

Urban Bioretention

~Distributed Stormwater Management

AGENDA

Registration (9:30 – 10:00 a.m.)

Welcome (10:00 – 10:15 a.m.)

*Julius Ciaccia, Executive Director
Northeast Ohio Regional Sewer District*

Regional Stormwater Management (10:15 – 10:30 a.m.)

*Kyle Dreyfuss-Wells, Environmental Program Manager
Northeast Ohio Regional Sewer District*

Stormwater Management ~ Lansing, MI. (10:30 – 11:30 a.m.)

Featured Speaker:

*Chad Gamble, Director of Public Services
City of Lansing, Michigan*

Discussion (Q & A) (11:30 – 12:00 p.m.)

Sponsored by:

Northeast Ohio Regional Sewer District
& Building Cleveland by Design*

Video by:

Northeast Ohio Regional Sewer District



Lansing's Wet Weather Triumvirate

Analysis leading to the Michigan Ave. Bioretention Program

Chad Gamble, P.E.
Director of Public Service
Lansing, Michigan

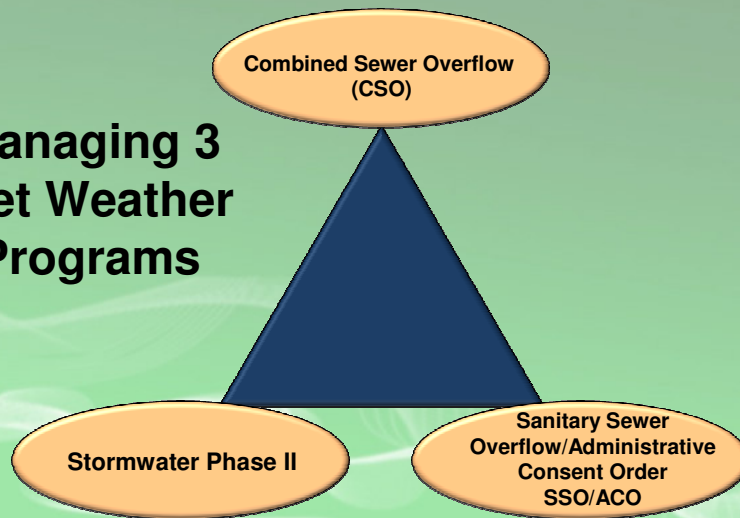
December 4, 2008



City of Lansing Bioretention Plan



Managing 3 Wet Weather Programs



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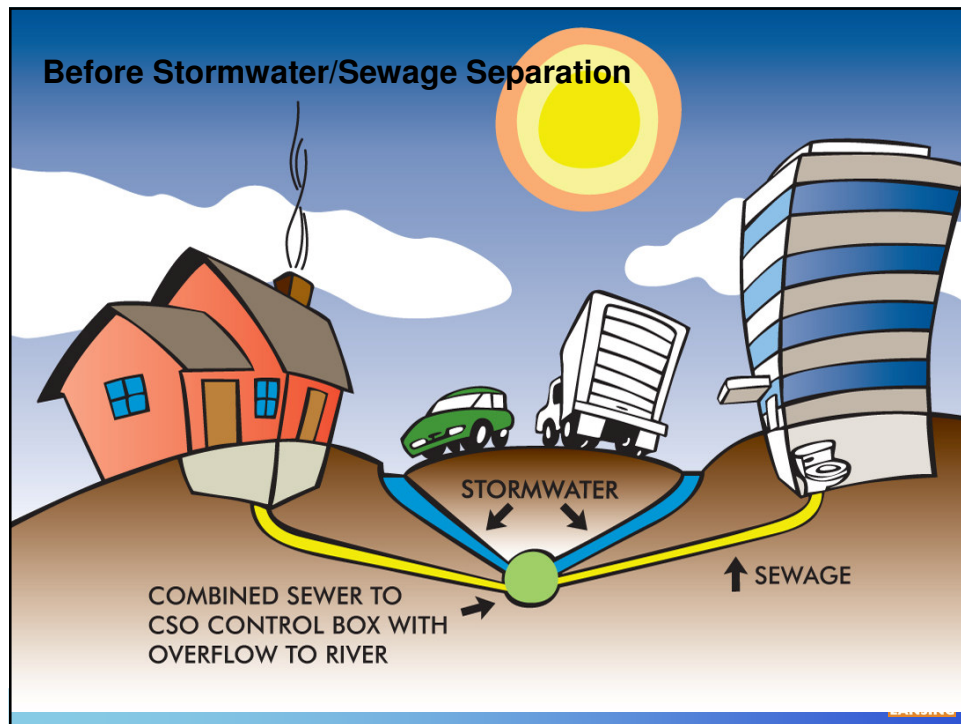
Clean Water Act (CWA) 33 U.S.C. 1251 et seq. 1977

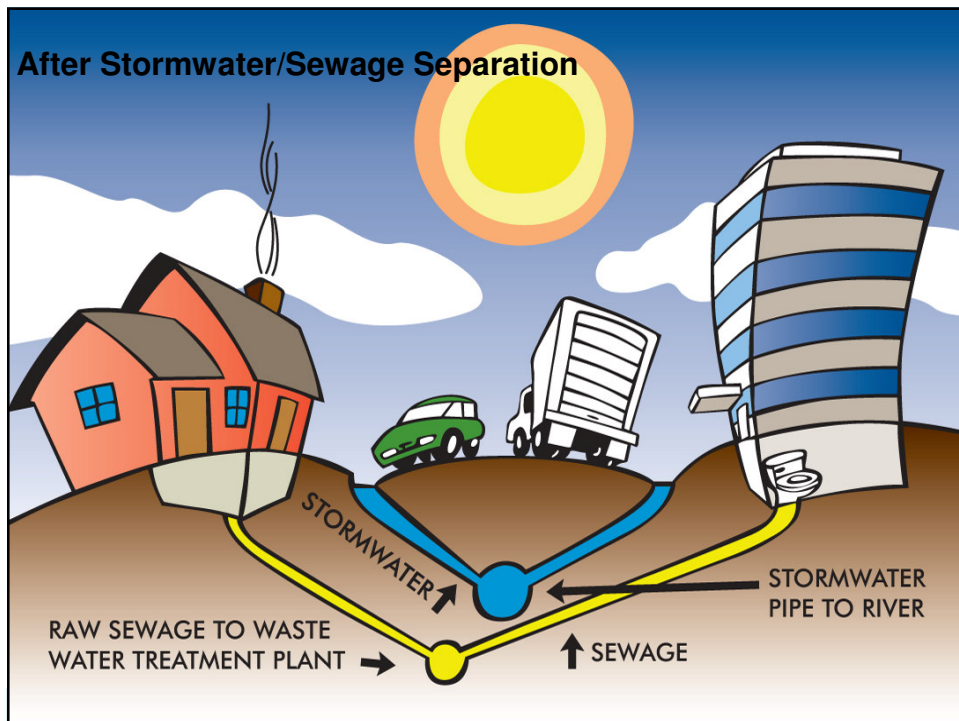
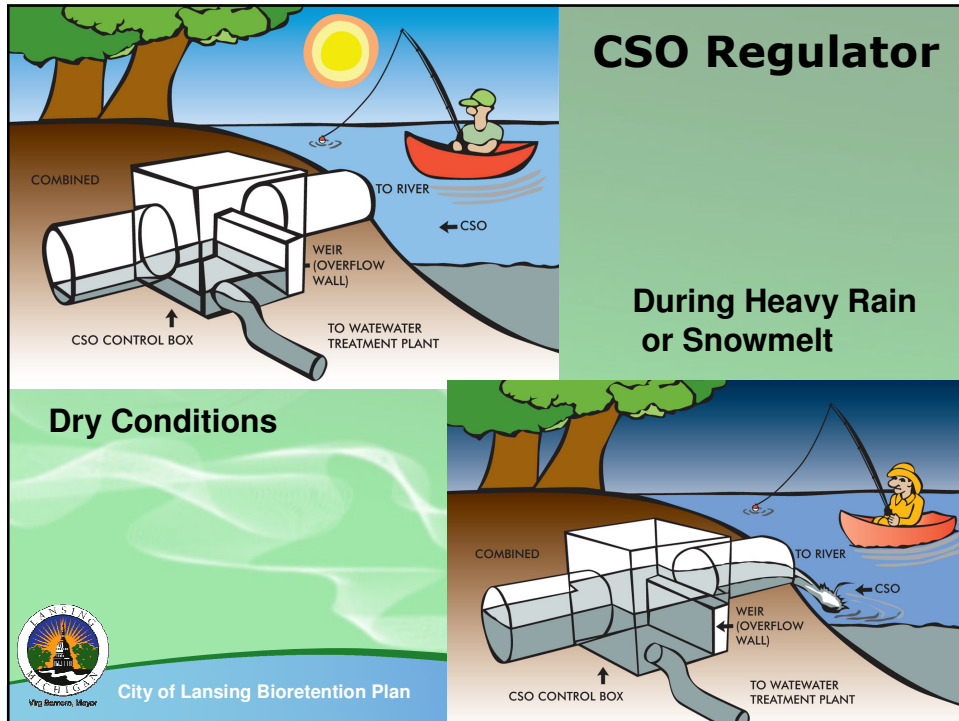
- The Federal Water Pollution Act of 1972 (Clean Water Act) was amended to include new provisions in 1977.
- It sets the basic structure for regulating discharges to Federal or State Waters.
- The Act gave the EPA authority to set effluent standards on industry-based systems and continued existing water quality standards.
- The Clean Water Act (CWA) made discharges of any pollutant from a point source to a navigable water unlawful without an NPDES permit.



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CSO Program - Status



Schedule

- Construction start: 1992
 - End of construction: 2020
- } 1.65 million gallons eliminated each year!!!

Sewer Separation

- Total 1991 combined sewer tributary area: 7,167 acres
- Combined sewer area separated or redirected from overflow since 1991: 4,240 acres
- Separation percent complete: 59% (4,240/7,167)
- Combined sewer area currently under construction: 441 acres
- Combined sewer area beginning construction in 2009: 249 acres
- Combined sewer area currently under design: 246 acres
- New sanitary sewer constructed with CSO program: 56 miles
- New water main constructed with CSO program: 33 miles
- New roadway constructed with CSO program: 61 miles



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Stormwater Phase II



- Implemented in March 2003
- Is intended to further reduce adverse impacts to water quality and aquatic habitat
- Applies to additional MS4s and construction sites disturbing equal to or greater than one but less than five acres of land.



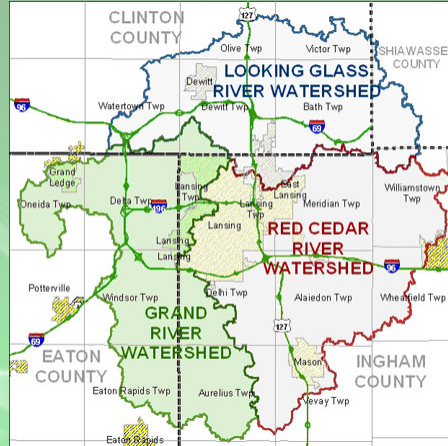
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Managing the Storm Watersheds



- 2 Watersheds encompassed 3 counties
- 20 communities collaborated to form the Greater Lansing Regional Committee (GLRC) for Stormwater Management
- Decided to pursue to a Watershed Based Permit



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SSO/ACO Program



- Sanitary Sewer Overflow Administrative Consent Order entered with the MDEQ in January 2004
- Eliminate all SSO's for rainfall events up to and including 25-year 24 hour growing season storm events.
- Mandated completion date is 2020.



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Typical Footing Drain Configuration

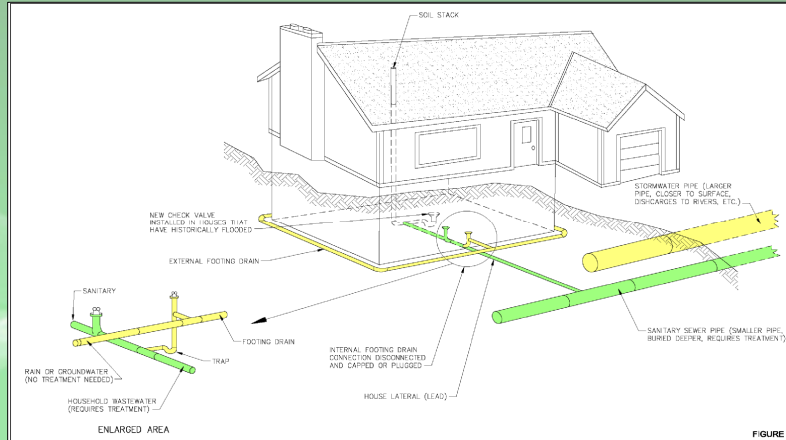


FIGURE 1



City of Lansing Bioretention Plan



Current SSO/ACO Program

- Footing Drain Disconnection in separated areas (up to 26,000 homes proposed)
- Construct private storm lateral to the public storm sewer system
- Current SSO Plan cost: **\$320M**



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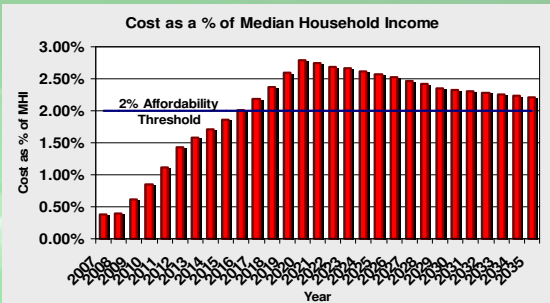


Three separate projects all addressing Wet Weather Programs!



Affordability of the Current Capital Program

CSO Program: \$388 million over next 15 yrs.
SSO Program: \$373 million over next 15 yrs.
Total CSO and SSO Program Cost: \$761 million

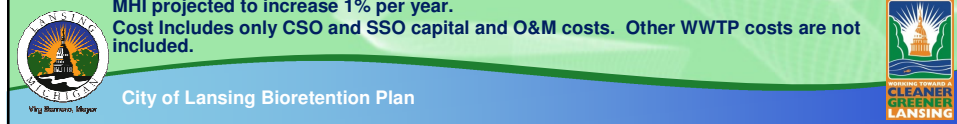


Year	Est. Annual Residential Customer Cost ²	Est. Median Household Income (MHI) ³	Residential Cost as a % of MHI
2007	\$141	\$37,206	0.4%
2008	\$149	\$37,578	0.4%
2009	\$235	\$37,954	0.6%
2010	\$325	\$38,334	0.8%
2011	\$431	\$38,717	1.1%
2012	\$560	\$39,104	1.4%
2013	\$623	\$39,495	1.6%
2014	\$683	\$39,890	1.7%
2015	\$748	\$40,289	1.9%
2016	\$818	\$40,692	2.0%
2017	\$899	\$41,099	2.2%
2018	\$986	\$41,510	2.4%
2019	\$1,089	\$41,925	2.6%
2020	\$1,180	\$42,344	2.8%
2021	\$1,172	\$42,768	2.7%
2022	\$1,162	\$43,195	2.7%
2023	\$1,160	\$43,627	2.7%
2024	\$1,155	\$44,064	2.6%
2025	\$1,146	\$44,504	2.6%
2026	\$1,134	\$44,949	2.5%
2027	\$1,122	\$45,399	2.5%
2028	\$1,106	\$45,853	2.4%
2029	\$1,085	\$46,311	2.3%
2030	\$1,085	\$46,774	2.3%
2031	\$1,085	\$47,242	2.3%
2032	\$1,085	\$47,715	2.3%
2033	\$1,085	\$48,192	2.3%
2034	\$1,085	\$48,674	2.2%
2035	\$1,085	\$49,160	2.2%

MHI based on historical trends from 1990 and 2000 Census.

MHI projected to increase 1% per year.

Cost Includes only CSO and SSO capital and O&M costs. Other WWTP costs are not included.

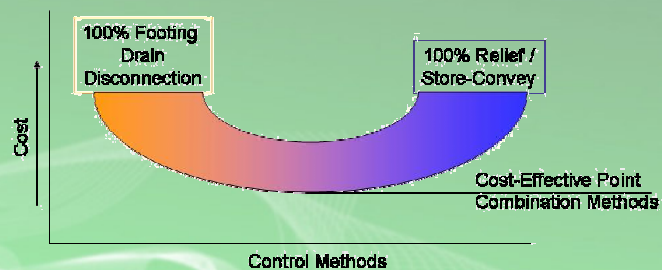




Review of Combined Sewer Overflow (CSO) and Sanitary Sewer Overflow (SSO) Programs



Finding the Optimal Point



Alternative CSO/SSO Plan

- Sewer rehabilitation
- Targeted I/I removal
- Selected sewer separation
- Tunnel with relief sewers



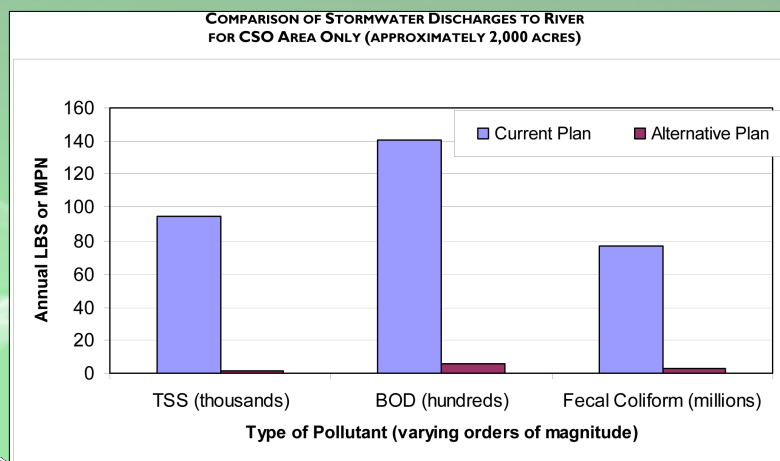
Vig Bonanno, Mayor

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Solving the REAL Problem

Annual Loading Comparisons

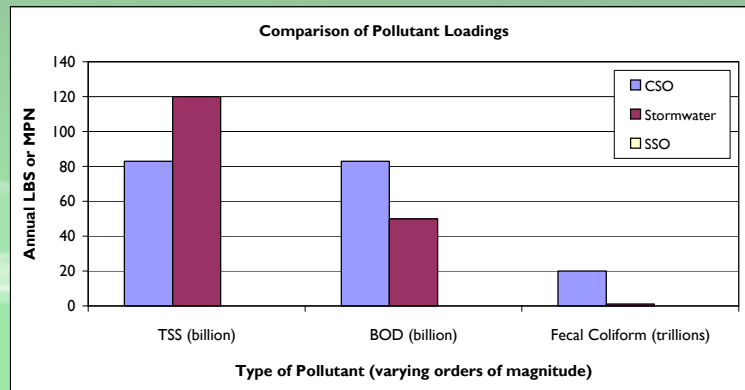


Vig Bonanno, Mayor

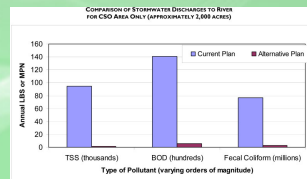
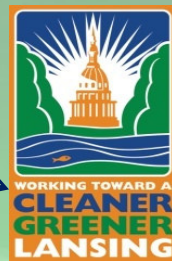
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Raw Pollutant Loading Comparisons

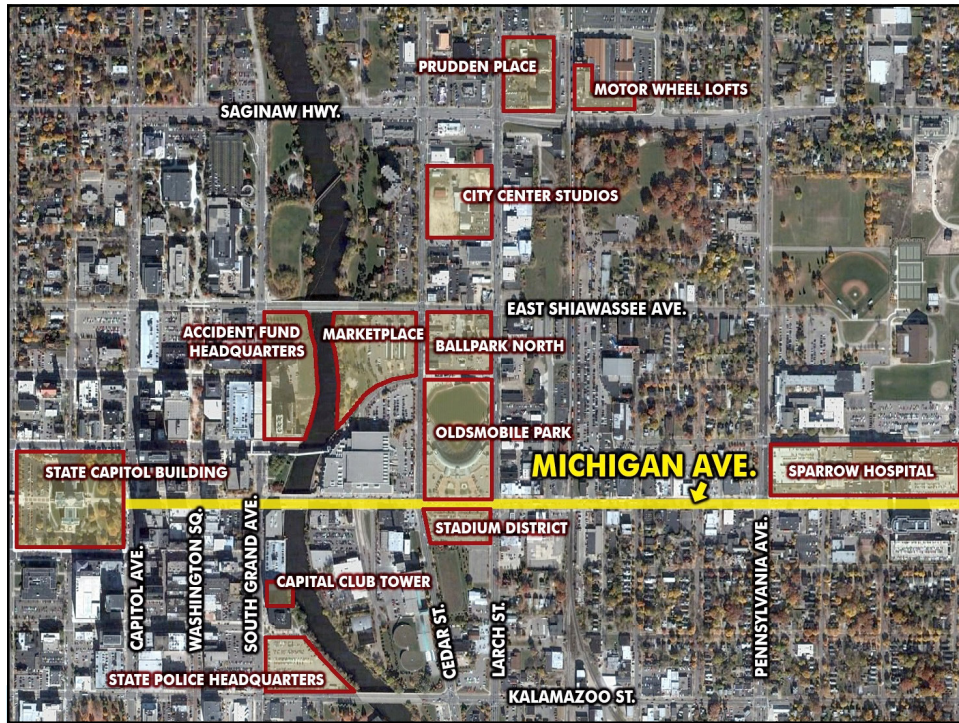


City of Lansing Bioretention Plan



City of Lansing Bioretention Plan





Beautifying Downtown Lansing- Project Build-Up

- **January 2004**
 - Mayoral Task Force formed
- **July 2004 – Committee Recommendations:**
 - Create gathering places
 - Highlight pedestrian crosswalks
 - Green up the corridor!
 - Place kiosks and benches where appropriate



City of Lansing Bioretention Plan



Project Overview

- The City of Lansing, Michigan is incorporated bioretention (rain gardens) into a streetscape design leading up to the Capitol grounds.
- Waterbody: Grand River
- Length of Corridor: 4 city blocks, 1,900 LF
- Bioretention Location: Behind curb
- Drainage: Roadway and sidewalk
- Cost: Approximately \$1 million
- Funding: Grants (Transportation Enhancement and MDEQ Nonpoint Source)
- Construction Schedule: Began Spring 2007



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Business Owner Buy-in

- June 2005
 - Commercial Business Meeting
 - No objections – No Comments??

“Green Up the Corridor”



Virg Bernero, Mayor

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The Politics

Mayor Virg Bernero



City Council



The project that almost wasn't.



Virg Bernero, Mayor

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Grass Roots Support

- **City Council Member Support**
 - City Council Member Absent
(sometimes being absent is a Gift!!!)
- **Mid-Michigan Environmental Action Council**
- **Ingham County Drain Commissioner**



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Funding Issues

- **MDEQ** - Clean Michigan Initiative Grant
- **EPA-Region 5** - 319 Non-point Source Grant
- **Michigan Department of Transportation**
Federal Transportation Enhancement
Funding

Finally... design begins in Winter 2006

“Green Up the Corridor”



City of Lansing Bioretention Plan



Bioretention Goals

- Beautification
- Stormwater Treatment (~1 inch)
- Public Education
- Pedestrian Friendly



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