

Mueller Water Products

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Best Practices for Optimizing Water Pipe Assets

Smart Acoustic Monitoring Solutions for Water Efficiency and System Resiliency

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Echologics Solutions



Leak detection technology and services for pressurized water pipes



Water pipeline integrity and condition assessment services



Permanently installed leak detection monitoring for water mains

Optimizing Water Systems

Water Efficiency and System Resiliency

Older Water Pipe Networks:

- Leak more (background leakage)
- Leak quieter (more difficult to find)
- Have higher risk of catastrophic failure

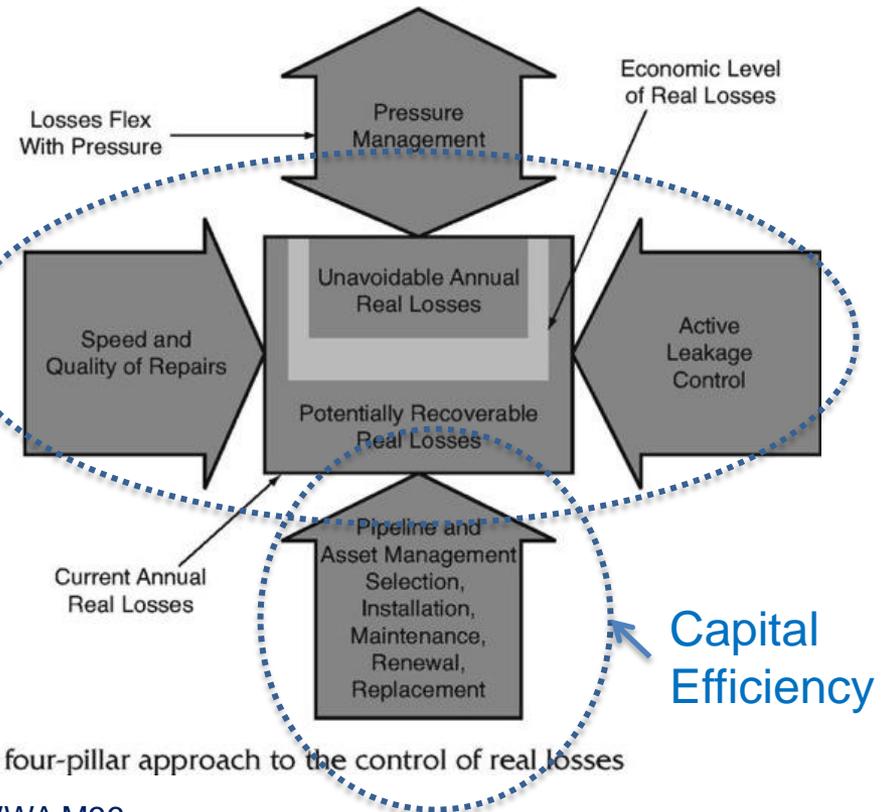


Figure 5-1 The four-pillar approach to the control of real losses

Reference: AWWA M36

Condition Assessment and LD

Tools of the Trade

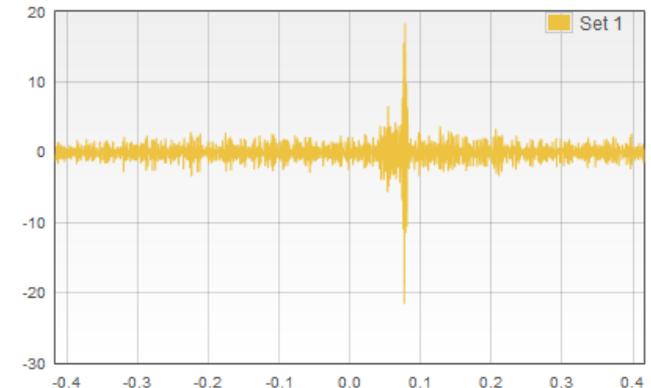
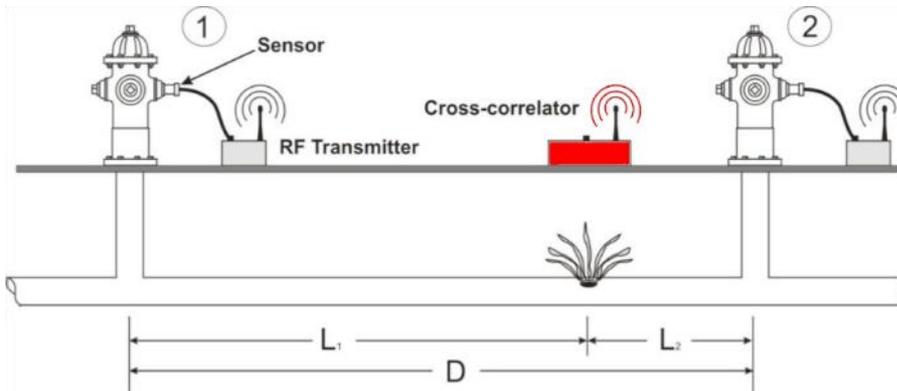
LeakFinder Acoustic Correlator



Leak Correlation Acoustic Analysis

Principle of Operation

1. Bracket the leak with two sensors
2. The leak sound propagates in both directions
3. Correlator measures the time difference to reach each of the sensors to determine the exact leak location



Advances in correlation technology allow for lower frequencies and long-distance sensor spacing



Permanent Monitoring Systems for Water Efficiency and System Resiliency

Permanent Monitoring is Ideal for Critical and High-Risk Water Mains



- Major roadways, highways and bridges
- Railways and transport links



- Campus Environments



- Government buildings
- Tourism and financial districts



- Industrial zones

Benefits of Permanent Monitoring

Financial
Savings



Resource
Allocation



Risk
Avoidance



System Components



Monitored Pipeline



Operation

24 hour leak detection cycle

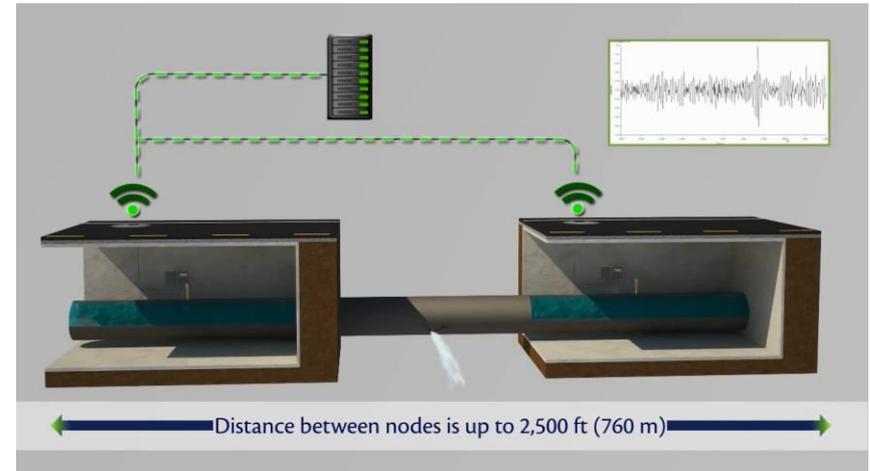
- Time-synced acoustic data capture
- Upload to central server and processed
- Results passed to UI or SCADA

On-Demand Functionality

- Clients can force unscheduled data capture
- Manual correlation

Autonomous

- Automated correlation peak selection
- Scheduled and Ad-hoc Reporting



Time between leak detection surveys reduced from years to hours

Permanent Monitoring: Case Study

West Virginia American Water

Service Area: 5 mi², Average Production 25 MGD

Total Nodes: 386

Pipe: 4" – 12" DI and CI

Service Start: Dec 2014

Experience: 4th installation at American Water with 11 leaks found in the first month and 45 leaks in the first 5 months of operation, 40 of which had not yet surfaced prior to repairs. Credited with 2.3 MGD of water loss reduction. Phase 1 of multiple phased deployments.

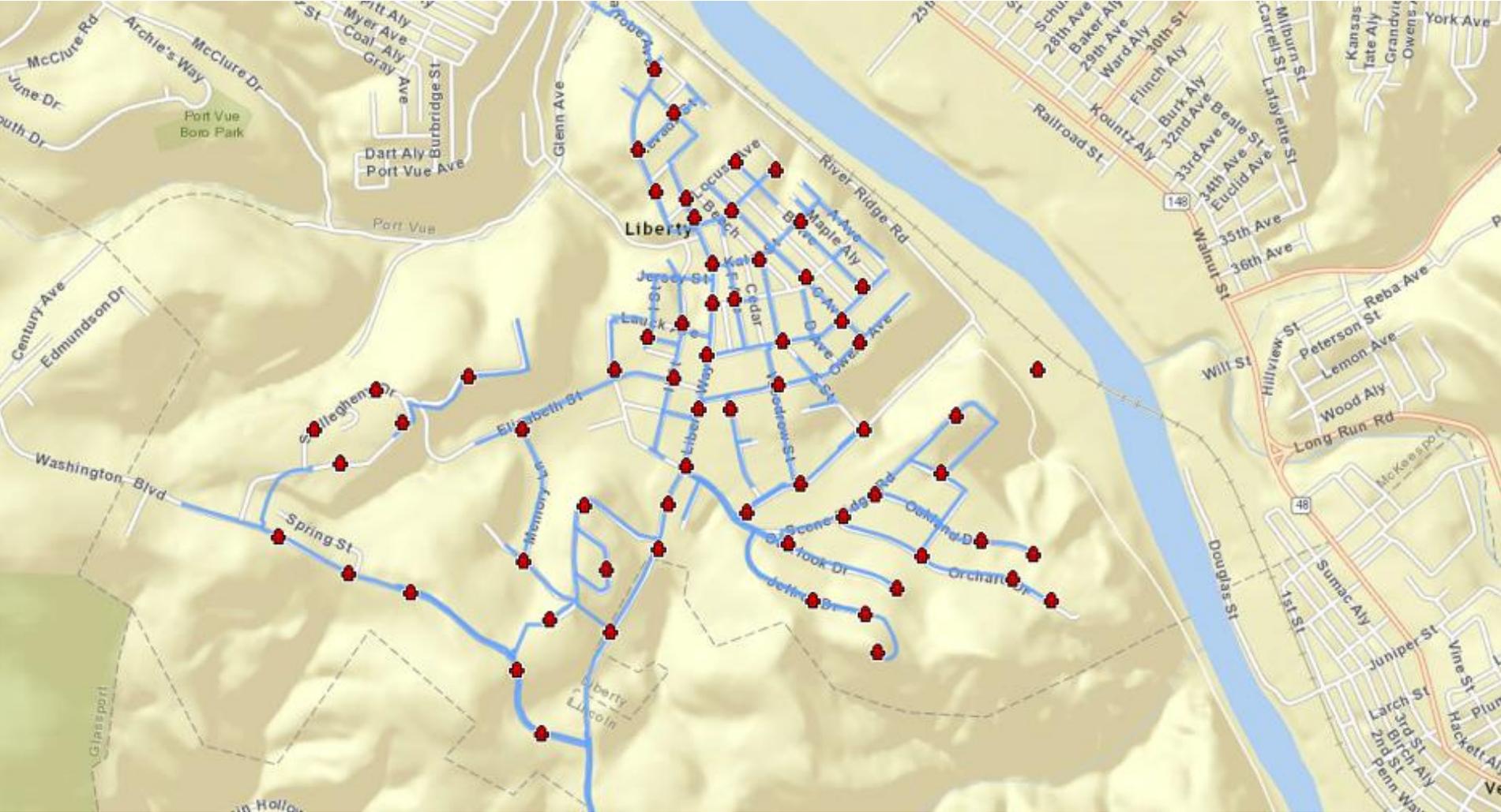


Another 1.5 MGD of water loss was recovered from a 36" PCCP main leak, that was picked-up by the DX system through ground vibration.



Permanent Leak Detection in Practice

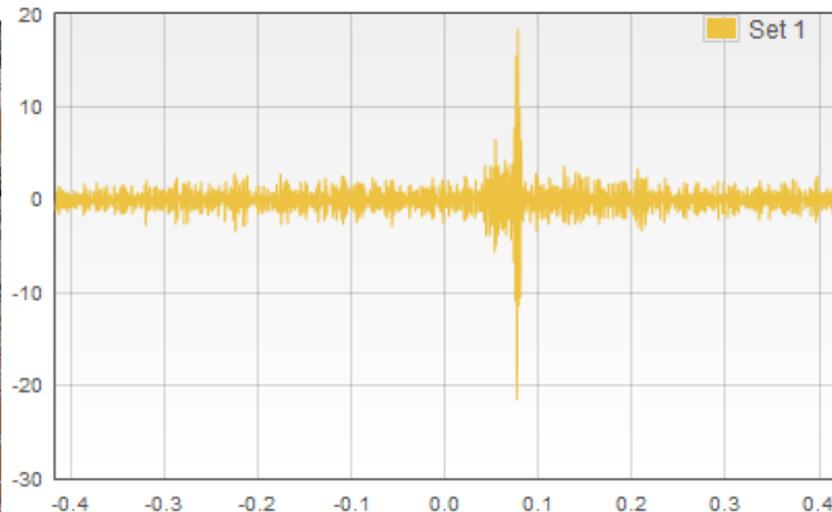
Leak Progression to Failure (almost) – Liberty PA



Permanent Leak Detection in Practice

Leak Progression to Failure (almost) – Liberty PA

Ability to track the progression of a leak from...



+4 weeks

(prior to excavation)



Dave Hughes: “...a time bomb defused”;
5 gpm leak paid for the system

Expandable Functionality

Core functionality is
acoustic leak detection

Pressure/Flow



Temperature



Chlorine



Other Client
Requirements

4-20 mA
Signal

Opportunity to expand from advanced leak detection to
customized pipeline monitoring

NIST Global City Teams Challenge

- Initiative for the advancement of Internet of Things (IoT) technology within a Smart City / Community environment
- Mueller/Echologics, AT&T and IBM are participating vendors for water sector cluster
- Technology engagements consist of Echologics Permanent Monitoring in conjunction with AT&T wireless communications and IBM Visual Dashboard
- Las Vegas, Los Angeles and Atlanta are participating cities

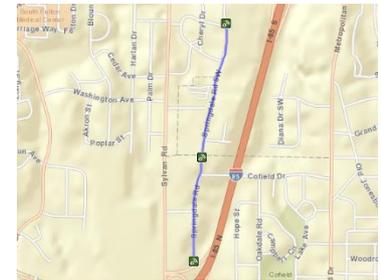
Smart City Challenge

Operational Experience

Project: Las Vegas, NV
Pipeline: 36" Asbestos Cement
Objective: Leak monitoring
Monitoring Start: April 2015



Project: Atlanta, GA
Pipeline: 20" Ductile Iron
Objective: Leak, pressure monitoring
Monitoring Start: April 2015



Project: Los Angeles, CA
Pipeline: 36" Concrete Lined Welded Steel
Objective: Leak monitoring
Monitoring Start: May 2015





Recent Innovations

Semi-Permanent Monitoring Solution



Antenna

Power Source

Processor &
Comms HW

Hydrophone



EchoShore-Mobile system fills the information gap between periodic leak detection surveys and permanent monitoring for improved detection and reduced risk on critical water mains