- Incorporate into standard street planning and design process
- Cost effective
- Adaptation for climate change
- Improves water quality
- Improves drainage

Backup Slides

Example: Bioretention with Trees

Urban street before, Syracuse, NY

Urban street after curb extension, bioretention with tree planting, and overflow, Syracuse, NY

Example: Porous Pavement

Before

After

Example: Porous Pavement Alleys

Before (July 2011)

Conventional reconstruction (8-inch reinforced concrete):

After (February 2012)

Green alley retrofit (permeable pavers with infiltration trench)