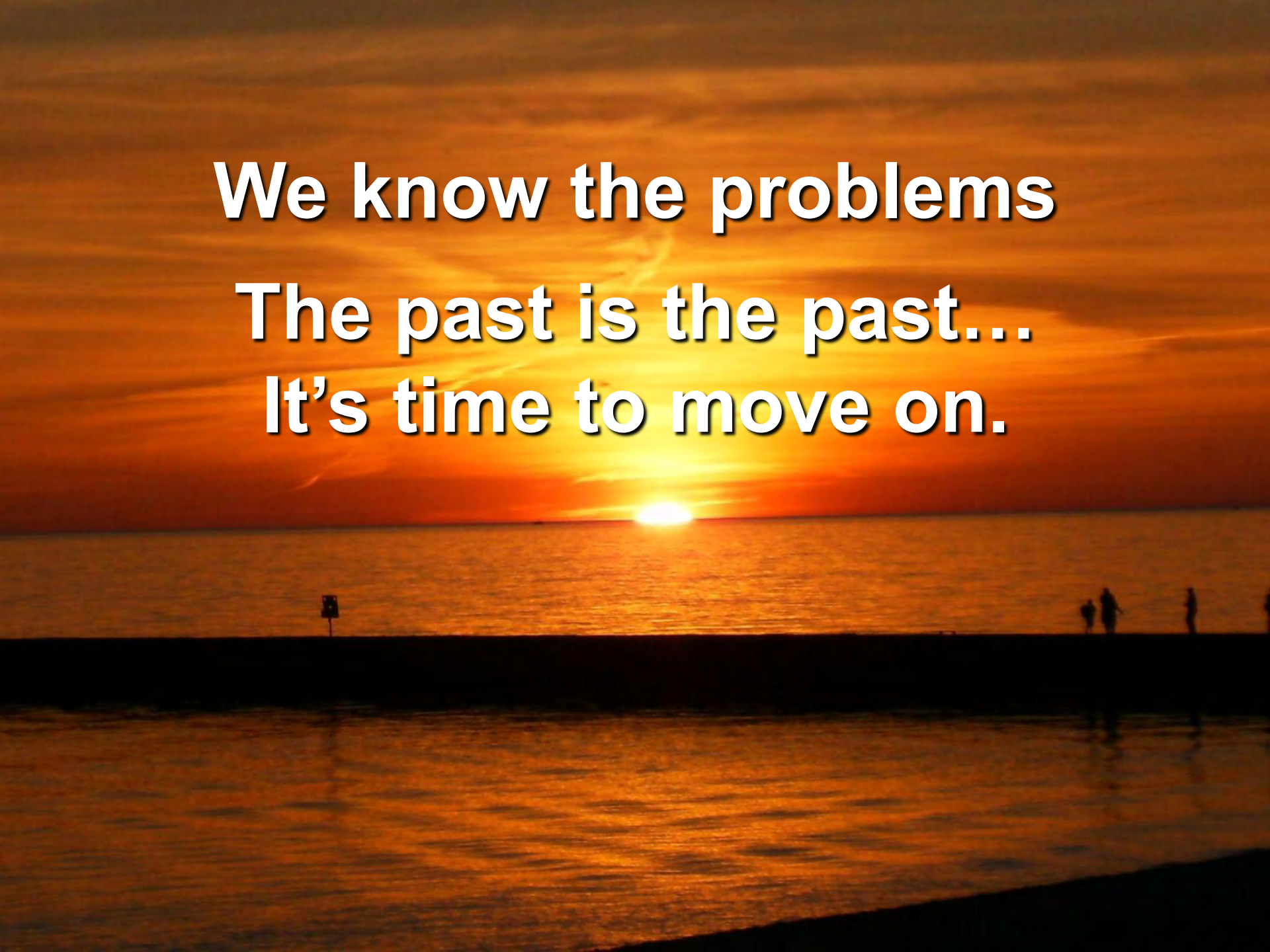
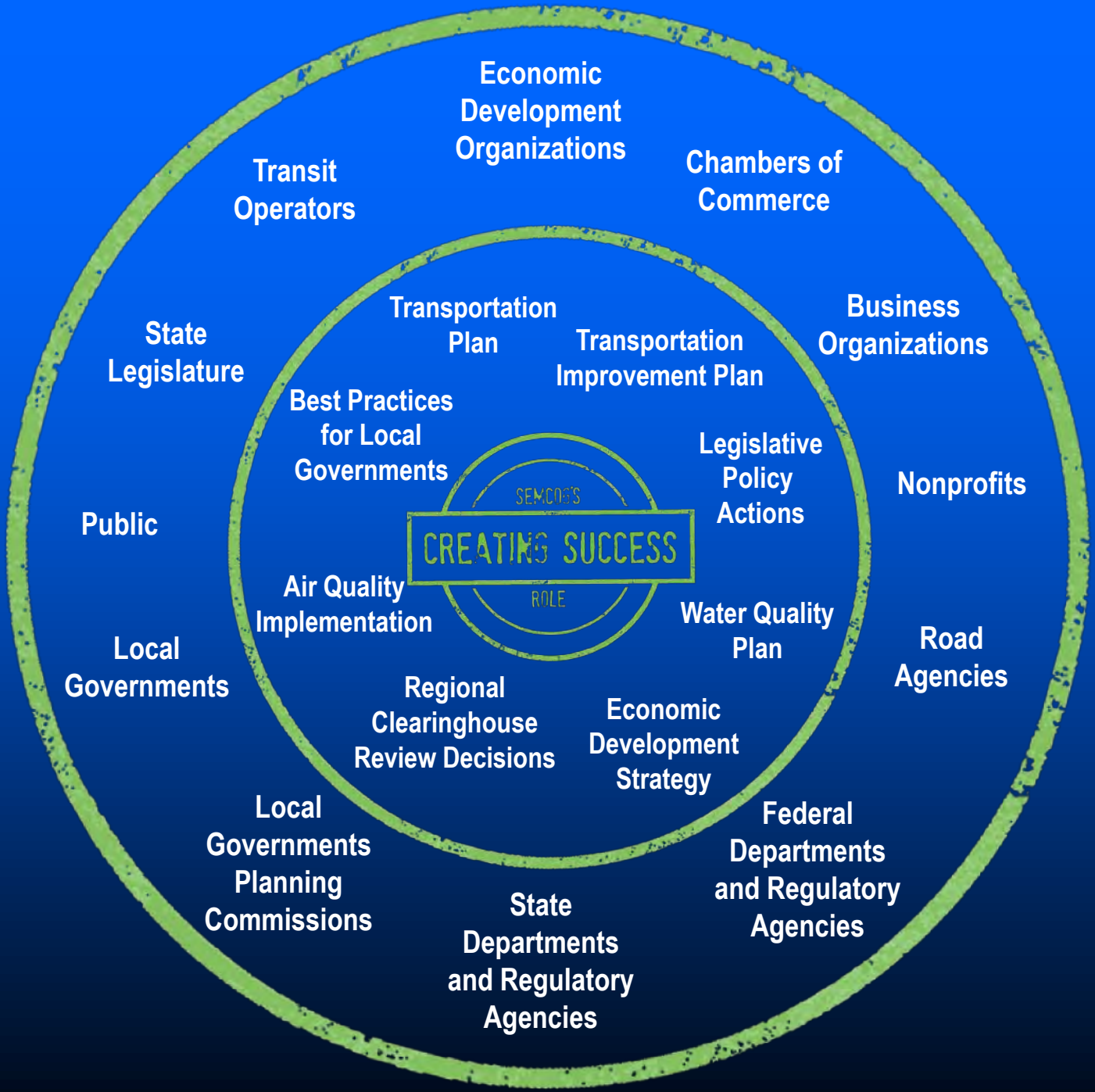
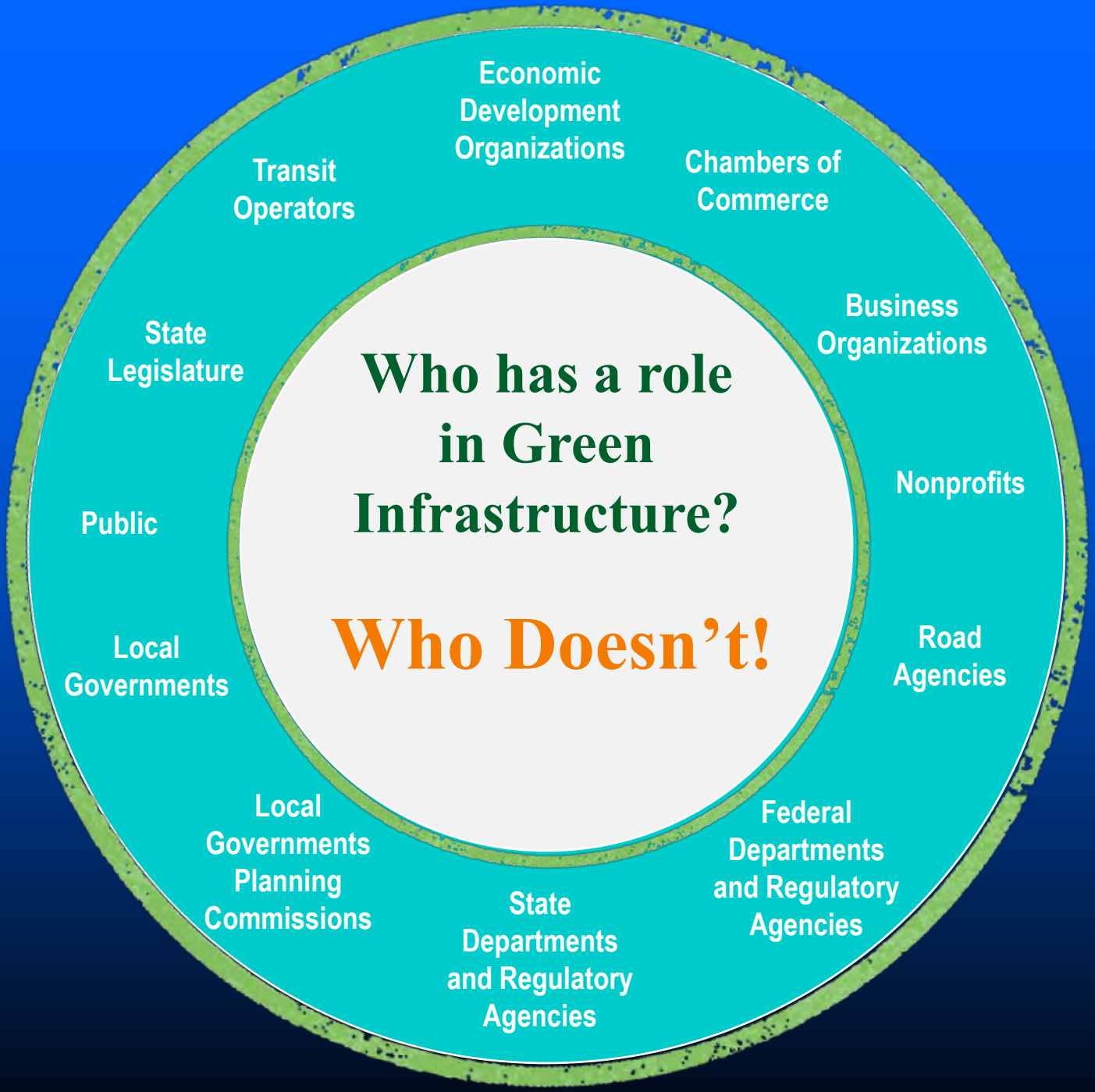
Integrating Green Infrastructure into the DWSD CSO Program


We know the problems
The past is the past…
It's time to move on.

SOUTHEAST
CREATING SUCCESS
MICHIGAN

Our shared outcomes


Economic Development Organizations
Transit Operators
Chambers of Commerce
State Legislature
Transportation Plan
Transportation Improvement Plan
Business Organizations
Best Practices for Local Governments
Legislative Policy Actions
Nonprofits
Public
SEMCOG'S
CREATING SUCCESS
ROLE
Air Quality Implementation
Water Quality Plan
Local Governments
Road Agencies
Regional Clearinghouse Review Decisions
Economic Development Strategy
Local Governments Planning Commissions
Federal Departments and Regulatory Agencies
State Departments and Regulatory Agencies


Economic Development Organizations
Transit Operators
Chambers of Commerce
State Legislature
Business Organizations
Who has a role in Green Infrastructure?
Nonprofits
Public
Who Doesn't!
Local Governments
Road Agencies
Local Governments Planning Commissions
Federal Departments and Regulatory Agencies
State Departments and Regulatory Agencies

Project Redesign

- Original tunnel terminated
- Met EPA financial hardship criteria
- New project includes grey & green infrastructure
- Green infrastructure expected to be incorporated as a regulatory requirement in the new NPDES permit

DWSD's Financial Commitment

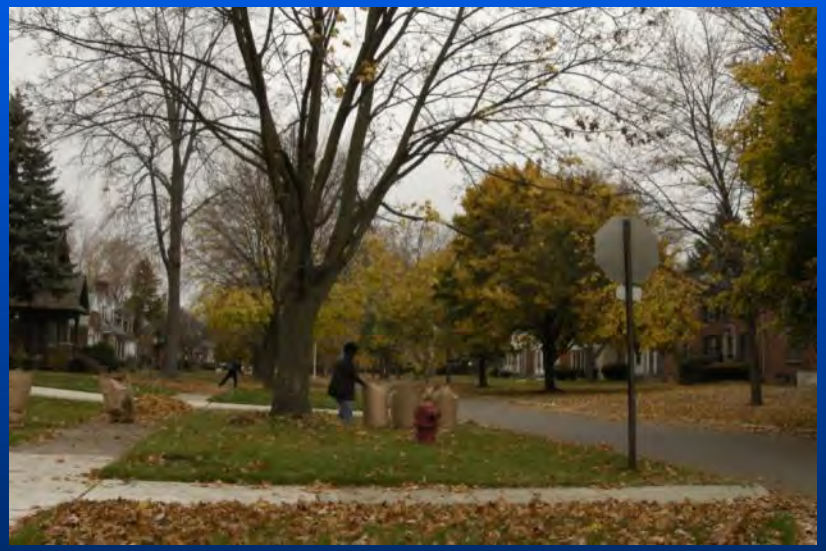
- $50 M over 20 years
- Operating expense, not capitalized
- $3 M per year operating expense is roughly equivalent to $50 M investment in conventional CSO control facilities

Project Area

- West side of Detroit
- Over 107,000 Parcels
- 24,000 Acres
- 37.5 Square Miles
- Three freeway systems
- Rouge Park and Eliza Howell Park

Green Infrastructure Analysis Outcomes

- Estimate Benefits
  - Stormwater runoff volume
  - Air quality
  - Economic value
  - Urban temperatures
  - Energy efficiency



CITYgreen© Green Infrastructure Analysis

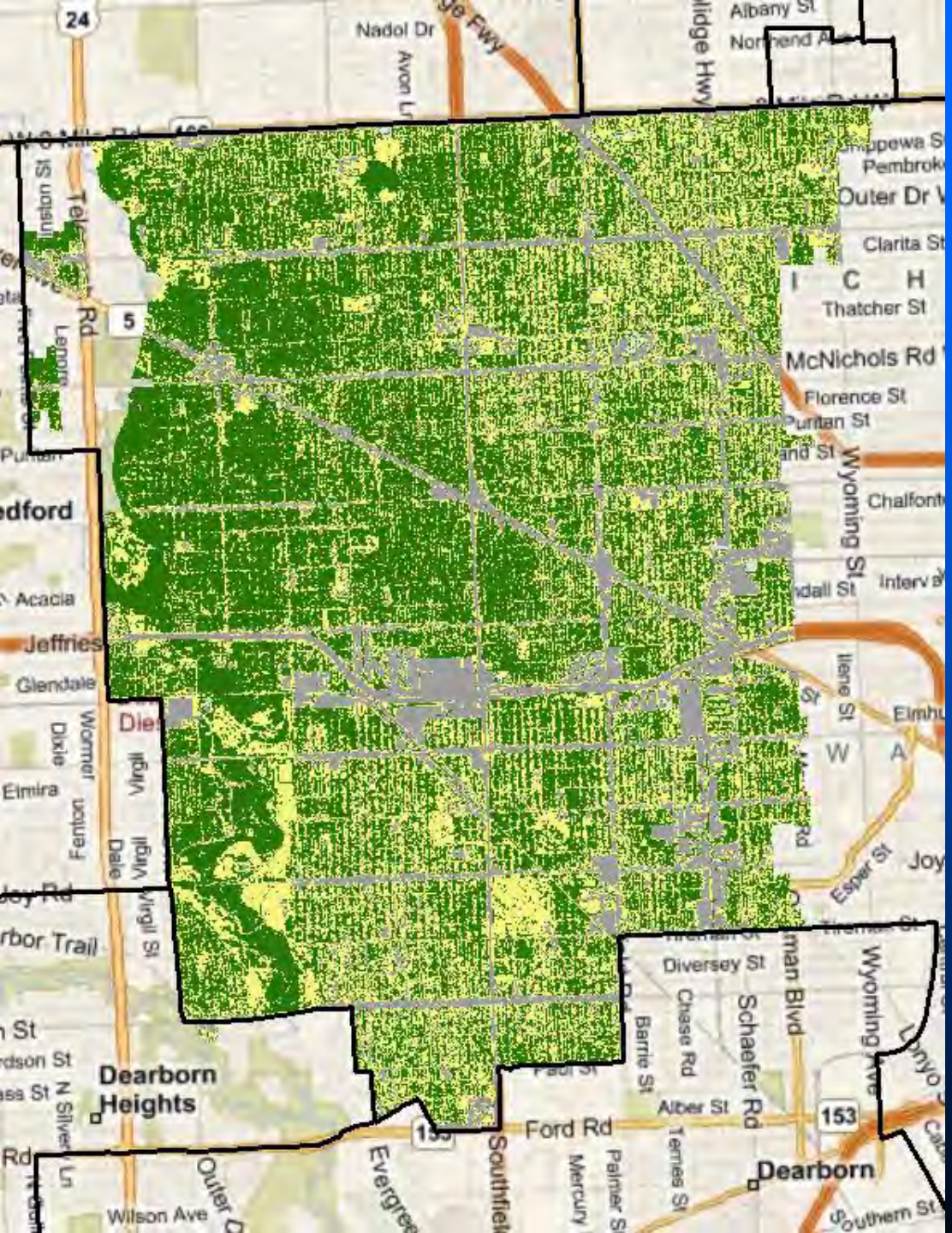
- Land cover analysis not GI BMP analysis
- Focus on stormwater runoff volume
- Utilize changes in land cover to estimate volume reduction

CITYgreen© Green Infrastructure Analysis

- Stormwater runoff analysis
  - TR-55 Curve Number Method
  - Analysis of existing vs. future scenario
  - 2-year; 24-hour event City of Detroit rainfall data (2.25 inches)
  - Local topography
  - Hydrologic soil group

Data Sources

- City of Detroit Parcel Data
- Estimated Abandoned Lots – City Data
- 2005 Land Cover
- Land Cover Classifications
  - Tree Canopy
  - Open Space
  - Urban
  - Water
  - Bare



Land Cover

- 44% Impervious surface (roads largest source)
- Residential is largest contributing area
- Good tree canopy in many areas

- Impervious Surfaces
- Open Space – Grass/Scattered Trees
- Trees
- Urban: Bare
- Water Area

City of Detroit Parcel Data

- City of Detroit Properties
  - Parks
  - Municipal Buildings
  - Vacant Tax Exempt
- Commercial
- Industrial
- Residential
- Institutional
- Roads
- Schools
- State Land
- Wayne County Land
- Vacant Non-Tax Exempt
- Other (Fed, Hospital, Civic)

Parcel + Land Cover Data Results

Parcel Type	Total Area (Acres)	Impervious (Acres)	Open Space-Grass Scattered Trees (Acres)	Trees (Acres)	Urban-Bare (Acres)	Water (Acres)
City of Detroit Parks	2,032	95.2	938.5	966.5	29.2	2.90
Civic	17	10.5	1.8	4.9	0.2	0.0
Commercial	906	671.8	110.1	115.3	8.8	0.55
Hospital/Medical	43	31.5	6.0	4.7	0.3	0.0
Industrial	984	806.9	57.6	81.9	37.2	0.0
Institutional	359	195.4	74.6	80.1	9.2	0.0
Municipal/Detroit Buildings	55	43.1	3.6	3.6	4.3	0.0
Residential	10,928	3,154.0	1,603.3	6,120.9	49.5	0.0
Roads	6,744	3405	852	2429	59	0.06
Schools	552	263.2	177.0	84.4	27.6	0.0
State Land	126	10.7	27.4	86.2	1.3	0.0
State & Federal Buildings	7	5.5	1.1	0.5	0.0	0.0
Vacant Non-Tax Exempt	826	99.3	177.4	536.6	13.2	0.0
Vacant Tax Exempt	300	14.6	62.9	220.0	2.4	0.0
Wayne County Land	142	7.2	31.3	100.6	2.4	0.0
Total	24,021	8,813.7	4,124.5	10,834.9	244.6	3.51

CITYgreen© GI Analysis

- Parcel/land cover combination
- Future scenarios by percent change
- Model results - existing vs. future scenario
- Results based on CN reduction and stormwater runoff volume reduction for 2-year; 24-hour event (2.25 in)
- Air Pollution (CO, NO_2, O_3, PM10, SO_2) Reduction
- Carbon Benefits
- Carbon Sequestration (rate carbon removed)

Example - Roads

- Existing
  - 3,407 Acres Impervious
  - 853 Acres Open Space-Grass/Scattered Trees
  - 2,426 Acres Tree Canopy: Grass/Turf Understory
  - 57 Acres Urban: Bare
- Future Scenario
  - Convert 33% of Impervious Area to Tree Canopy w/ Impervious Understory
  - Convert 50% of Open Space Grass to Tree Canopy w/ Grass Understory

Roads Analysis Results

- Stormwater Runoff Volume
  - Approximately 7.5 million CF reduction
  - Curve number change from 89 to 84
- Air Pollution
  - 308,000 lbs/year removed
- Carbon Storage
  - 171,000 tons
- Carbon Sequestered
  - 1332 tons/yr

Other Scenarios

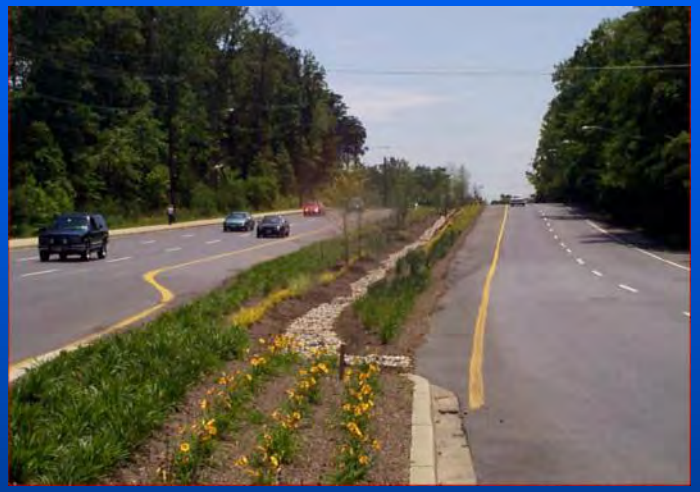
- Residential: Disconnect Downspouts
- Parks: Increase tree canopy and grow zones
- Municipal properties: Manage parking lot runoff

Overall Analysis Results

- Approximately 22% reduction (180 MG)
- 2-year; 24-hour event (2.25 inches)

Green Infrastructure Activities

- Tree Planting
- Demolitions and Greening Vacant Properties
- Greening Roadways
- Municipal Properties
- Downspout Disconnection



Implementation Strategy

- Reduce inflow to combined sewers 10% - 20%
  - Goals include volume reduction, as well as quality of life issues.
- Acknowledges demographic and population changes
- Works towards City goals of removing abandoned homes and dealing with urban blight
- Coordinating with Detroit Works efforts
- Utilizing various departments expertise and established processes, including partnering w/ Greening of Detroit
- Reflects national Green Infrastructure strategies
- Consistent with CSO approaches across country (Philadelphia, Portland, Cincinnati, Washington D.C.)

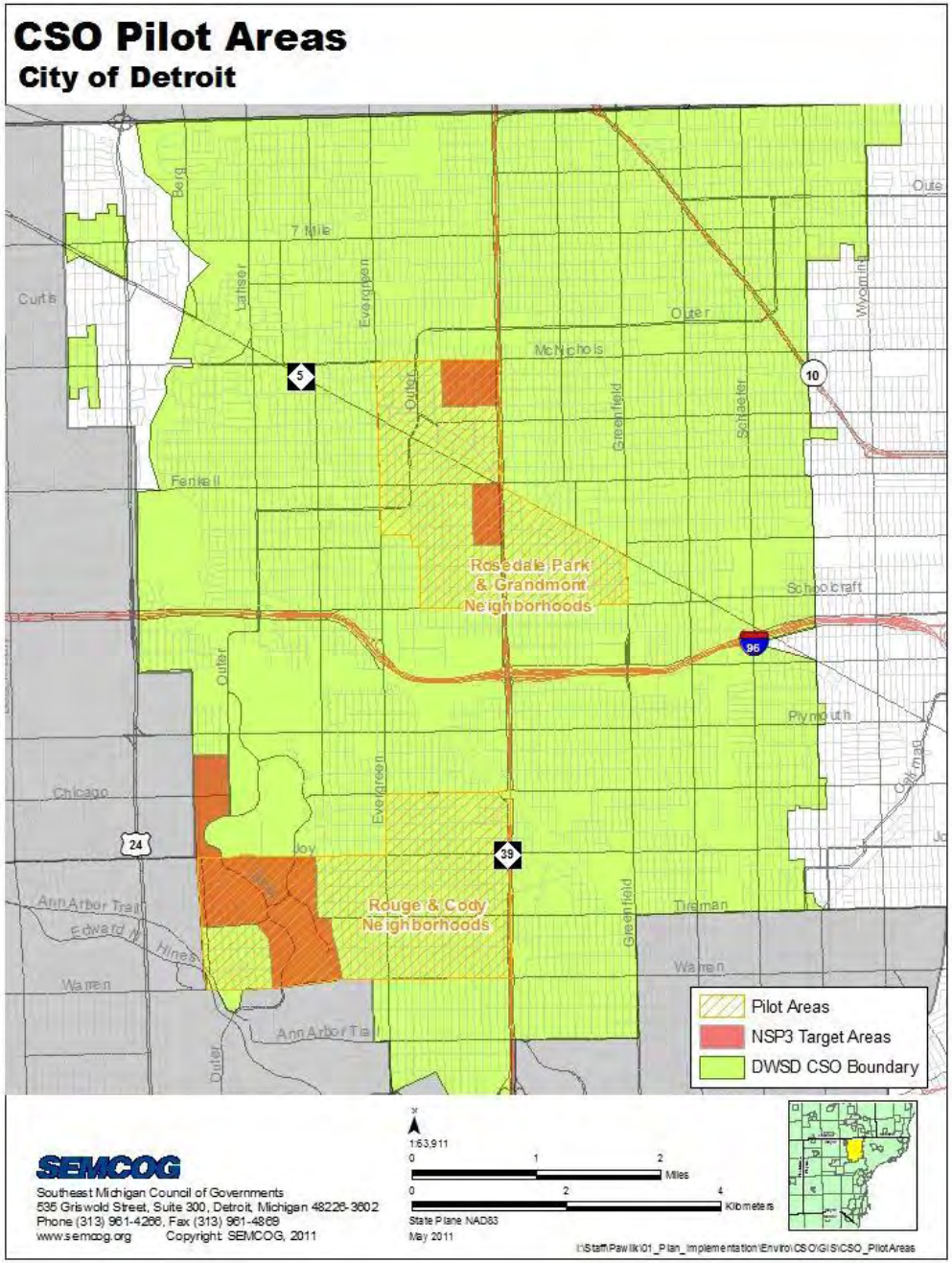
Collaboration is Key

Implementation Strategy

- **Early Focus: Two pilot areas focusing on techniques consistent with stabilization efforts.**
- **Evolving Focus: In coordination with Detroit Works, implement larger-scale greening efforts.**

Implementation Strategy

- Pilot Areas
  - Focus on stabilization green techniques
  - Support Detroit efforts
  - In concert with NSP 3 stabilization areas
- Rosedale Park
- Rouge/Cody



Rosedale Park

- Grandmont/Rosedale Development Corporation
- GI Techniques
  - Street trees, pilot stormwater forest, downspout disconnection, small number demolitions/ greening vacant

Rouge Cody

- Joy-Southfield Community Development Corporation
- Rouge Park
- Support Cody High School/ Stein Playfield reinvestment
- GI Techniques
  - Street trees, road retrofit, road reconstruction, downspout disconnection, demolitions/ greening vacant

Tree Planting

- Short Term
  - Focus on Pilot Areas
  - Street Trees
  - Pilot Stormwater Forests
- FY 2010/2011: 1000 trees
- FY 2011/2012: 2000 trees

Tree Planting

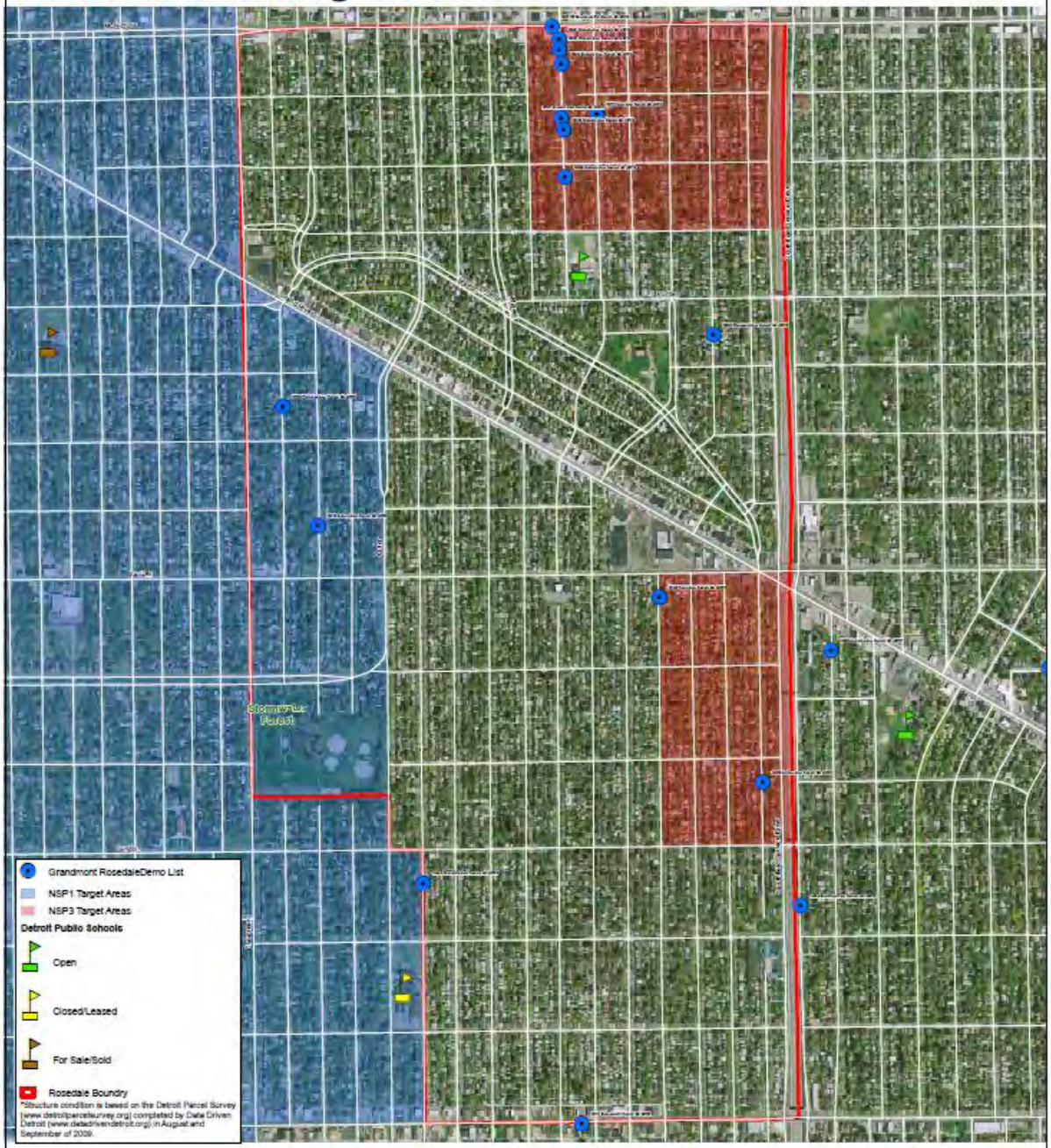
- Long Term
  - Forested Lots
  - Stormwater Forests in under utilized parks

Demolition and Greening Vacant Parcels

- Demolition Short-Term
  - City-Owned Residential Units
  - Private-Owned in Pilot Areas
  - Setting up for larger greening opportunities
- FY 2010/2011: 6-7 City Owned
- FY 2011/2012: 165 Private

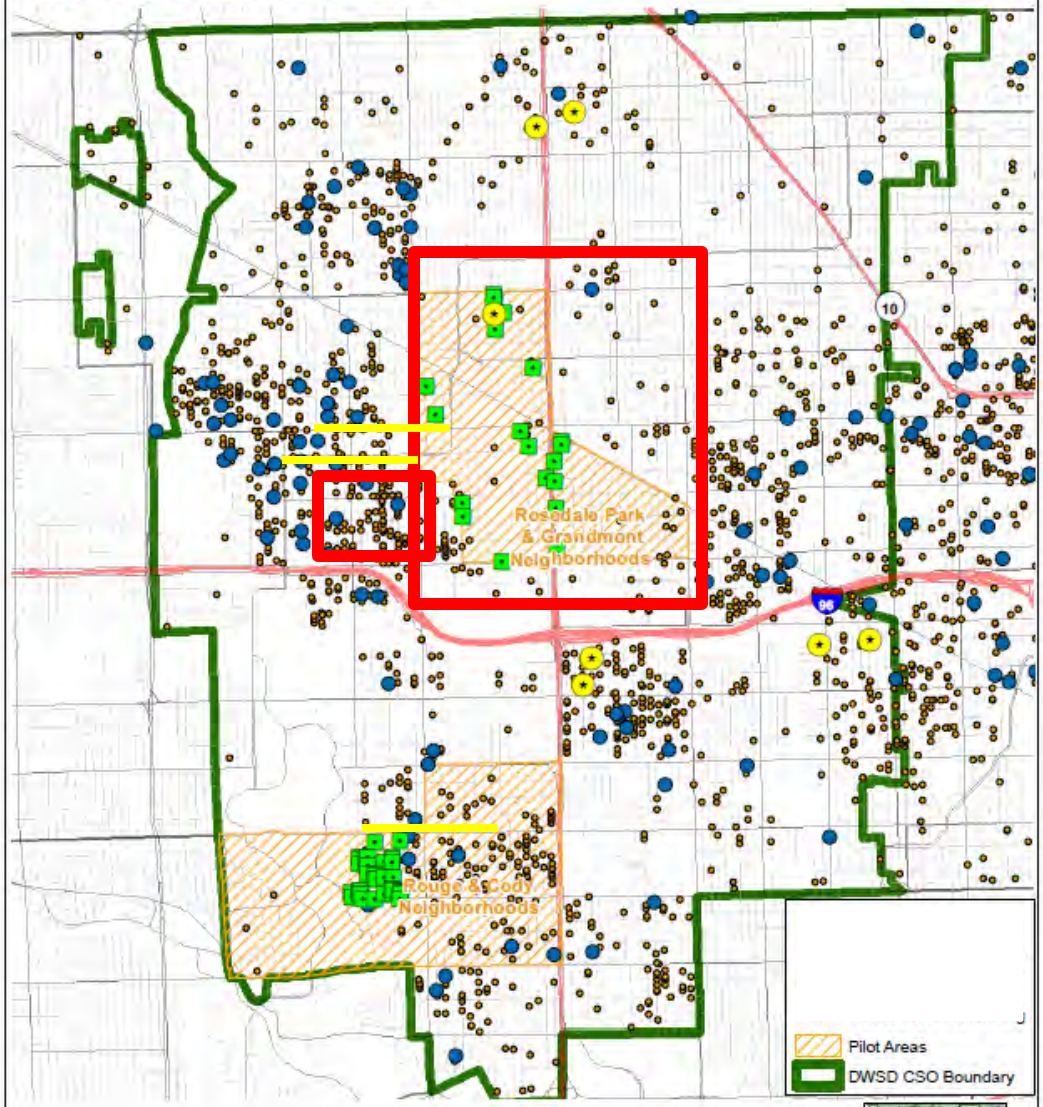
DWSD - CSO Project

Rosedale Park Neighborhood



Compiled Demolition List

City of Detroit CSO Area



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www.semcog.org

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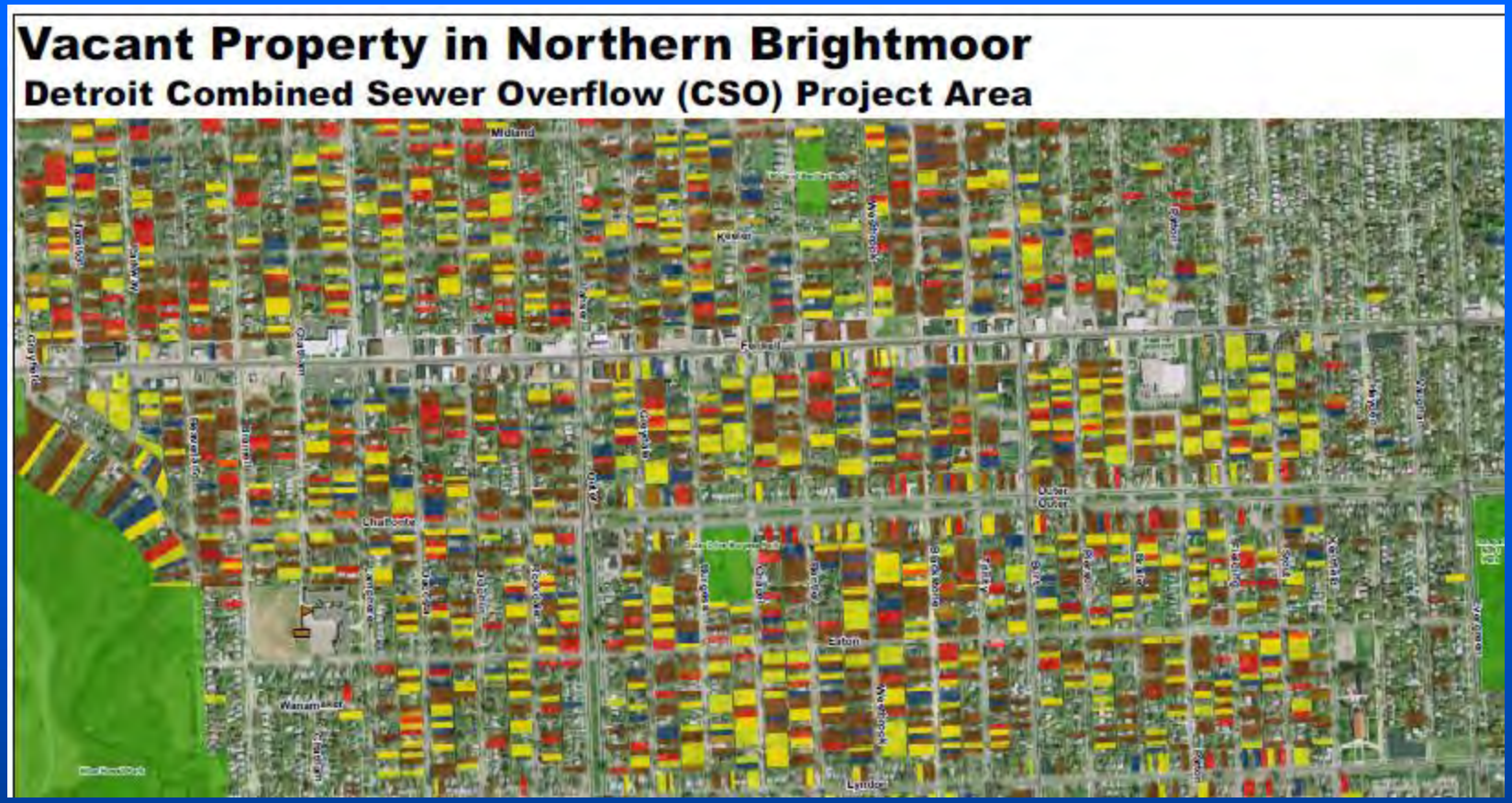
Demolition and Greening Vacant Parcels

- Greening Short-Term
  - Determining techniques
  - Pilot Greening individual lots
  - Discussions on multiple lot greening

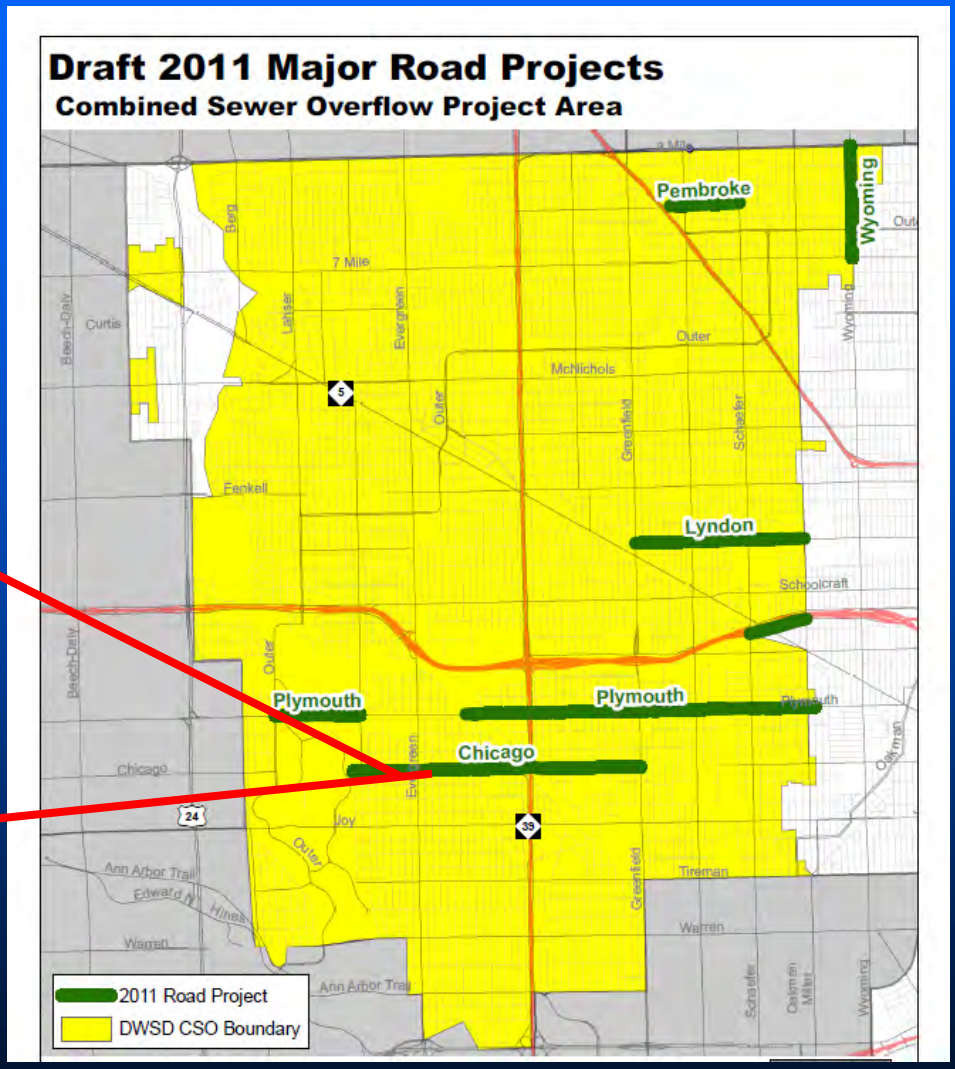


- **Long Term**
  - **Large Scale Greening of City Owned Vacant parcels**
  - **Over 2,800 parcels**

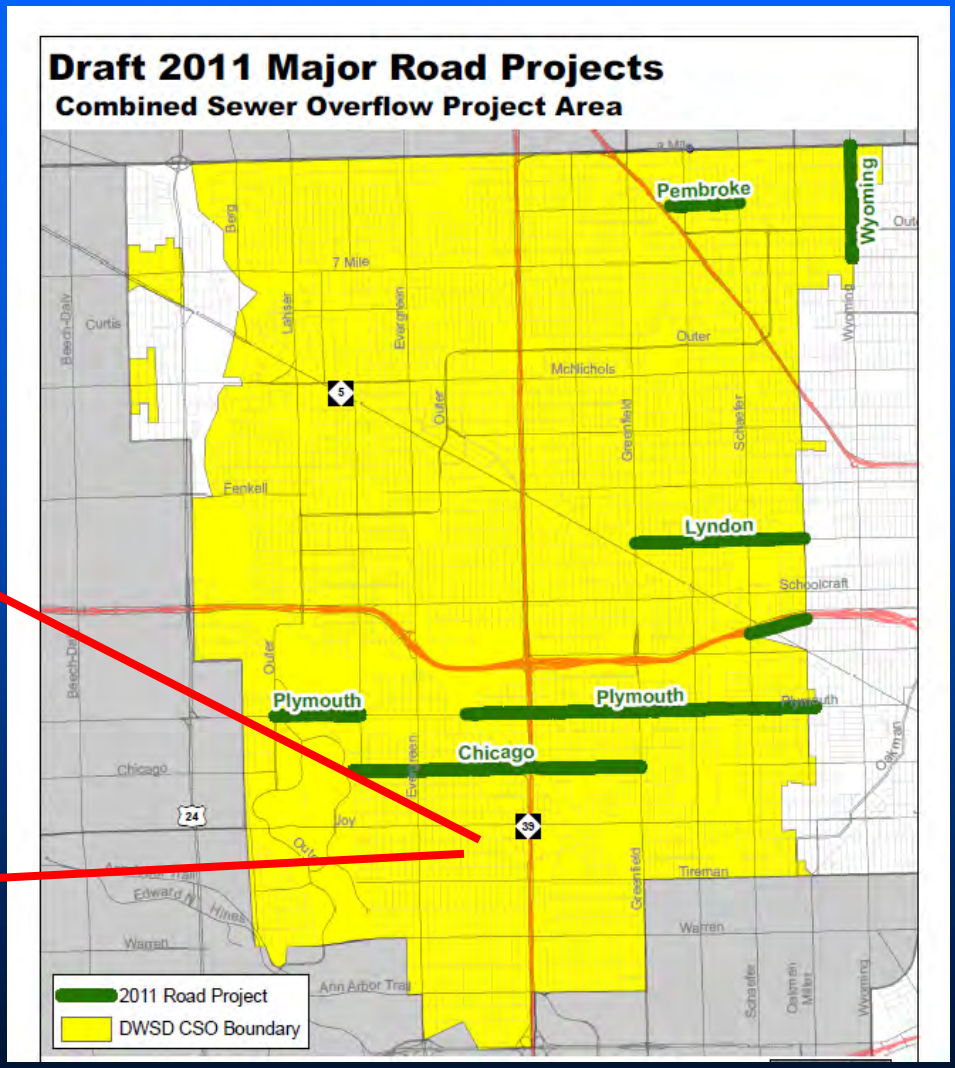
Downspout Disconnection

- Short Term
  - Homeowner program
  - Free workshops/materials
- After June 30, 2012
  - Building and Safety inspection process

DWSD CSO Green Infrastructure Program

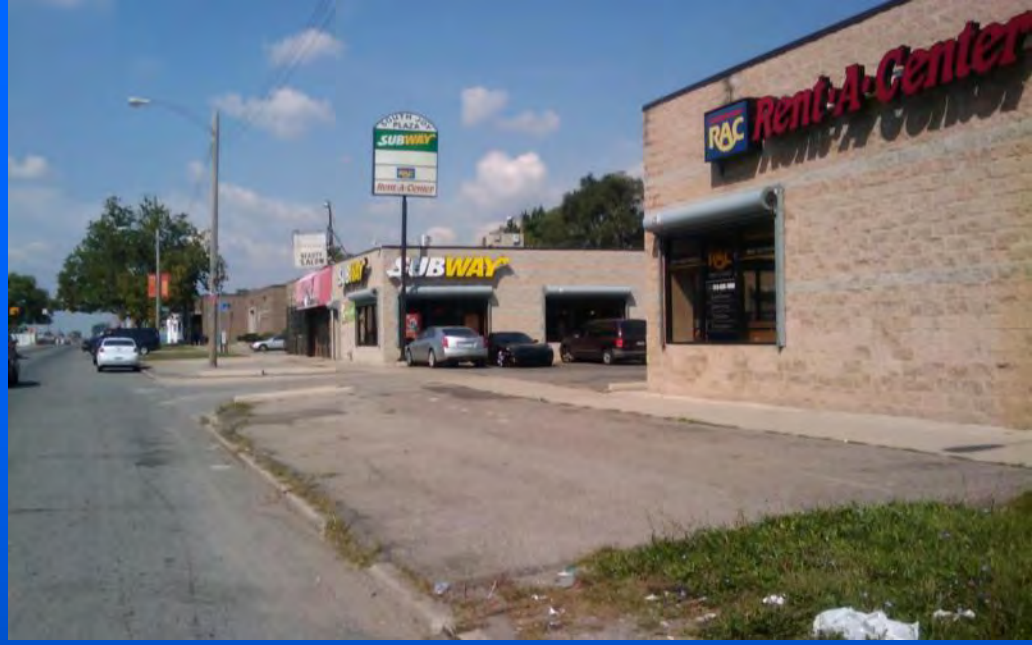


DWSD CSO Green Infrastructure Program



Greening Roads

- Long Term
  - Integrate into annual reconstruction and/or resurfacing projects
  - Standard specifications



Municipal Property

- Short Term
  - Assess pilot area opportunities
  - Public Works yard
- Long Term
  - Dependent on assessments

Other Important Implementation Aspects: Tracking Progress

- Modeling programs being evaluated
- Integrated GIS
- Tracking began in 2010

Other Important Implementation Aspects: Long Term Strategy

- Internal process for selecting & prioritizing
- Long-term estimated goals/benefits

Other Important Implementation Aspects: Public Messaging

- Developing Brand/Messaging
  - Detroit Residents
  - Region
  - Nation

The Big Picture

Questions?

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