

KUB

By-Laws Revisions

February 21, 2019



Resolution 1390

Resolution 1390

- Recommendations reviewed at January Board meeting
- Housekeeping Changes
- Codifies the commitment appropriation approval process
- Codifies that Commissioners cannot be employees or retirees of a telecommunications utility or any other utility service provider

KUB

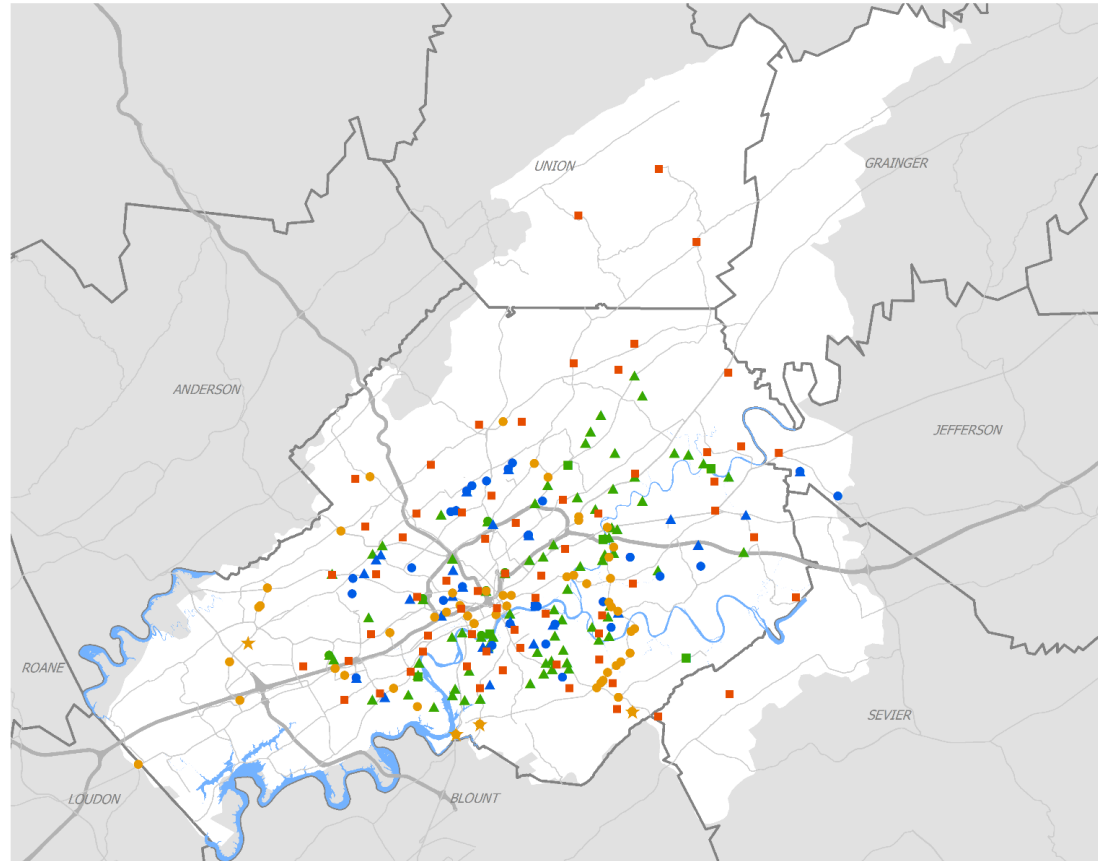
Remote Site Maintenance

February 21, 2019



Remote Sites

- **Electric** ■
 - 9 Infeed stations
 - 63 distribution stations
- **Gas** ●
 - 4 city gate stations
 - 49 regulator stations
- **Water** ●
 - 26 booster pump stations
 - 28 storage facilities
- **Wastewater** ▲
 - 63 lift stations
 - 6 storage facilities
 - 2 chemical injection facilities
- **Treatment Plants** ■ ●
 - 1 water treatment plant
 - 4 wastewater treatment plants



Station Management Services (SMS)

■ Wires

- 29 employees
- Skills
 - Electrical
 - Communication
 - Automation
 - System Protection



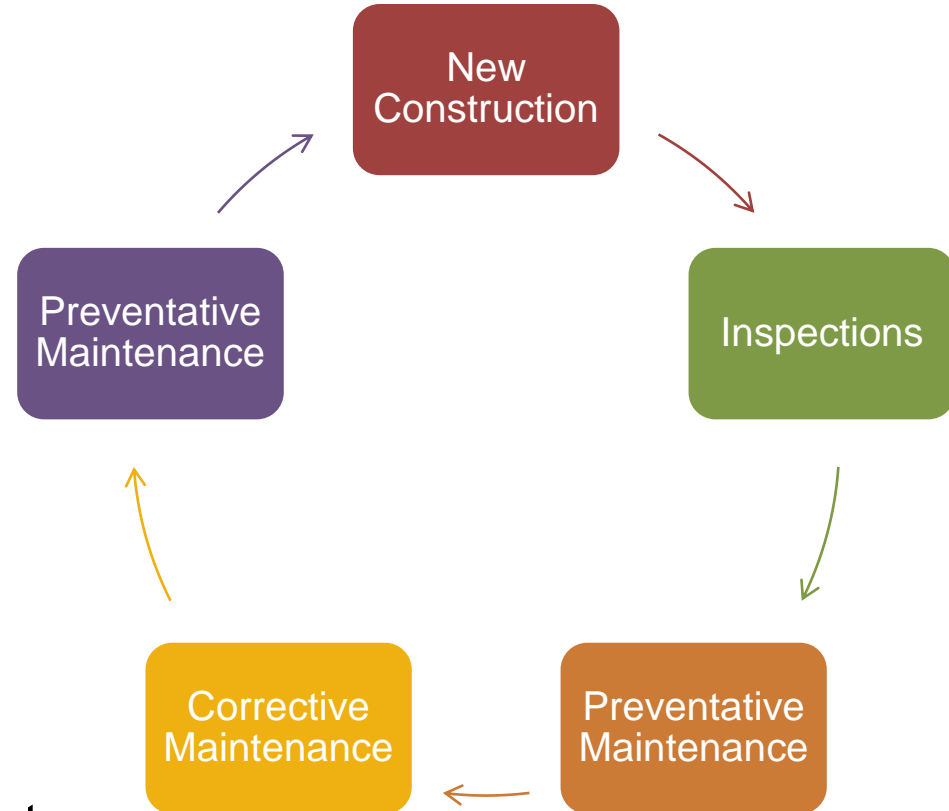
■ Pipes

- 33 employees
- Skills
 - Mechanical
 - Electrical
 - Chemical
 - Communication



Maintenance Is Strategic

- **Balanced approach**
 - Maintenance vs. replacement costs
 - Asset performance
- **Focus primarily on**
 - Safety
 - Avoiding service interruptions
 - Extending asset life
 - Ensuring device performs as expected
 - Meeting regulatory requirements



Electric Substations

- Primary assets
 - Substation transformers
 - Circuit breakers
 - Control/automation systems
- Programs
 - Electrical testing
 - Transformers: 4 years
 - Breakers: 4 years
 - Batteries: quarterly
 - Control systems: 3 years
 - Oil analysis: 6 months
 - Control house: 15 years
 - Protective coating
 - Transformers: 30 years
 - Breakers: 15 years
 - Structure: 15 years



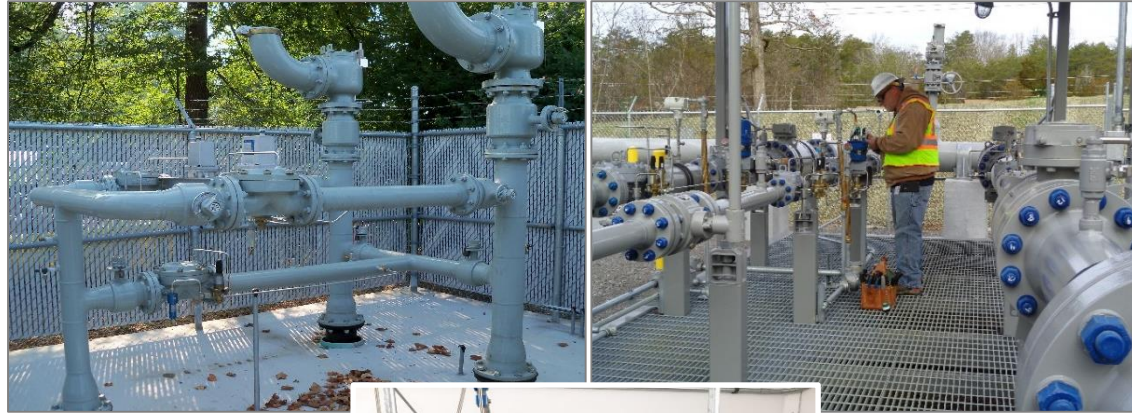
Natural Gas Gate and Regulator Stations

■ Primary assets

- Piping
- Regulators
- Chemical feed systems

■ Programs

- Gas leak inspection
 - Residential: 3 years
 - Non-residential: annually
- Station inspections: annually
- Injector inspections: weekly
- Station coatings: 10 years
- Odorant sampling: monthly
- SCADA alarms: annually



Water Remote Sites

■ Primary assets

- Pumps, motors, and drives
- Reservoirs and storage tanks
- Generators
- Valves

■ Programs

- Pumps: 10 years
- Motors: 15 years
- Gear boxes: 25 years
- Storage tank inspections: 5 years
- Storage tank cleaning: Per inspection
- Protective coating: 30 years



Wastewater Remote Sites

■ Primary assets

- Pumps, motors, and drives
- Chemical feed and screening systems
- Odor control systems
- Storage tanks

■ Programs

- Pumps: 7 years
- Motors: 7 years
- Grinders: quarterly
- Storage tank inspections: annual
- Wet well cleaning: 6 months
- Valve and actuator repair: 10 years



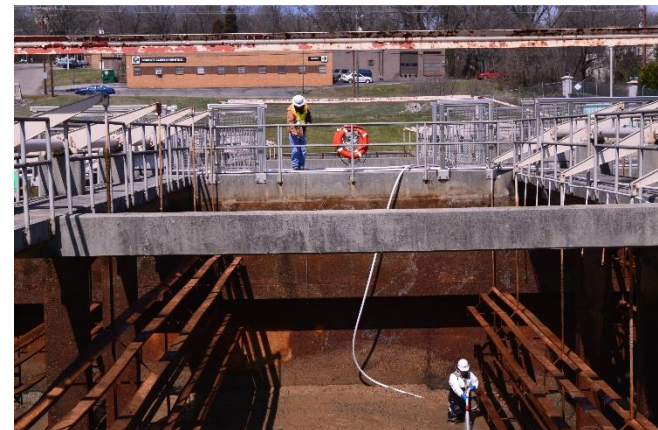
Water/Wastewater Treatment Plants

■ Primary assets

- Water: Mark B. Whitaker
- Wastewater: Kuwahee, Fourth Creek, Loves Creek and Eastbridge
- Pumps, motors, and drives
- Chemical feed and screening systems

■ Programs

- Pumps and motors: 10 years
- Gear boxes: 5-10 years
- Tanks and clarifier cleaning: annual
- Valve and actuator repair: 10-15 years
- Kuwahee digester cleaning: 5 years
- MBW filter renewal: 5 years

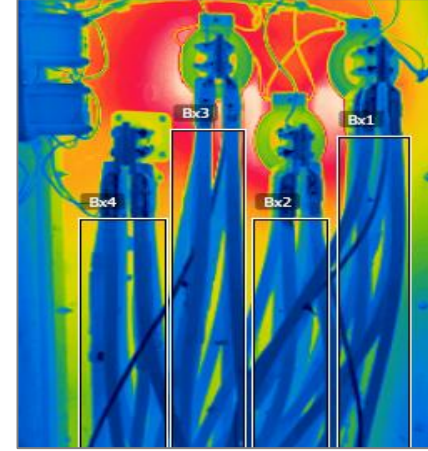


Advancing Maintenance

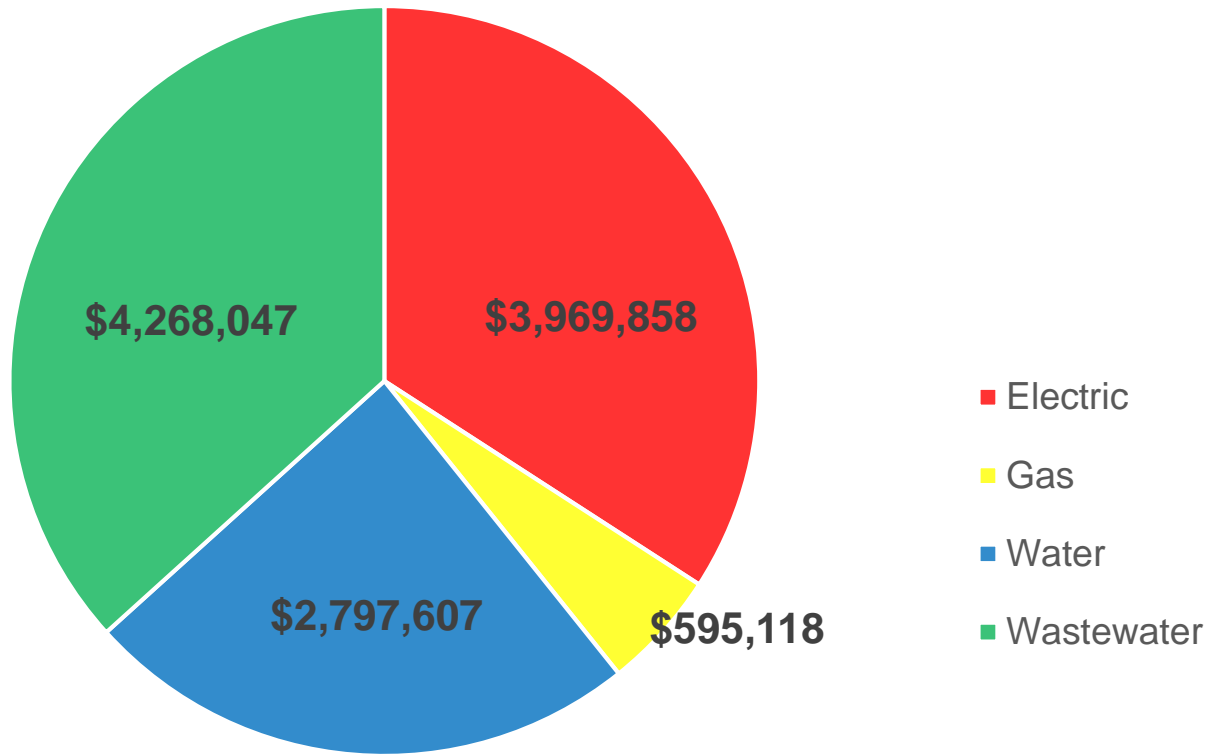
- Moving from traditional maintenance tasks
 - Inspection/Visual
 - Periodic/Scheduled
 - Preventative
 - Corrective
- Employing 'next level' techniques
 - Predictive maintenance
 - Design strategy and input
 - Leveraging asset performance history (Maximo)
 - Technology and other improvements

Predictive Maintenance

- Thermography
 - Substations
 - Critical stations: annually
 - Distribution: 4 years
 - Transfer switches: annually
 - Pump and Lift Stations: developing
- Vibration analysis
 - Pumps and motors: every 3 months
- Oil analysis
 - Transformers: every 6 months
 - Pumps, gearboxes, grinders: every 1-6 months



FY19 Maintenance Costs By Utility



Effective Maintenance Improves Reliability and Performance

- Meeting regulatory requirements
 - Recent TDEC and TPUC inspections with no findings
 - Water system sanitary survey scored perfect 100
- Mitigating unplanned service interruptions
 - Using technology, automation, and maintenance to improve reliability
- Extending asset life and performance
 - Using failure data to drive maintenance cycles
 - Continuing to balance replacement cycles of costly equipment

KUB

Minority and Women Owned Business Enterprise Program (MBE/WBE)

February 21, 2019



We Value Diversity In All We Do



Our Vision:

KUB exists to serve its customers, improving their quality of life by providing utility services that are safe, reliable and affordable.

Shared Values:

- We value the safety and well-being of our customers and employees.
- We value fairness, and try always to make decisions that provide the greatest good for the most people.
- We are in a position of trust and hold ourselves to high ethical standards.
- We improve the value of our services through efficiency, innovation and communication.
- We value the commitment and hard work of our employees.
- We are environmentally responsible in our operations and support the sustainability of our communities' natural resources.
- We participate in the communities we serve.

Our Mission:

Our mission is to act as good stewards of our communities' resources: utility assets, customer dollars, and the environment. We work to safeguard those resources and enhance their value for the people of the communities we serve and generations to come.

We Measure Our Success by:

Customer Satisfaction

System Performance

Financial Performance

Safety Performance

Keys to Success:

Managing Our Utility System Infrastructure

Electric

Natural Gas

Water

Wastewater

Improving The Customer Experience

Managing Our Finances Effectively

Meeting Or Exceeding Regulatory Standards

Investing in A Skilled, Diverse Work Force

Partnering For Economic Development

Being Environmentally Responsible

MBE/WBE Program Balances Requirements To Achieve Supplier Diversity

(MBE/WBE Program)



Federal Law: Equal opportunity, inclusion and non-discrimination

State Law/City Charter: Fair, open and competitive bidding

KUB Procurement Guidelines: Diverse supplier community

How the MBE/WBE Program Works

- Overseen by Program Coordinator Nikitia Thompson
- Creating awareness
- Providing community education and outreach
- Offering technical assistance
- Monitoring and reporting



Creating Awareness

- Program coordinator serves as community liaison
- Pre-bid meeting communication
- Bid documents encourage contractor utilization of MBEs and WBEs
- Social media



Providing Education and Outreach

- Individual company meetings
- Community events
 - Knoxville/Knox County Diversity Focus Group
 - KUB Supplier On-Boarding events
- Partnerships with other government entities
 - City of Knoxville
 - University of Tennessee
- Procurement newsletter



Offering Technical Assistance

- Guidance on pre-qualification for construction projects
- Assistance in finding non-KUB projects to gain experience
- Feedback on successful and non-successful bids



Monitoring and Reporting

- Equal Opportunity Business Activity Report to Board's Audit and Finance Committee
- Title VI Report to Mayor and City Council
- Regular updates to President and CEO and Procurement Oversight Committee

Program Having an Economic Impact

Fiscal Year	MBE/WBE Contracts (\$)	MBE/WBE % of Total
2009	\$10.3 million	7.6%
2010	\$11.5 million	8.9%
2011	\$14.8 million	10.7%
2012	\$18.8 million	10.5%
2013	\$19.4 million	10.9%
2014	\$18.6 million	10.0%
2015	\$20.6 million	10.4%
2016	\$19.9 million	10.1%
2017	\$22.7 million	11.7%
2018	\$20.6 million	10.3%

Focusing on Continual Improvement

- More networking events
 - 50 vendors attended December on-boarding session
- Increased communication efforts
 - Newsletters
 - Social media
- New partnerships with community groups and agencies

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Water Technology: Leveraging Data for Leak Detection

February 21, 2019

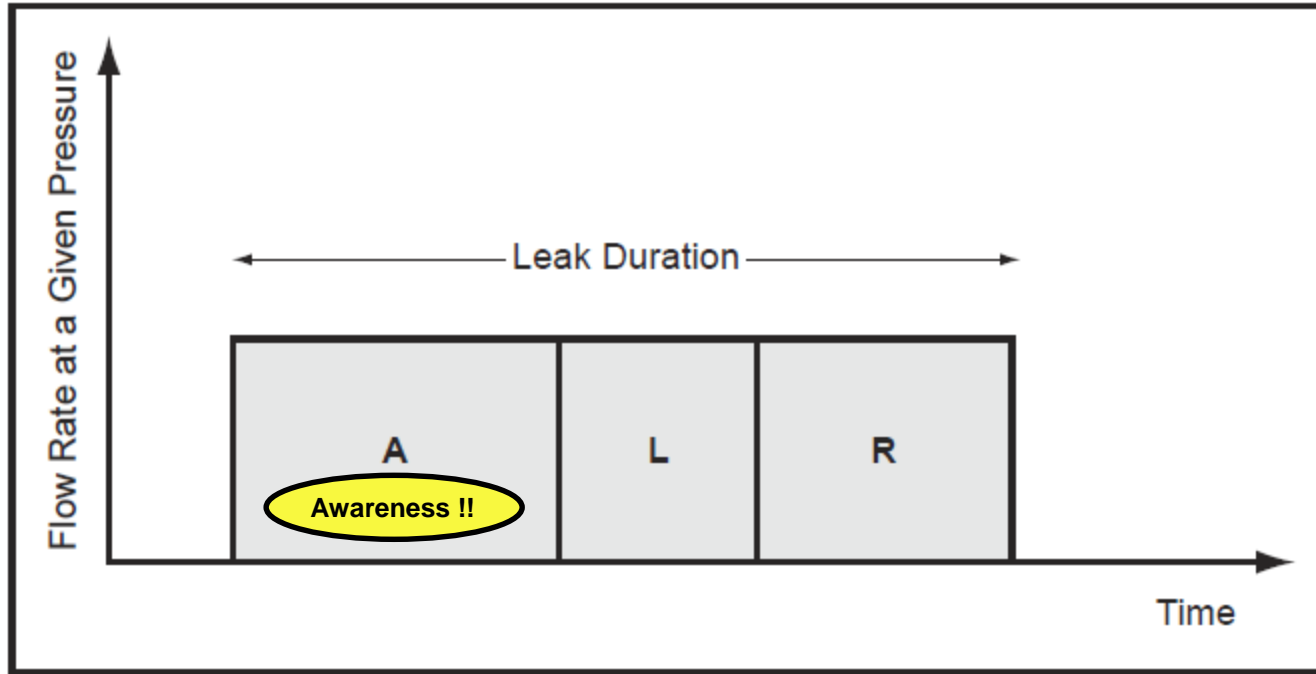


Types of Leaks

- Sudden break
 - High priority emergency repair
 - High flow but short duration
- Leak underground
 - No visible leak
 - Low flow but long duration
 - Leak volume > main breaks



Components of Leak Repair



Time periods in the life of a leak: A-Awareness, L-Location, R-Repair

Using Technology to Detect Leaks

■ Challenges

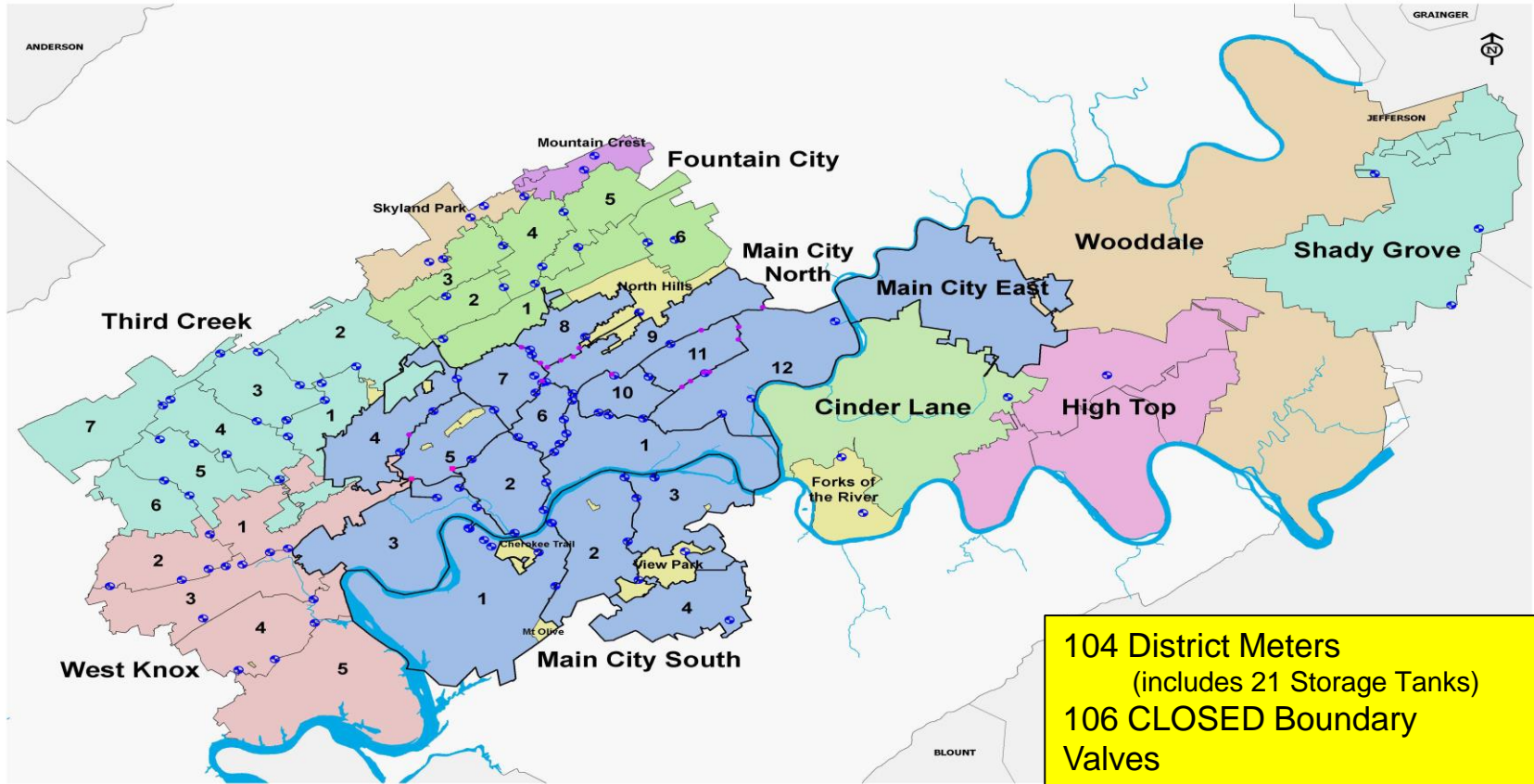
- Leaks are difficult to detect
- System-wide leak detection can be costly

■ Technology provides solutions

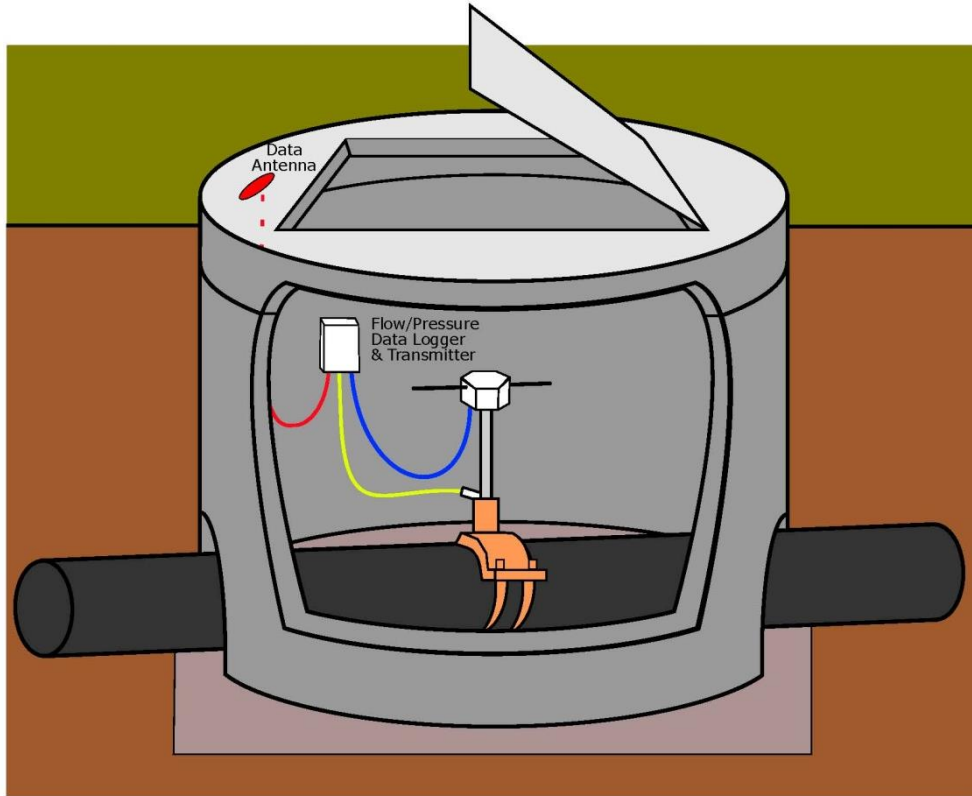
- District Metered Areas (DMAs)
- Data Analytics



District Metering Improves System Knowledge



District Meter Installation

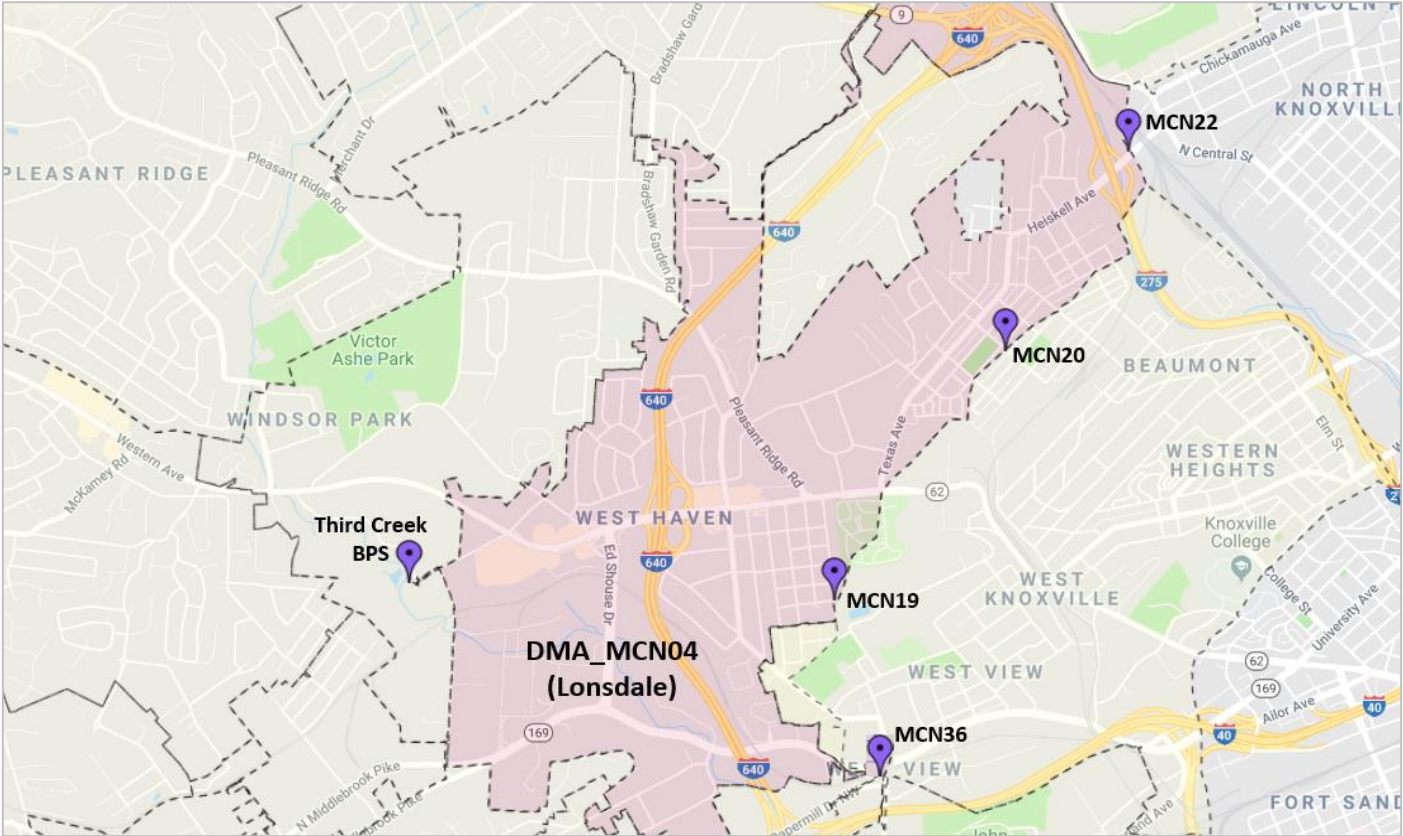


Data Sources Promote “Smart” System

- 60 existing SCADA sensors
- 100 new District Meter Sites
- In progress – Meter data for large customers
- Data stored on the cloud for access by multiple work groups



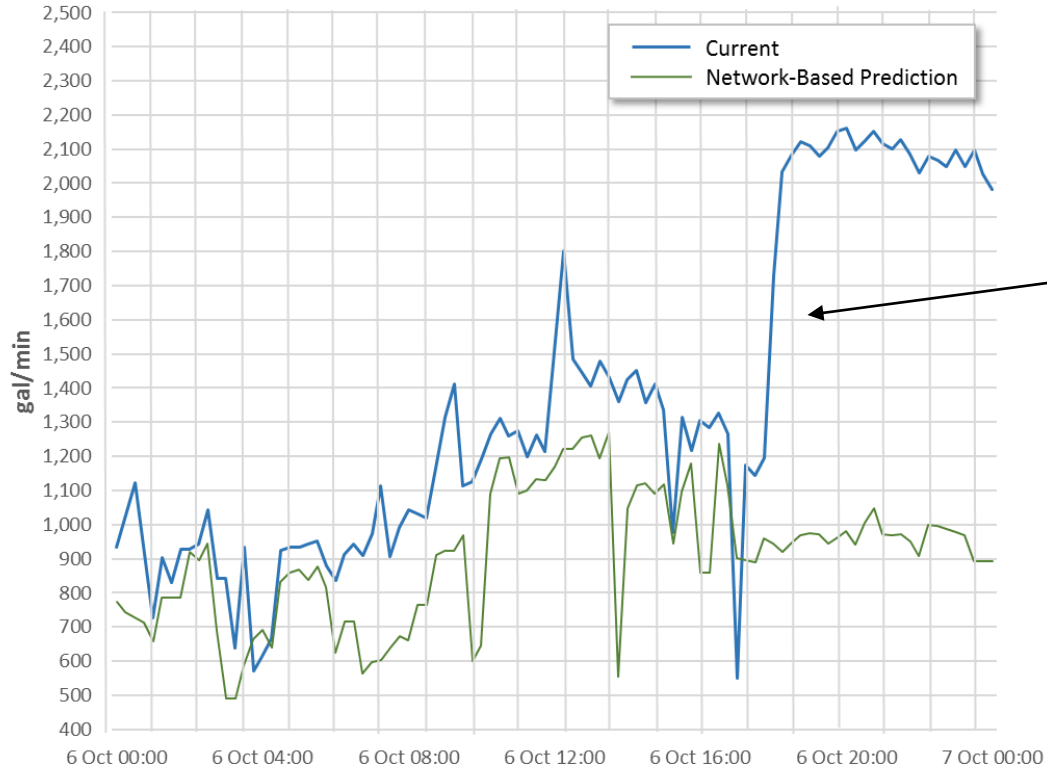
Lonsdale District Metered Area



TaKaDu Shows Flow Increase on Oct 6

Graph

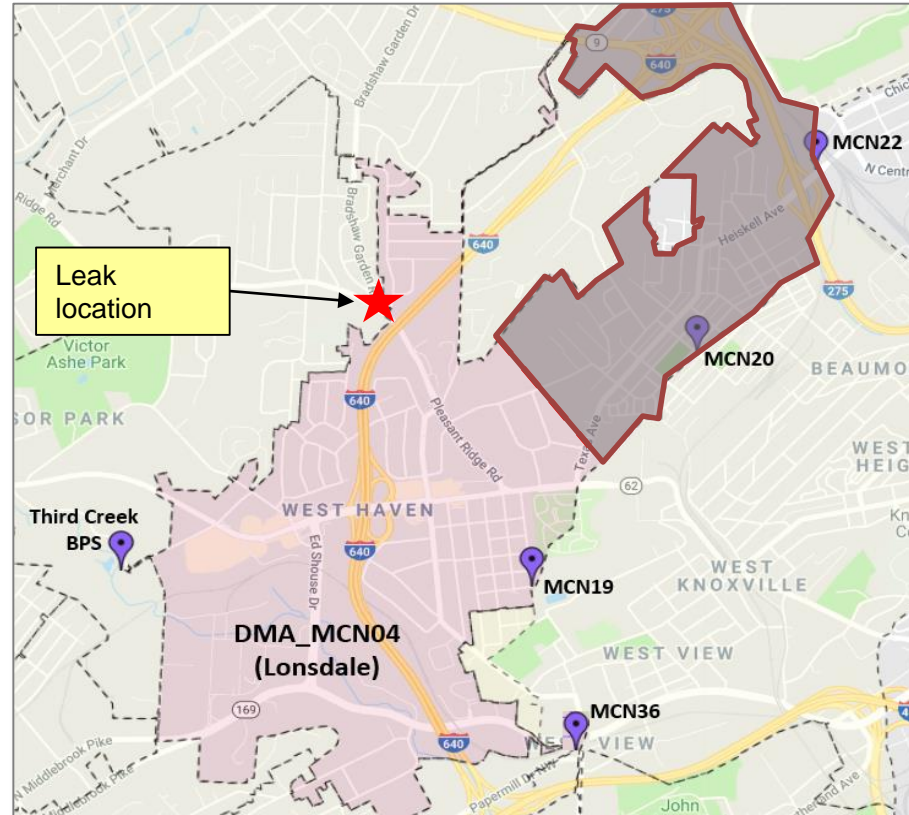
DMA_MCNO4 (Lonsdale DMA) Supply - Compared to Network-based prediction



Supply Increase
Saturday, Oct 6,
2018

Narrowing Search

- DMA's / *TaKaDu*
- Step-testing
- *Maximo* – low pressure call
- Hydraulic modeling
- Field investigation

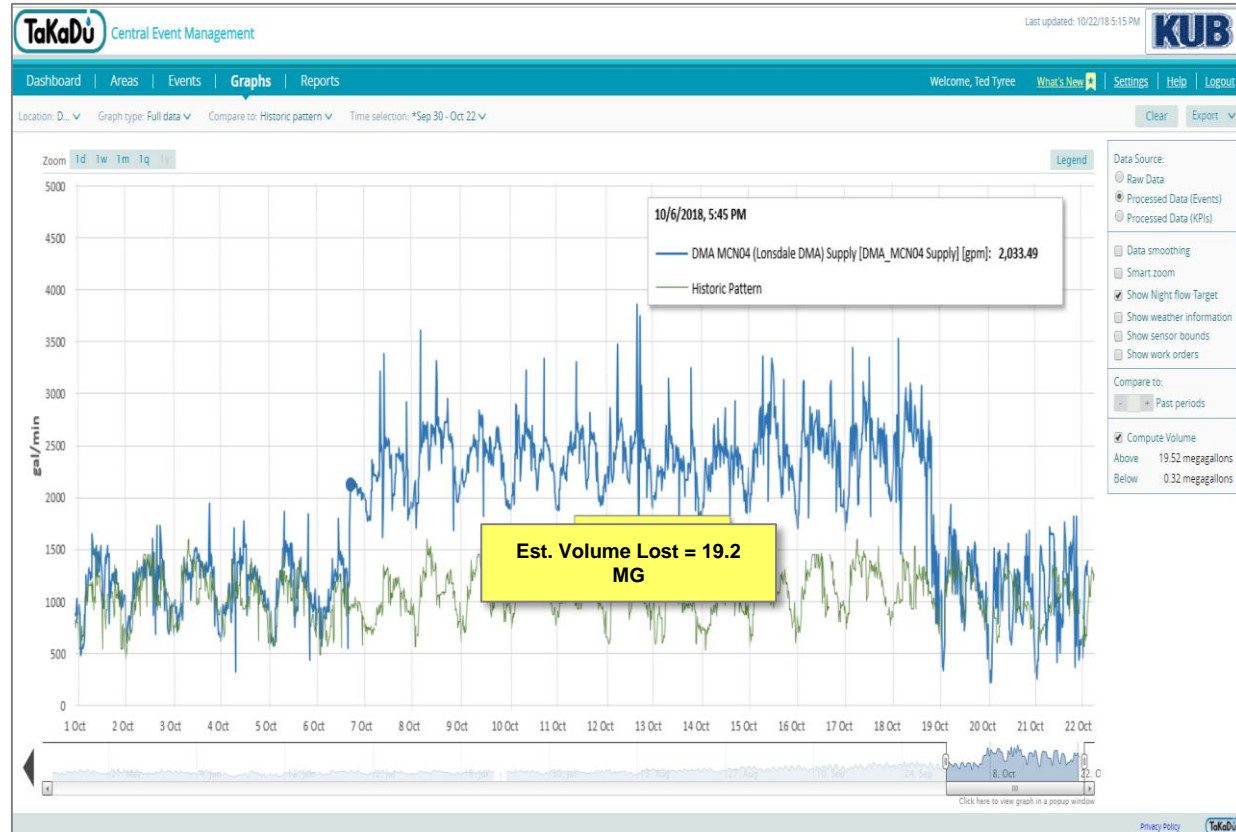


Leak Found & Isolated October 18th



“Smart” Water System Finds Leaks

- Leak Start Time
 - Oct 6
- TaKaDu Notification
 - Oct 9
- “Awareness” Time
 - 3 days
- Leak Duration
 - 12 days
- Value of Water Lost
 - Daily: \$609
 - Total: \$7,714
- \$ Lost if Leak Not Found & Repaired
 - 1 month = \$18,970
 - 1 year = \$230,800



Benefits of Technology and Data Analytics

- District Metered Areas (DMAs) are very effective in reducing “Awareness Time”
- *TaKaDu* provides prompt notification of major leaks
- New technology is part of strategy to reduce leaks

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Weatherization Assistance Grant

February 21, 2019



Weatherization Assistance Expanded With New Grant Award

- Funded by Federal Home Loan Bank of Cincinnati's Affordable Housing Program
- Provides \$500,000 to continue Home Uplift Pilot in Support of Round It Up
- Nearly doubles customers served



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