Managing a Large Scale Water Main Renewal Program
• **Aqua America**
  - Investor owned water and wastewater utility
  - 3 million people served across 8 states
  - Celebrating our 130th anniversary in 2016

• **Aqua Pennsylvania**
  - Largest operating company
  - Southeast PA surrounding Philadelphia and smaller systems throughout PA
- 35 counties
- 114 “systems”
- 239 municipalities
Southeast PA territory

- Berks, Bucks, Chester, Delaware and Montgomery counties
- 120 municipalities
Aqua PA Water Main Inventory

- Asbestos Cement
- Cast Iron
- Cement Stovepipe
- Ductile Iron
- Other
- PVC

- All Aqua PA (5,775 miles)
- Greater PA (1,279 miles)
- Southeast PA (4,496 miles)
Cement Stovepipe

- Unique to Southeast PA
- “Sandwich” of cement material and galvanized iron jacket
- Hundreds of miles installed in 1920’s
- Highest % of main breaks and often severe
- Approximately 40 miles remaining
What is driving our water main renewal program?

- **Distribution System Improvement Charge (DSIC)**
  This surcharge on customer’s bills is designed to provide customers with improved service, reliability, and safety by financing the accelerated repair and replacement of older utility pipelines and infrastructure.

- Allows investor owned utilities to recover the costs of water main replacement without regulatory lag

- DSIC approved by the PA PUC in 1997 with a 5% cap

- Cap increased to 7.5% in 2009
1,743 Miles (30%) Replaced or Rehabilitated over 19 Years

Aqua PA Water Main Renewal History

Aqua PA - Miles of Pipe Cleaned & Lined and Replaced

Miles

0 20 40 60 80 100 120 140 160 180 200


Greater PA
SE PA
C&L
Water Main Breaks in Aqua PA (SEPA)

Declining main break trend
• Accelerated water main renewal program
• Identify pipes that need to be addressed
• Renewal costs increasing
• Other utility work on the rise
• Company resources staying the same (or decreasing)

“How can Aqua PA successfully prioritize and manage its water main renewal program?”
Prioritizing pipe for replacement is easy when you have the right information…
Challenge - Identifying Pipes (Theoretical approach)
• Asset Information Management System
• Consolidated variety of data sources into a single web-based platform
• Provides access to pipe, hydrant, services, and main break data
• Provides access to 60,000 scanned construction drawings
Scoring model example
Identifying pipe “hot spots”
Identifying problematic pipe

2015 Pipe Inventory SEPA
- Ductile Iron: 55%
- Cast Iron: 33%
- Cement: 7%
- Stovepipe: 1%

2015 Main Breaks SEPA
- Cast Iron: 82%
- Ductile Iron: 2%
- Cement: 8%
- Stovepipe: 1%
In a perfect world….

Identifying pipe candidates
Identifying Cast Iron pipe candidates

In the real world....
Challenge - Identifying Pipes (Realistic approach)

- Where are water quality issues?
- Where are hydraulic issues?
- Which townships are willing to work with us?
- What is my budget this year?
- When was that road paved?
- What are other organizations doing?
- Where are hydraulic issues?
- Are the projects evenly distributed?
- What pipe categories are most problematic?
- Which main breaks created the most problems?
Internal Cooperation

Engineering
- Modeling
- Capital planning
- Mapping

Finance
- Establish and manage budget

Network Operations
- Operate & maintain
- SCADA

Production
- Produce water
- Compliance

Engineering

Network Operations
- Operate & maintain
- SCADA

Finance
- Develop & manage budget

Production
- Produce water
- Compliance
Coordination with other organizations

- PennDOT
- PECO
- SEPTA
- Municipality paving
PennDOT Paving
- Receive project locations from PECO
- Incorporate into Aqua GIS
- Coordinate work when feasible
Coordination with SEPTA
### Municipal Paving

#### Lower Merion 2008-2012 (List Received Sept 2012)

- **Year:** 2012
- **Street:** Woodgate Road
- **Start:** Roscommon Road
- **End:** Cul-de-sac
- **Municipality:** Lower Merion
- **County:** (Montco)
- **Division:** WESTERN

**Link to PDF:** [http://172.16.14.142/listWe](http://172.16.14.142/listWe)

#### TOWNSHIP OF LOWER MERION 2008 - 2012 RESURFACING PROGRAM
SEPTEMBER 10, 2012

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<th>No.</th>
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Southeast PA

- 3 Aqua estimators/designers do field investigation, design, and cost estimate
- Combination of in-house and outsourced design
- Aqua Inspectors responsible for oversight of outsourced construction crews

Greater PA

- All design work is outsourced
- All projects are bid individually
- Design engineer typically responsible for inspection
- SEPA operations divided into 3 construction divisions
- 3-year contracts are bid for water main replacement within each division
- Projects > 5,000 feet are bid out separately
- All projects in Greater PA are bid out separately

<table>
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<th>Year</th>
<th>Miles Replaced</th>
<th># of Projects</th>
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<td>160</td>
<td>118</td>
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<td>2016</td>
<td>148</td>
<td>210</td>
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</table>
Questions answered in a single application

- What is the status of a project?
- How many $$ are we spending in each Division?
- How much work is going on in a municipality?
- What projects are scheduled for next year?
Managing projects with GIS
• Understand your system
• Collect appropriate information to guide decision making
• Pick the prioritization process that works for you
• Coordinate with outside organizations
• Identify opportunities to break down barriers
• Take the time to build management “tools”
• A picture is worth a thousand words (GIS)
THANK YOU!

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