

Climate Change Considerations of a Combined Sewer Overflow Control Program



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Northeast Ohio Regional Sewer District

Agenda

- ▶ District Overview
- ▶ Northeast Ohio's Combined Sewer Overflow (CSO) Problem
- ▶ Climate Change impact on future sewer system performance
- ▶ Greenhouse Gas Emissions associated with "Gray" CSO Control
- ▶ Role of Green Infrastructure in GHG Reduction and CSO Control
- ▶ Regional Stormwater Management Program

NEORSRD Service Area - District Overview



- 250 miles of District-owned sewers (up to 20 ft diameter)
- 46 miles of CSO sewers (up to 16 ft diameter)
- 12 miles sludge force main
- 289 drop structures
- 7 pump stations
- 586 fixed weir flow regulating structures
- 26 automated regulators
- 126 CSO outfalls
- 10 floatable control facilities
- 8 tunnel odor control facilities
- Lakeview Dam
- 3 Wastewater Treatment Plants

Northeast Ohio Regional Sewer District

The History of Combined Sewer Systems

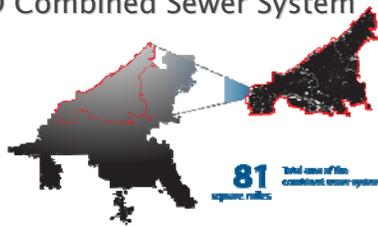


More than 100 years ago, single pipe systems conveyed wastewater away from homes and streets in a single pipe, and discharged untreated wastewater directly to nearby rivers and lakes.



Around the 1970's, larger pipes called "interceptors" were built in Cleveland to convey combined wastewater flows from these single-pipe systems to centrally located treatment plants where the water would be treated before being discharged to the waterways.

NEORSRSD Combined Sewer System Area



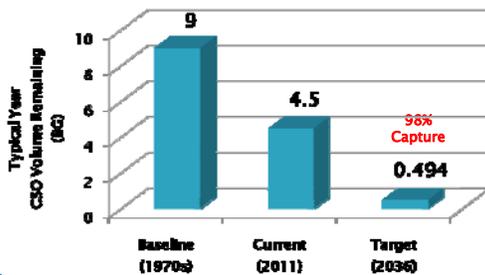
81 total area of the combined sewer system
square miles

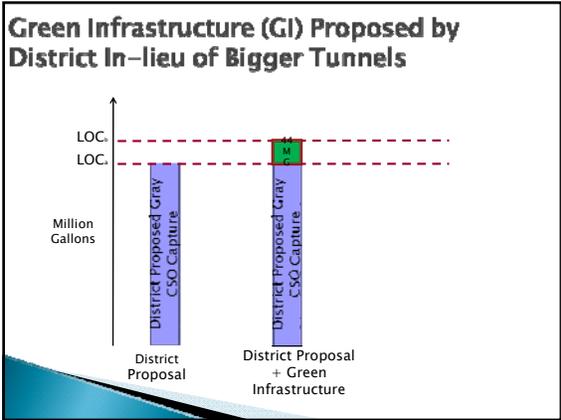
65 total area of the sewer service area
square miles

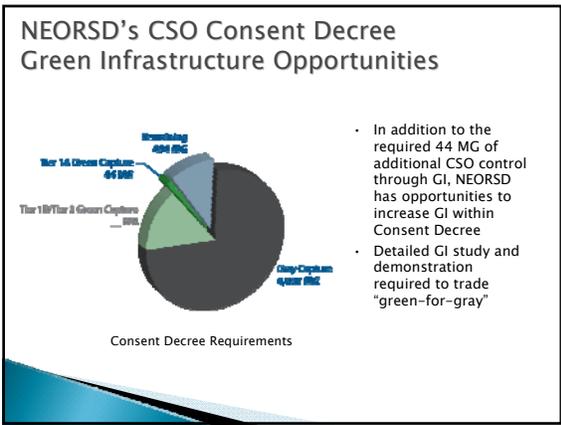
36 Annual stormwater runoff volume
billion gallons
including Ohio's sewer service in the combined sewer system

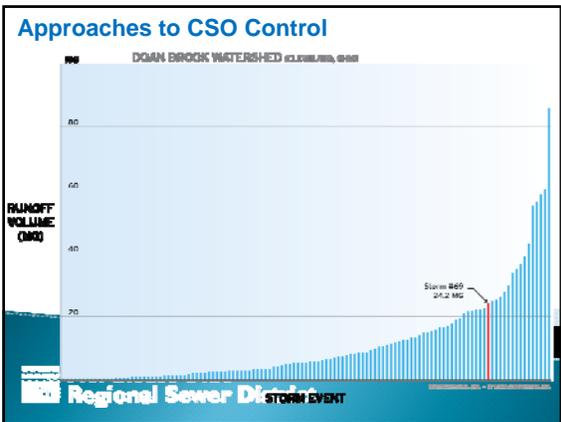
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Regional Sewer District**

EPA Requires Northeast Ohio's CSO Problem Reduced in 25-Years

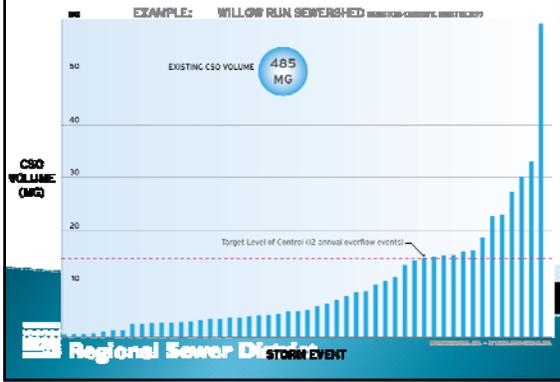




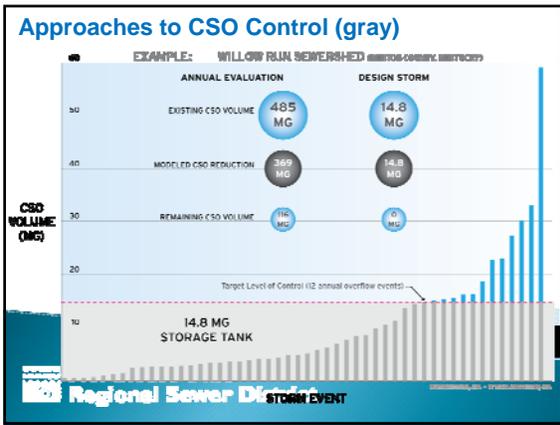




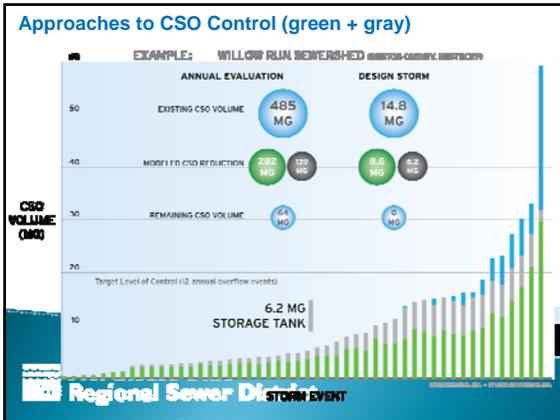
Approaches to CSO Control



Approaches to CSO Control (gray)

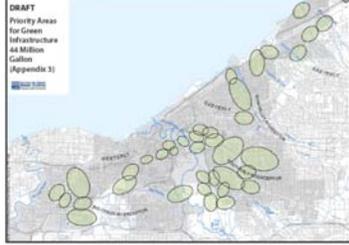


Approaches to CSO Control (green + gray)



NEORSD's CSO Consent Decree Green Infrastructure Opportunities

NEORSD GREEN INFRASTRUCTURE FEASIBILITY STUDY



- Green Infrastructure Study is a required milestone deliverable under Consent Decree, due December 2011
- GI Study has identified preliminary locations for potential reductions in CSO volumes through use of GI
- Next step: identify priority opportunities and projects which deliver largest CSO reduction

NEORSD's Regional Stormwater Management Program (SMP)

- Flooding and erosion occur throughout Northeast Ohio
- SMP is a comprehensive, watershed approach to cost-effectively address those problems



NEORSD's Regional Stormwater Management Program (SMP)

Collapsed culvert threatens road



Green Infrastructure Offers Opportunities for Win-Win

- **Regional Stormwater Management Program** will be funded through monthly Stormwater Fee of \$4.75/3,000 sq. ft. of impervious surface.
- **Stormwater Fee Credits** will be available for projects that integrate stormwater control measures to limit the peak flow or runoff volume.
- **NEORS** may contribute to design and construction of these stormwater control measures as part of green infrastructure program.
- **Maintain those stormwater control measures and receive Stormwater Fee Credit.**

Non-residential Stormwater Fee:

- ▶ Owner:
 - Public Square West
- ▶ Total ERUs: 15
- ▶ SMP Fee:
 - \$71.25/month
 - \$213.75/quarter
 - \$855/year



NSFR: High Rise

- ▶ Owner:
 - Cleveland Financial Associates
- ▶ Total ERUs: 40
- ▶ SMP Fee:
 - \$190/month
 - \$570/quarter
 - \$2280/year



Stormwater Control Measures....



Case Study: Removing 1-Acre of Impervious Drainage from Combined Sewer System

- ▶ Impervious Surface: ~1 Acre
- ▶ Annual Stormwater Runoff: ~1 MG
- ▶ Annual CSO Contribution: ~0.5 MG
- ▶ Costs to resurface "Gray": \$ X
- ▶ Costs to resurface "Green": \$ Y

\$Y - \$X	■ \$/gal
Vol. CSO Controlled	



Next Steps

- ▶ Green Infrastructure Studies to be completed by December 31, 2011
 - Identify potential size of opportunities to downsize tunnels
 - Identify "quick-hit" projects to demonstrate effectiveness to EPA
- ▶ First semi-annual Report to EPA on July 1, 2011

Questions?



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Regional Sewer District**

Ohio Balanced Growth Program

Kirby Date, Program Manager,
Best Local Land Use Practices






Water Resources
Council



Lake Erie
Commission



Cleveland State
University
Maxine Goodman Levin
College of Urban Affairs

Ohio

Ohio's Balanced Growth Program

- "...strategies that will balance the protection of Lake Erie [and Ohio water resources] with continued economic growth."
- *Transitioning to regional economic, environmental and social systems: empowering collaborative decision making in Ohio's regions.*



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University
Maxine Goodman Levin
College of Urban Affairs



Ohio Lake Erie
Commission

balancedgrowth.ohio.gov

Ohio

Ohio's Balanced Growth Program

- Harnessing the LOCATION of development and conservation for economic growth
- Voluntary
- Incentive-driven
- Local Government focus
- In place since 2004, statewide expansion 2009



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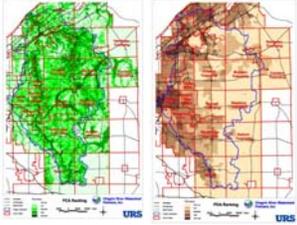


Ohio Lake Erie
Commission

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Ohio's Balanced Growth Program

- Planning Framework: collaborative planning -- resolving WHERE development and conservation belong



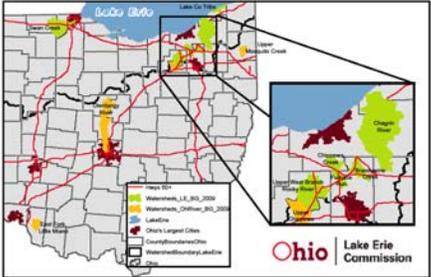
- PDA
- PCA
- PAA
- Locally determined

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Ohio's Balanced Growth Program

Balanced Growth Planning Partnership Watersheds

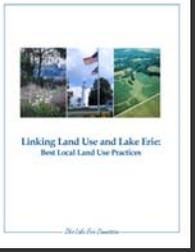


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Ohio Lake Erie Commission

Ohio's Balanced Growth Program

- Best Local Land Use Practices: Priorities for local policy implementation
- Network development in eight Ohio regions
- On the ground assistance and problem-solving



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Ohio Lake Erie Commission

Ohio
**Top Priority
 Best Local Land Use Practices**

1. COMPREHENSIVE PLANNING
2. COMPACT DEVELOPMENT




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 Department of
 Transportation

Ohio
**Top Priority
 Best Local Land Use Practices**

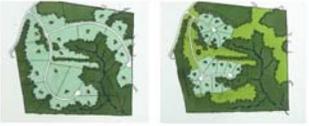



3. STORM WATER MANAGEMENT
4. FLOOD/STREAM/WETLAND PROTECTION

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Ohio
**Top Priority
 Best Local Land Use Practices**

5. CONSERVATION DEVELOPMENT
6. NATURAL AREAS ESTABLISHMENT (Meadow Protection)




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 **Best Local Land Use Practices**
Additional Guidance Documents

- Transfer of Development Rights
- Steep Slope Protection
- Historic Preservation
- Source Water Protection
- Woodland Protection
- Access Management
- Brownfields Redevelopment
- Scenic Protection
- Agricultural Protection

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 **Best Local Land Use Practices – Resources Available**

- Web site www.balancedgrowth.ohio.gov
- Best Local Land Use Practices document – issues, guidance, recommendations
- Model and Example regulations
- Education and technical workshops
- Case studies
- DVD for elected officials and business interests
- Ongoing technical assistance

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 **The BGI and Climate Change**

- Locate development and conservation WHERE they belong
- Use development areas and infrastructure efficiently
- Update codes and regulations to accommodate more water coming faster, reduce quantity of runoff, protect development from flooding
- And more!

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Ohio | **Balanced Growth**

Ohio | Lake Erie
Commission

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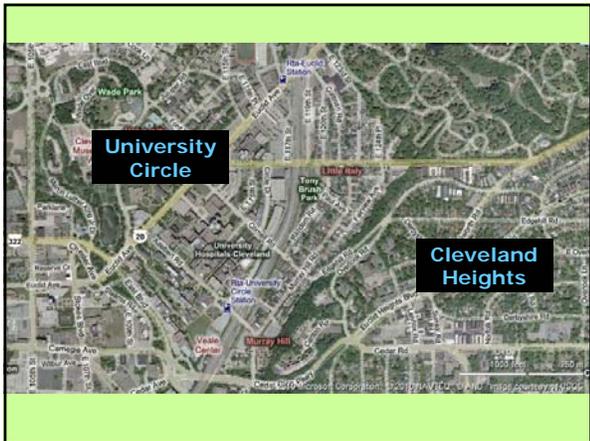








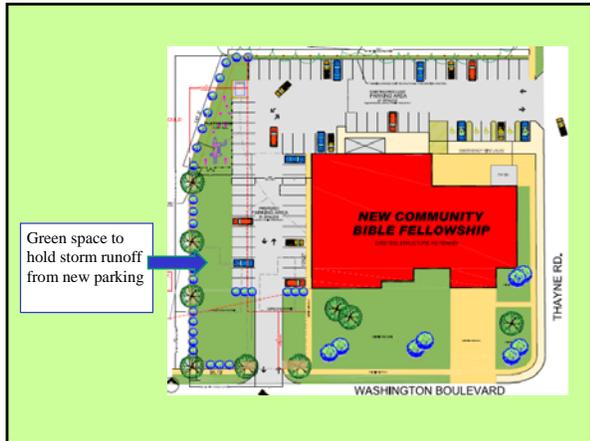


















OVERVIEW OF PROCESS

PHASE 1

- Task 1-1: Kick-Off Meeting
- Task 1-2: Review of Existing Code
- Task 1-3: Key Stakeholder Interviews
- Task 1-4: Technical Review Memorandum

← EMPHASIS ON PUBLIC PARTICIPATION & STAKEHOLDER INPUT

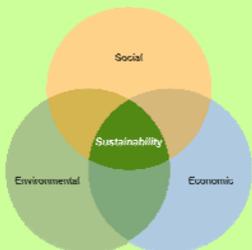
PHASE 2

- Task 2-1: Prepare Draft #1
- Task 2-2: Staff Review of First Draft
- Task 2-3: Prepare Public Draft
- Task 2-4: Public Meeting
- Task 2-5: City Council Presentation
- Task 2-6: Final Document

← EMPHASIS ON CRAFTING A LEGALLY SOUND, & EASILY ADMINISTERED & UNDERSTOOD ORDINANCE

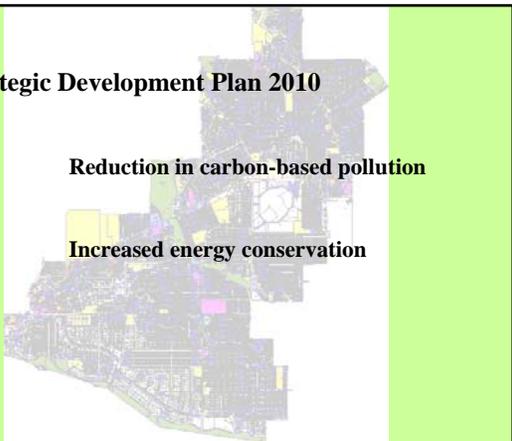


Goals for Sustainable Regulations



- Reduce barriers
- Create Incentives
- Set Standards

Strategic Development Plan 2010



Reduction in carbon-based pollution

Increased energy conservation

Sustainability Audit Objectives



- *Decrease water consumption
- *Reduce impervious surfaces
- *Increase tree and vegetation coverage and bio-diversity
- *Encourage local food production
- *Reduce landfill dumping
- *Encourage energy efficiency and clean modes of transportation

SUSTAINABILITY AUDIT

Zoning review:

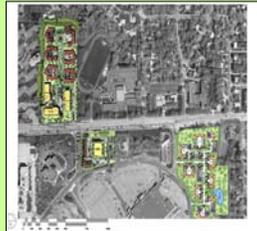
- General zoning provisions
- Large-scale development processes
- Residential districts
- Commercial districts
- Accessory structures & uses
- Principal uses
- Parking standards
- Landscape & water conservation



LARGE-SCALE DEVELOPMENT PROCESS

Expand planned development to include sustainable benefits:

- Energy efficient buildings
- Conservation easements
- Innovative water management
- Public infrastructure improvements: complete streets, bike lanes
- Public open space, public plazas & public art
- Accessible/ADA compliant units
- Proper solar orientation



RESIDENTIAL DISTRICTS

- Lot coverage and impervious surface
- Single-family year yard additions
- Single-family parking requirements



COMMERCIAL DISTRICTS

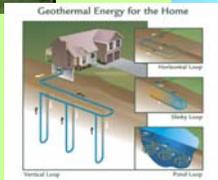
Sustainability as part of physical form

- pedestrian-oriented, compact design
- Transparency along street frontages
- Bike access & storage
- Connect to surrounding areas
- High quality, sustainable building materials
- Proper landscaping



ACCESSORY STRUCTURES & USES

Alternative Energy Sources



ACCESSORY STRUCTURES & USES

Water Efficiencies



PRINCIPAL USES

Solar farms



Community gardens & urban agriculture



Adaptive Reuse

PARKING STANDARDS

- Include maximum number of parking spaces
- Allow land banked parking
- Allow car sharing in parking lots & structures
- Allow compact spaces for charging of electric vehicles & fuel efficient vehicles
- Allow semi-pervious materials for paving
- Design & siting requirements for bike parking



LANDSCAPE & WATER CONSERVATION

- Enhance landscape design requirements – plantings
- Minimum installation sizes for all plant types
- Allow for naturalized lawns, native landscapes & gardens



- A species diversity requirement
- Establish recommended & prohibited plant lists

