Home Builders Association for Greater Cincinnati
415 Glensprings Drive
9:00 a.m.

February 10, 2016
The Genius of Water
a.k.a. the Tyler Davidson Fountain

Dedicated in 1871, honoring the “uses and benefits…and pleasure of water.”

Charles Greve, Centennial History of Cincinnati
HBA Coffee Series

- A Stroll Down Memory Lane
- The Clean Water Act / Consent Decree
- Our Assets
  - Collection System
  - Treatment
  - Lab / Regulatory Compliance
  - Watershed Operations
- Engineering and Construction
- Why Does It Matter
- Management / Finance
A Stroll Down Memory Lane
Building sewers was part of the “search for the Ultimate Sink” in urban America
  – Creating “out of sight – out of mind conditions” that are critical to normal urban development

Building sewers was part of controlling urban pollution
  – Impacting community health (1820s – 1940s)
  – Impacting the workplace (1880s – 1960’s)
  – Impacting the environment (1900 – present)

Building sewers changed the way we Live, Work, and Play in the U.S. and in Greater Cincinnati
Historical Overview of Sewers

- Cincinnati sewers
  - Transformed urban culture
  - Provided improved public health
  - Created profit
  - Advanced science and engineering

Even though only a small part of Cincinnati had sewers by the late 1850’s, this 1857 map, showing existing and proposed sewer lines, indicates that city officials were beginning to conceive of a sewerage system for the entire city. (The dotted lines are proposed sewers.)
Early to mid-1800s

- “Sewers” were open gutters in the streets that led to creeks and rivers
  - Carried mainly rainwater and “offal” (variety of household wastes)

- First underground sewer in Cincinnati was built ca.1828 – Wade Street sewer
  - Six foot high limestone sewer with an arched ceiling and square floor
  - Carried storm water only

- Outhouses and cesspools were principal method of eliminating sanitary wastes

- Building sewers was a private and not public function
Historical Overview of Sewers
Since the 1860s, when sanitary sewers were relatively new in Cincinnati, they were already changing the way people lived, worked, and played, creating a “Community of the Future.”
Late 1800s to early-1900s

**Cincinnati built “combined sewers”**

- Carried rainwater and sewage (together in the same pipe) to nearest open natural water source
- Streams were piped – Lick Run
- Earliest combined sewers constructed of clay, brick, or limestone - some of these sewers still exist today in parts of the city!

“Sanitary only” sewers were common in suburban Cincinnati communities
Historical Overview of Sewers

Brick sewer from the 1800s
1900 - 1967

- Concerns about drinking water quality
  - The solution to pollution is no longer dilution
- City “boosterism” = 1912 infrastructure growth
- Concerns about sewage from second tier of “bedroom communities” outside City
- Concerns about flood elevation (pool stage) of Ohio River at Cincinnati
- 1948 Cincinnati Master Plan includes wastewater treatment as an environmental, economic development, and public health initiative
- 1963 Sewer Master Plan envisions city and county co-joined system
Historical Overview of Sewers
In 1968, the County Commissioners asked the City to manage and operate the County sewer system because it was failing:

✓ County Administrator R.A. Anderegg called the county sewer system “inadequate in every sense of the word.”
✓ A state health department survey found that “every stream in the area was . . . polluted.”
✓ The State threatened to ban new construction in Hamilton County until the health emergency was addressed.
✓ The County Commissioners were summoned to Columbus to show why their sewer permits should be renewed.
The County needed $23 million to fix its “plaguing sewer crisis,” but it didn’t have the money.

✓ The County’s voters did not want to pay to fix their sewer system. The County first asked voters to pass a levy to raise the funds, but it was defeated by a two-to-one margin.

✓ The Commissioners then unilaterally imposed a significant use fee, which resulted in backlash from ratepayers who had just voted down the tax increase.

The County had no option left.

• The City, by contrast, had a good sewer system, funded by City ratepayers paying substantially more than County ratepayers, and $12 million in reserve in City accounts.

Why do we have a “1968 Agreement?”
What is the “1968 Agreement?”

• The County turned to the City for help.
• On April 10, 1968, the County and City entered into a 50-year agreement to operate a County sewer district under state law.
• The agreement was “to provide for better and more efficient sewer service in Hamilton County through more effective management of the operation, maintenance, and development of all sewerage and sewage disposal facilities of the County.”
• The agreement expires on April 30, 2018.
1968 AGREEMENT

- 50-year Agreement between City and County for the operation of a county sewer district under state law.
- Expires April 30, 2018
- In 1968 City operated its own sewer system.
- County was not able to obtain development permits due to health hazards caused by its sewer system.
1968 Agreement - Roles of City

- Acts as sole and complete management and operating agency of the sewer district- district is run by City employees.
- Advertises, purchases and lets contracts
- Drafts all legislation for approval by County Commissioners
- Retains all legal title to its assets

1968 Agreement - Roles of County

- Approves rates
- Approves the capital improvement plan
- Approves the budget
City Ownership of Sewer Assets

- The City of Cincinnati owns 3 treatment plants located in the City.
  - ✓ These plants were owned and operated by the City prior to the 1968 Agreement.
  - ✓ These plants treat nearly 100% of all wastewater in the district.
- 2009 Amendment to the City Charter requires a vote of the electorate before city assets can be sold or transferred to a regional sewer district.
Sewer Assets = $11 billion
1968 Agreement

Current Status

• County has proposed formal mediation with a neutral moderator
• City favors a discussion led by elected officials
• If no resolution prior to expiration of agreement in April of 2018, City may return to operating a municipal sewer district.
  ✓ Could provide wastewater services to Hamilton County and other jurisdictions.
  ✓ This is the same model used by Greater Cincinnati Water Works, which is owned and operated by the City and provides clean water to the region.
The Metropolitan Sewer District has justified its creation during the first two years of its operation. According to a report by the University of Cincinnati's Institute of Governmental Research, the Metropolitan Sewer District has justific-

As most small communities were unable to treat sewage to meet ORSANCO standards, 26 communities banded together in a Metropolitan Water Pollution Control program operated by the City of Cincinnati.

“The structure of the County handicapped the efficiency of county operation,”... “the solution was for the county to create the sewer district, then contract with Cincinnati for its operation.

The Metropolitan Sewer District has justified its creation during the first two years of its operation.

“This system satisfied, for a time, the problem of regional sewage treatment for those areas which were sewered. But it did not build or finance sewage li...
The Clean Water Act
The Clean Water Act is the primary federal law in the U.S. governing water pollution. Its objective is to restore and maintain the chemical, physical, and biological integrity of the nation's waters.
Consent Decree

- This court-monitored settlement agreement was entered into by City and County with EPA in 2002 and 2004.
- Under the Consent Decree, EPA has mandated that MSD significantly reduce the ~11.5 billion gallons of combined sewer overflows (CSOs) that occur annually in the district.
The Clean Water Act

Consent Decree
The Wet Weather Improvement Plan (WWIP) is the schedule of projects that City and County have agreed to complete under the Consent Decree.

- Phase 1 of the WWIP must be completed by December of 2018.
- Phase 2 of the WWIP will be negotiated beginning in 2017.
The Clean Water Act

Roadmap to 2018

- Elimination of 16 CSO
- Elimination of 33 SSO
- Elimination of 22 PSO
- Protection of 800 properties from sewer backups

$1 Billion Phase 1 Consent Decree Spending (2006$)

- 2019 $38M
- 2018 $106M
- 2017 $80M
- 2016 $58M
- 2015 $63M
- 2004-2014 $744M
## Phase 1 Milestone Status

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### Notes:

1. Planning for 10170080, 10170100, 10171580, and 10171620 completed under Upper Duck Bundle Planning (10170000).
2. Design for 10171740 and 10171780 under Oakley Station Project (10171741).
3. Project 10143920 includes sub-project 10143923 to accommodate right-of-way needs.
4. Project 10143940 includes sub-projects 10143942 and 10143943 to accommodate right-of-way needs.
5. Project 10143960 includes sub-projects 10143962 to accommodate right-of-way needs.
6. Project 10171860 includes sub-projects 10171861, 10171862, and 10171863 to accommodate right-of-way needs.
7. Projects 10131240 and 10131180 are within a defined bundle of work. Construction was started for the bundle in 2013.
8. Projects 10171980, 10171920 and 10171900 are within a defined bundle of work. Construction was started for the bundle in 2012.
9. Projects 10143920, 10143940 and 10143960 are within a defined bundle of work. Construction was started for the bundle in 2013.
10. The PTI, construction start, and construction finish milestones for Project 10131220 were revised by the Regulators in 2013.
11. The construction start milestone for Project 10130740 was revised by the Regulators in 2014.
12. Projects 10145500 and 10145580 were moved to coordinate with Phase 2 Project 10144882 during 2014 Adaptive Management discussions.
13. Projects 10170080, 10170100, 10171580, 10171620, 10171740, and 10171780 are within a defined bundle of work. Construction was started for the bundle in 2013.
The Clean Water Act

Phase 1 Project Status

- MSD has constructed 96 of the 116 defined Phase 1 projects

- The remaining projects are on schedule to be submitted in accordance with Consent Decree milestone dates.

Pie chart showing:
- Completed 83%
- Design 10%
- Under Construction 2%
- Bidding 3%
- Planning 2%
The Clean Water Act

Remaining Phase 1 Projects

2015

- Blue Rock Road Sewer Separation
- Eastern & Delta Sewer Separation Phase 3
- CSO 470 & 471 Sewer Separation Phase 3
- CSOs 127 & 128 Stream Separations

2016

- Muddy Creek WWTP Grit Improvements
- Muddy Creek Dewatering Improvements
- Glenview Pump Station Upgrade
- Daly Road Sewer Replacement
- CSO 179 Sewer Separation
- Lick Run Property Demolitions
- Sunset Avenue Sewer Separation
- White Street Sewer Separation
The Clean Water Act

Remaining Phase 1 Projects

2017

- Werk & Westbourne EHRT
- CSO 194 Sewer Separation
- CSO 195 Sewer Separation
- SSO 1000 Elimination
- CSO 54 Improvements
- CSO 217/483 Source Control Phase A
- Quebec Heights Sewer Separation
- Queen City & Cora Avenues Sewer Separation
- Wyoming & Minion Avenues Sewer Separation

2018

- Ludlow & Lafayette Parallel Sewer
- SSO 228 Elimination
- CSO 551 Sewer Separation
- CSO 125 Stream Separation
- CSO 181 Real Time Control Facility
- CSO 217/483 Source Control Phases A2, B, & C
- Lick Run Valley Conveyance System
- Quebec Road Sewer Separation
- Queen City Avenue Sewer Separation Phase 2
Assets

Collection System
Treatment
Lab / Regulatory Compliance
Watershed Operations
Total Assets

- Mains: 84.57%
- WWTP: 14.55%
- Buildings: 0.82%
- Land: 0.06%

$11.2 Billion
How Big is the Collection System?
How Big is the Collection System?

3,000 Miles of Main Sewer
How Big is the Collection System?

3,000 Miles of Main Sewer

Los Angeles – Cincinnati – New York City

2,822 miles
How Big is the Collection System?

3,000 Miles of Main Sewer
~ 1,500 Miles of Building Sewers
Who are we?
24/7/365 Customer Service

Keep it Flowing!

What's Our Job?

Condition Assessment

Sewer Repair & Rehabilitation
Our new website: www.doyourpartcinci.com

How citizens can help us keep the sewers flowing

- Educate the young, and the young at heart!
- Make a difference in sewer system operation and maintenance!
Assets

Collection System
Treatment
Lab / Regulatory Compliance
Watershed Operations
Treatment

- Protects public health and the environment through professional water reclamation
- Treat more than 180 million gallons of sewage daily from 43 municipalities, villages, and townships in Greater Cincinnati.
- That’s almost 65 BILLION gallons per year.
65 BILLION gallons!
That’s enough to fill up Paul Brown Stadium about 250 times per year!
What Do We Do?

*We take this…*  
*…and make this*
WWT serves the needs of almost 800,000 customers throughout Hamilton Co. and portions of Butler, Clinton and Clermont Counties!
The Division operates 7 major Treatment Plants and has an annual budget of approximately $45 million.

Where Do We Do It?
Mill Creek WWTP

1959

130.0 MGD
East Section

- Sycamore Creek
- Polk Run

1953: 38 MGD
1958: 10.0 MGD
1970: 8.0 MGD

1958

City of Cincinnati
Sweetheart of Ohio
Loveland 1879

Metropolitan Sewer District of Greater Cincinnati
West Section

1961
15.0 MGD

1995
1.5 MGD

1997
5.5 MGD
Primary Treatment

Secondary Treatment
UV Disinfection
The “solids”
Solids Handling

About 39,000 dry tons of dewatered bio-solids are produced from our 7 major treatment plants and incinerated at the Mill Creek and Little Miami facilities each year.
Treatment

- Mill Creek: 63%
- Little Miami: 17%
- Muddy Creek: 9%
- Taylor Run: 5%
- Polk Run: 3%
- Sycamore Creek: 2%
- Indian Creek: 1%
Assets

Collection System
Treatment
Lab / Regulatory Compliance
Watershed Operations
Lab/ Regulatory Compliance

Industrial Waste
Lab / Regulatory Compliance
## Lab / Regulatory Compliance

### 2015 NPDES Compliance Points

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Assets

Collection System
Treatment
Lab / Regulatory Compliance
Watershed Operations
Watershed Operations

Real-Time Control (RTC) Sites

High Rate Treatment Facilities

Stormwater Management Measures

Assets Built Specifically for Wet Weather
Watershed Operations

Mill Creek WWTP

Major Watershed Operations Facilities
Watershed Operations

High Rate Treatment

SSO 700 Storage and Treatment Facility

Muddy Creek CSO Treatment Facility
Watershed Operations

Storage-based Real-Time Controls (RTC)

- Lick Run RTC
- Mitchell Ave RTC
- Ross Run RTC
Engineering & Construction
Nearly 300 Active Projects

- 163 projects valued at $94 million
- 51 projects valued at $87 million
- 42 projects valued at $9 million
- 32 projects valued at $84 million

- Wet Weather
- Asset Management
- Sustainable Infrastructure
- Locals & Laterals
Winton Woods Aerial Sewer Replacement
One of MSD’s most critical assets – Bridge 3
Engineering & Construction

Winton Woods Aerial Sewer Replacement

Bridge 3 Post Construction
Winton Woods Aerial Sewer Replacement – Bridge 7
Preconstruction photo
Engineering & Construction
Post Construction photo
$4,852,385.36 Current Value
Kokosing Construction.
ODOT Bid Project
1,083’ - 12’ & 10’ X 10’ Box Culvert
CSO 12 Phase A4a

- $6,951,117 Contract
- Sunesis Construction
- Critical Coordination with ODOT I-75 Project.
- 845’ - 12’ X 10’ Box Culvert
Eastern and Delta Phase 3

- Final Phase of a Consent Project Eastern Delta (Bundle).
- Sunesis Construction
- Final Completion Milestone 12/31/2015
- $4,454,142 Contract
Engineering & Construction

Eastern and Delta Phase 3 – Challenges

- Ohio River Groundwater Influence
• Elimination of 16 CSO
• Elimination of 33 SSO
• Elimination of 22 PSO
• Protection of 800 properties from sewer backups

Sewer Rates
What is MSD doing to minimize rates?

Affordability
+
Cutting-Edge Sensor Technology

= Minimizing Rates
Affordability

- In Phase 2 negotiations, the City, County, and U.S. EPA will identify the next suite of projects and the schedule for completing them.
- The schedule will be based on what residents in the district can afford to spend.
- One measure of what residents can afford is MHI (median household income) - but MHI of all residents in the service district does not accurately reflect the burden on lower income residents.
- MSD is looking at more accurate ways to reflect the actual burden on ratepayers.
What is MSD doing to minimize rates?

Cutting-Edge Sensor Technology

- Maximizes existing infrastructure instead of building costly improvements
- Saves $$ - studies have shown similar sensor technologies have reduced the cost of South Bend, Indiana’s consent decree by 29%! 
MSD’s 2015 Wet Weather SCADA system did this....

1.4 MG discharge prevented (March 7th)

Mill Creek WWTP

Ohio River in flood stage

16 Miles
To do this all of this we needed real-time data from many locations......
We had some existing field sensors connected to a monitoring system.

We started there and built a 'bridge' to our new Wet Weather SCADA system. A major improvement occurred when we were able to make direct connections to our system... but......

.....so we set out to identify innovative low cost sensor equipment capable of direct connections to our system......

.....and avoided over $1 million in purchase cost.
Our short term bridge got us here (it worked!)

Our direct connection got us here

Our new equipment got us here
Management / Finance
Table of Organization

City of Cincinnati

Hamilton County

Regulators

Innovation Reform

External

Internal

Legislation

County

Legal

Ratepayers

Director

Administration

Information Technology

Finance & Accounting

Capital Control

Administration

Operations

Control/Consent

Engineering

Engineering/Construction

Construction

Watershed

Compliance

Treatment

Treatment

Watershed

Compliance

Engineering
Utilities

$5,500
How MSDGC spends each dollar of Operating Revenue?
Debt service is principal and interest payments on bonds sold to fund our capital improvements.
Debt

$1,000,000,000

32 Years
Debt

$1,000,000,000
Last payment 2038
Without additional debt!
Thank you
Thank you