Rainwater Harvesting in Cincinnati: A Sewer District’s Perspective

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MSD’s Sewer Network

- Publicly Owned & Operated Wastewater Utility Serving Southwest Ohio (Hamilton County)
- Serves a Population of about 855,000
  - 230,000 Residential and 250 Industrial Users
  - Operates 7 Wastewater Treatment Plants; treating 70 Billion Gallons/yr
MSD’s Environmental Challenge

- **41 inches (annual rainfall)** = **180 billion gallons (runoff)**
- **25 billion gallons** (sanitary flow) + **75 billion gallons** (sanitary flow)
- **155 billion gallons**
- **11.5 billion gallons**

- **212 Combined Sewer Overflow (CSO) Locations**
- **78 Sanitary Sewer Overflows (SSOs) Locations**
History of Consent Decree

- **2006**: Wet Weather Improvement Plan (WWIP) Submittal
- **2007**: Judge Approved Final WWIP
- **2008**: Regulators Reject Green Infrastructure BMP Approach
- **2009**: Revised WWIP Submittal
- **2010**: Phase II Plan Submittal
- **2011**: Phase I Complete
- **2012**: Significant Reduction of CSO Volume in Lower Mill Creek
- **March 2012**: Submit preliminary findings to the Hamilton County Board of County Commissioners
- **December 2012**: Submit preferred plan for significant reduction of CSO volume in the Lower Mill Creek by 2018
Why is Rainwater Harvesting Important to MSD?

- Capturing some or all of the rainwater that hits a building’s roof or other on-site impervious surfaces reduces peak stormwater flows in the combined sewer system.

- Reduced peak flows lessen the strain on MSD’s collection system during rain events, which can reduce the likelihood of CSOs and thereby reduce total overflow volume.

- MSD is under a federal consent decree to reduce CSOs.

- Potential for public-private partnerships and raising community awareness about stormwater.
Concerns & Future Challenges

- Trends of declining number of accounts and declining usage per account (revenue stability)

- When rainwater harvesting is implemented, need to ensure accurate billing for sewer treatment services provided (revenue stability and treatment capacity)
Simplified Rainwater Harvesting Diagram

Total Rainfall Captured
- Building Usage
= Net Capture

*Not drawn to scale*
Direct Impact Projects
- Large & Regional Scale – business case evaluations
- MSD as the implementer
- 100% ratepayer funded
- Owned and operated by MSD to support its core mission
  - Remove liability of stormwater

Enabled Impact Projects
- Anticipated annual stormwater runoff capture volume of 40 MG
- MSD partners with property owners to offset the cost of installation
- Integrated Bioinfiltration practices, green roofs, pervious/porous paving as part of watershed solutions

Inform & Influence
- Programmatic Elements to support sustainable infrastructure solutions
- Advisory Committee
- Comprehensive Plan
- Land Development Code Updates
Enabled Impact Projects

- Over 30 public/private green infrastructure projects throughout the Lower Mill Creek watershed
- Over 40 MG stormwater captured per year (already installed)
- Example of how public and private benefits can be realized by sustainable projects
Rainwater Harvesting - Complementary Programs

- **Green Roof Loan Program**
  - Partnership with Cincinnati Office of Environmental Quality (OEQ) and Ohio Environmental Protection Agency (OEPA)
  - Low-interest loans for green roof construction

- **Rain Barrels**
  - 55-gallon barrels available for purchase through MSD

Taft Information Technology High School: A 32,000-square foot shallow vegetative roof was installed on the roof of the Taft Information Technology High School.
Sustainability LENS

Currently developing planning tools to help facilitate private investments

- Screening and benchmarking tool
- Promotes integrated planning solutions within a watershed context in support of sustainable separation
- Evaluation of green and gray infrastructure for wet weather improvement program using sustainability
  - Economic viability
  - Environmental stewardship
  - Social values

- Sustainable LENS will include:
  - Integration of water quality & quantity goals & needs
  - Maintain or enhance environment through a technology-based solutions
  - Promotes environment protection, economic growth, and enhance quality of life
Modeling Effectiveness & Maximizing Benefits

- Currently developing planning tool/model to simulate peak flow reduction benefits paired with private benefits of rainwater harvesting systems

- Sample (Excel) model output based on user inputs of roof size, daily non-potable water use, and proposed cistern size

- Can help minimize $/gallon invested by building owners
Rainwater Harvesting Legislation Process

- GCWW, the City Planning and Buildings and City Health Departments, and other stakeholders w/ MSD
  - Task force led to the adoption of the new rainwater harvesting legislation

Considerations for broader use

- Rainwater harvesting systems
  - Potentially removing metering requirements and establishing a flat billing structure for single-family homes
- Commercial users
  - Specifications for ensuring adequate billing of use – i.e. require user to install and maintain calibrated metering system
Moving Forward

- MSD along with other stakeholders will continue to educate residents and business owners about the joint benefits to them and to MSD that can be realized through rainwater harvesting

- Assistance is available to anyone who has questions about the new legislation and what opportunities are available for their home or business
THANK YOU

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