



POWERFUL ANALYTICS.
ACTIONABLE INSIGHTS.

iHydrant®

Powerful Analytics. Actionable Insights.

CLOW
VALVE CO.



M&H VALVE COMPANY



KENNEDY VALVE

CLOW
CILOW CANADA

Agenda



Our Mission

Why manage pressure?

Customer Case Stories

Financial Savings

The iHydrant Solution (Software Demo)



Our mission

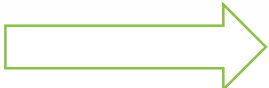
“Revolutionize water systems by leveraging powerful real time analytics and actionable insights to detect and prevent water loss and evolve the way your utility looks at water.”

POWERFUL ANALYTICS.

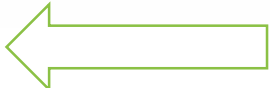


Why pressure management is important

Pressure Management



UARL
Annual Real Losses



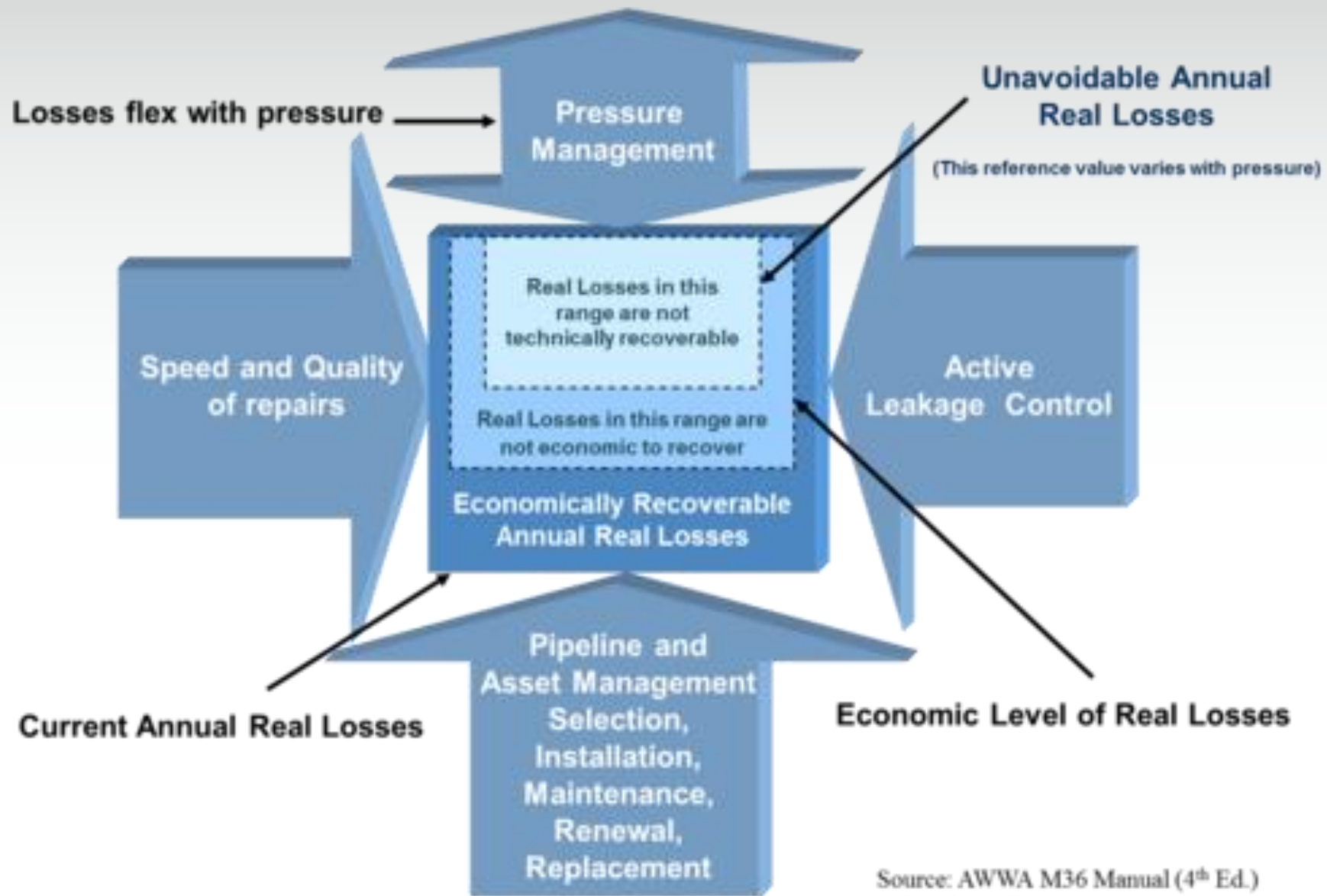
Pipeline Management

Speed/Quality of Repairs

Active leak Control

Relationship of Pressure to Water Loss



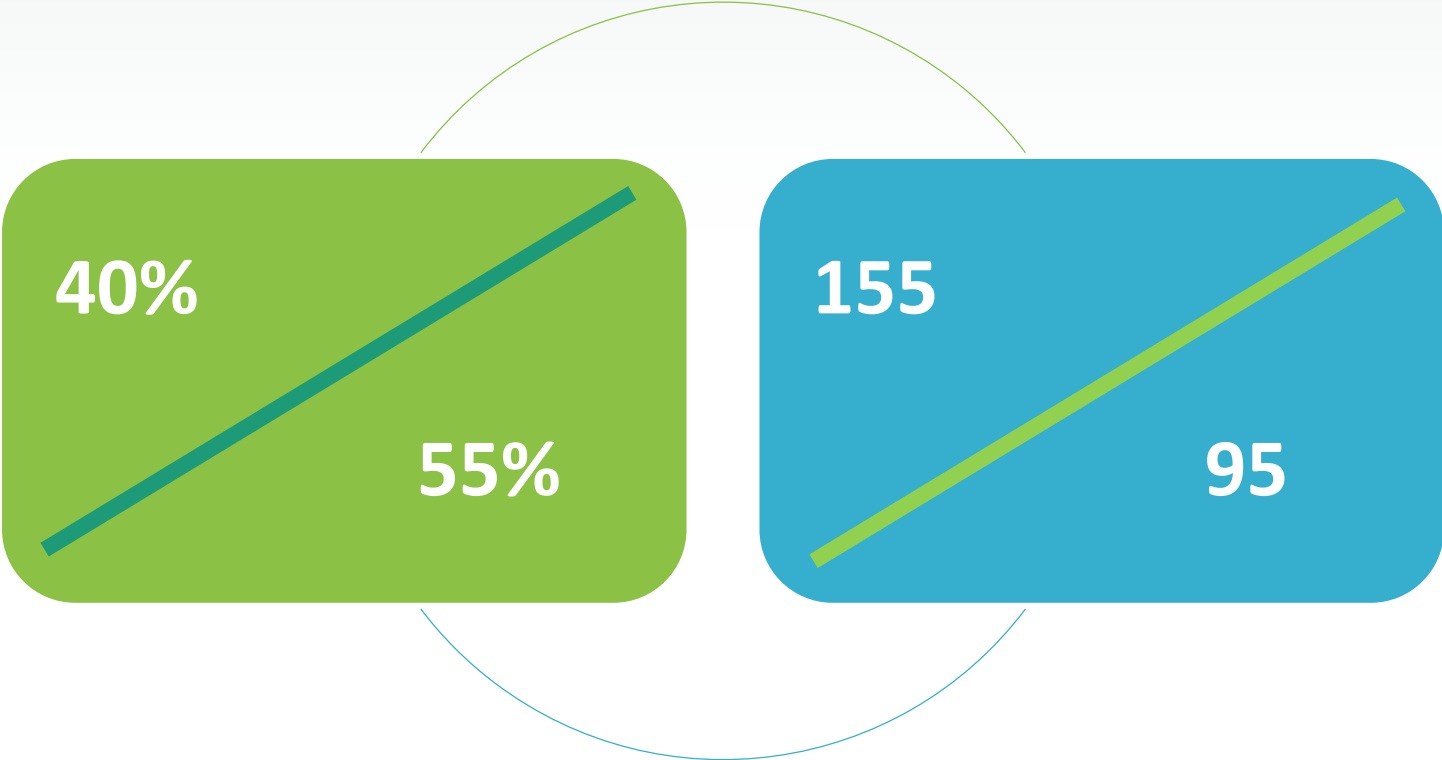


Source: AWWA M36 Manual (4th Ed.)
Original Credit: Dave Pearson



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Relationship of Pressure to Water Loss



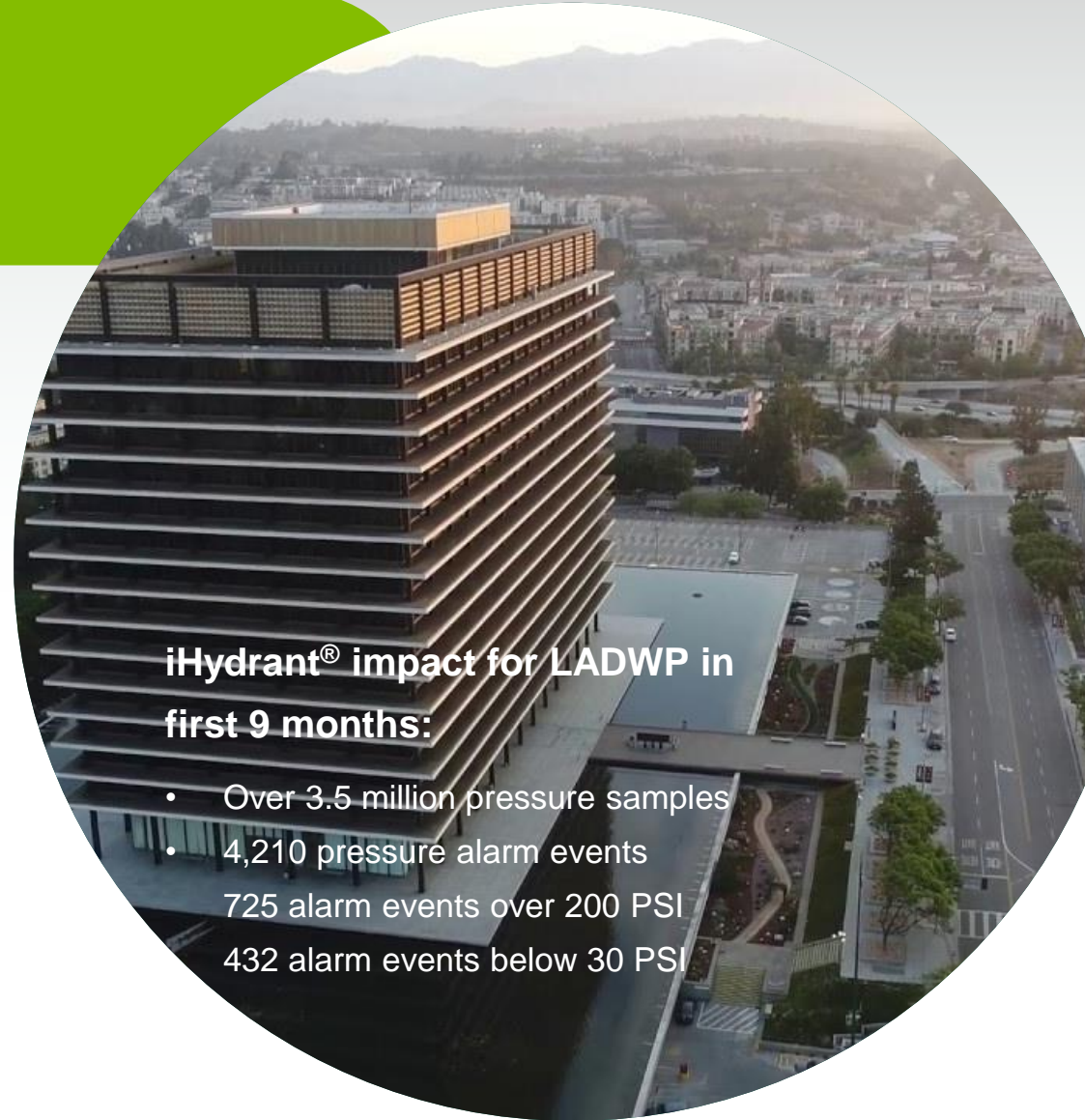
It's not just about water loss...

Extend the life of water infrastructure

Improved customer service

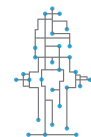
Decrease Liability

Hydraulic Modeling



iHydrant® impact for LADWP in first 9 months:

- Over 3.5 million pressure samples
- 4,210 pressure alarm events
 - 725 alarm events over 200 PSI
 - 432 alarm events below 30 PSI



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What iHydrant sees

Identify and mitigate issues

- Actuators
- Flushing/Fire
- PRVs
- Pumps
- Power Outages
- Valves
- Theft
- Accidental Damage
- Temperature





Pressure Monitoring

Customers' Benefits Noted:

- ▶ Alerted of main breaks in real time
- ▶ Reduce hydrant water theft
- ▶ Identify contractor breakage
- ▶ Utilities change pump patterns to reduce line stress and save energy costs
- ▶ Replaced defective PRV valves
- ▶ Repaired defective valve actuators
- ▶ Reduced line flushing due to high/low water temperature



POWERFUL ANALYTICS.
ACTIONABLE INSIGHTS.

Customer Case Stories

Powerful Analytics. Actionable Insights.



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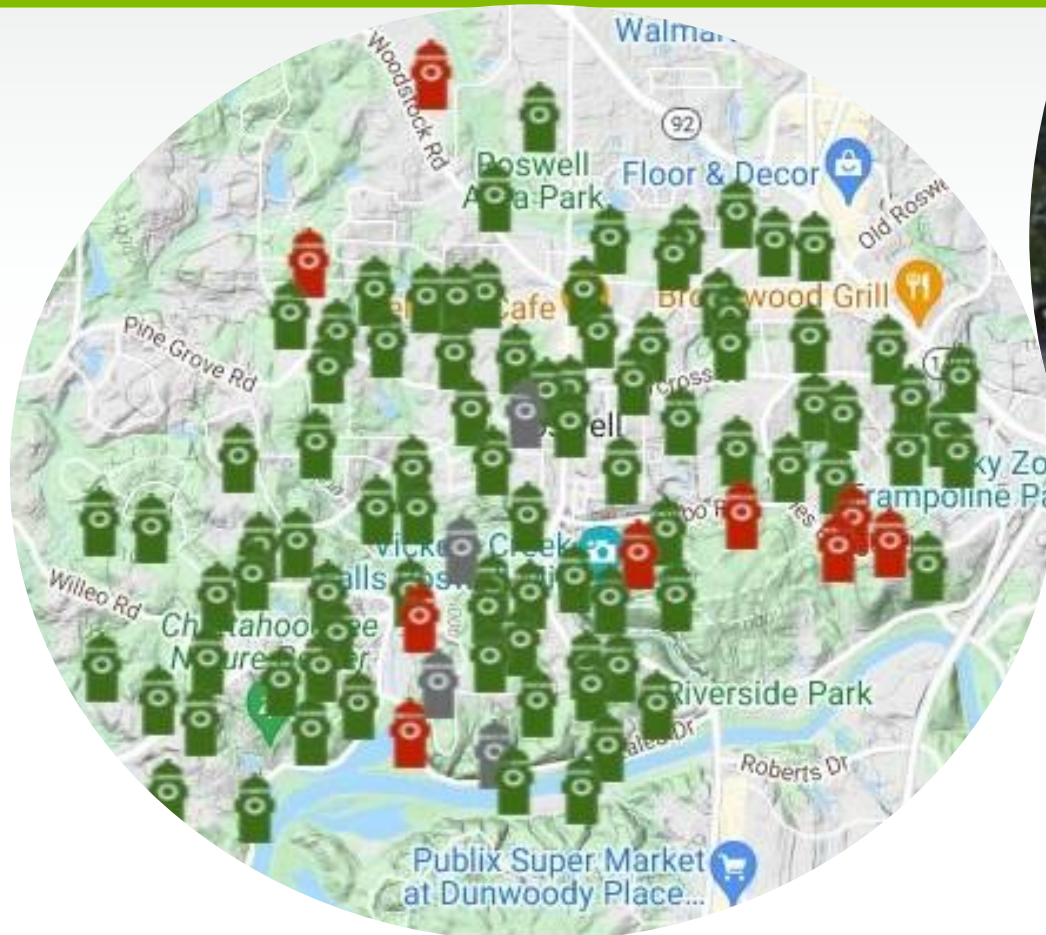


KENNEDY VALVE



City of Roswell GA

- 3 MGD water treatment plant
- 89 miles of mains
- 794 hydrants
- 100 iHydrants



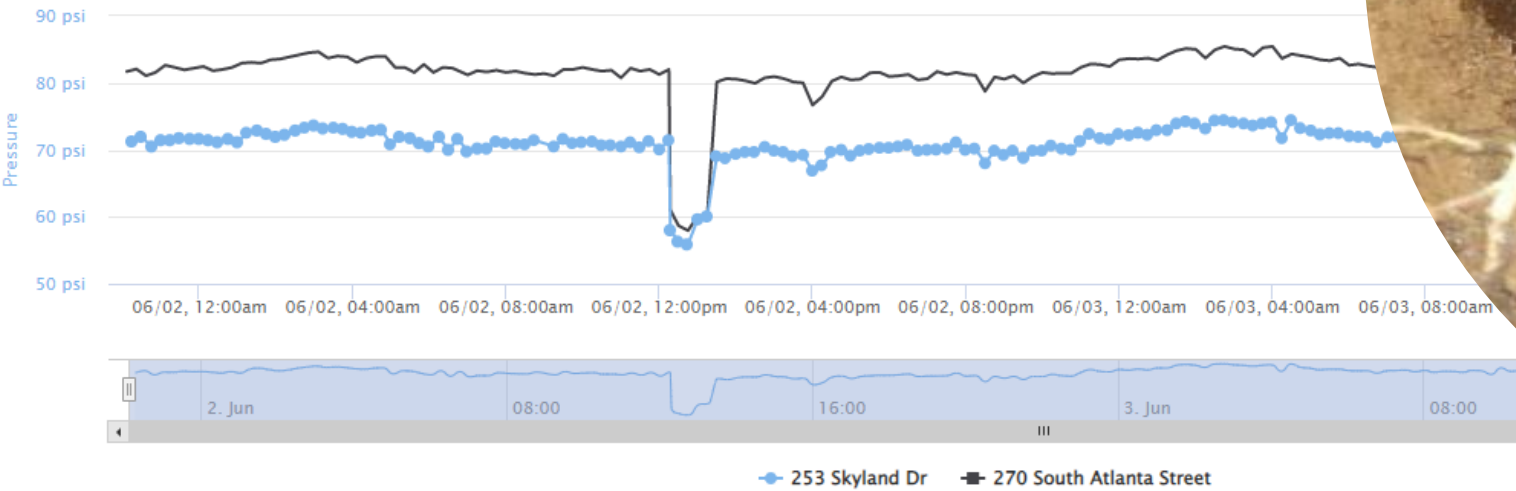
City of Roswell GA

- GA Power drilled in to 6" AC line



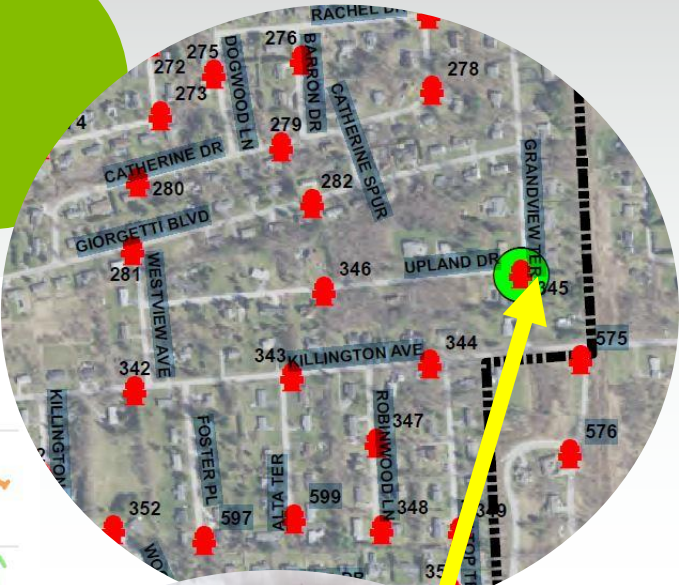
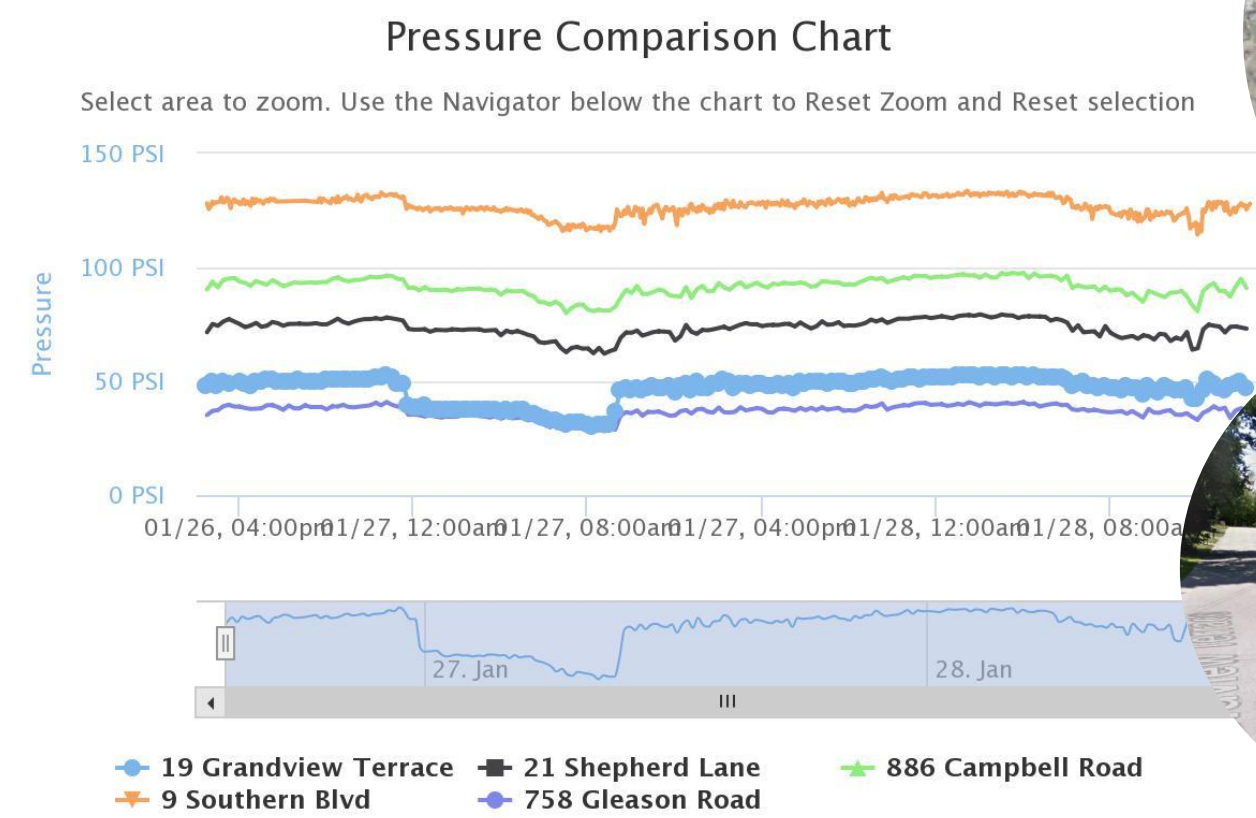
Pressure Comparison Chart

Select area to zoom. Use the Navigator below the chart to Reset Zoom and Reset selecti



Rutland VT Main Break

Main break
800K Gal in 1 day



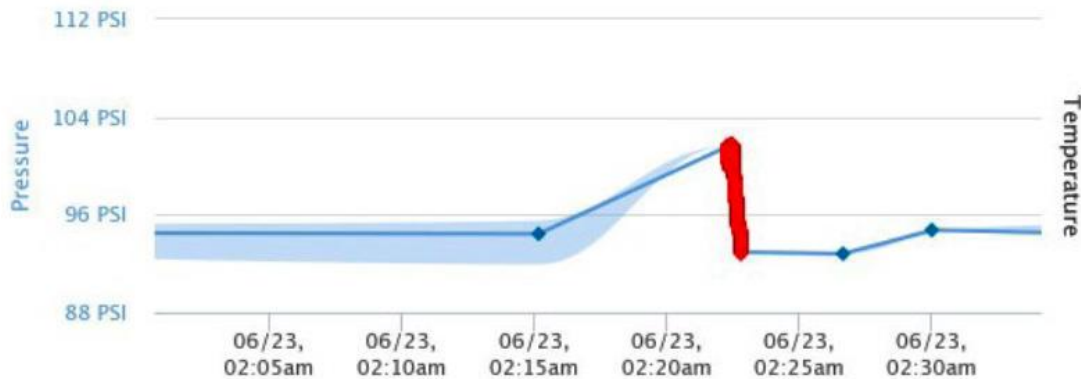
Highcharts.com



Rutland VT Water Theft

Pressure and Temperature Chart

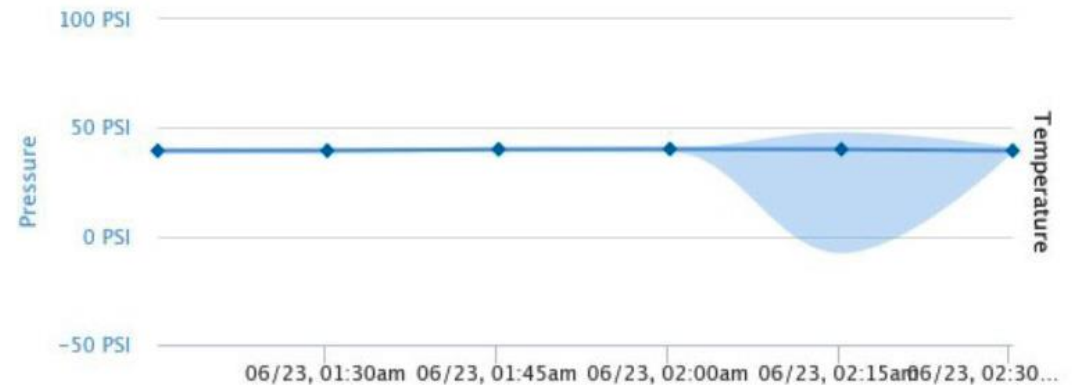
Select area to zoom. Use the Navigator below the chart to Reset Zoom and Reset selection



◆ Pressure (PSI) ■ Temperature (°F)

Pressure and Temperature Chart

Select area to zoom. Use the Navigator below the chart to Reset Zoom and Reset selection

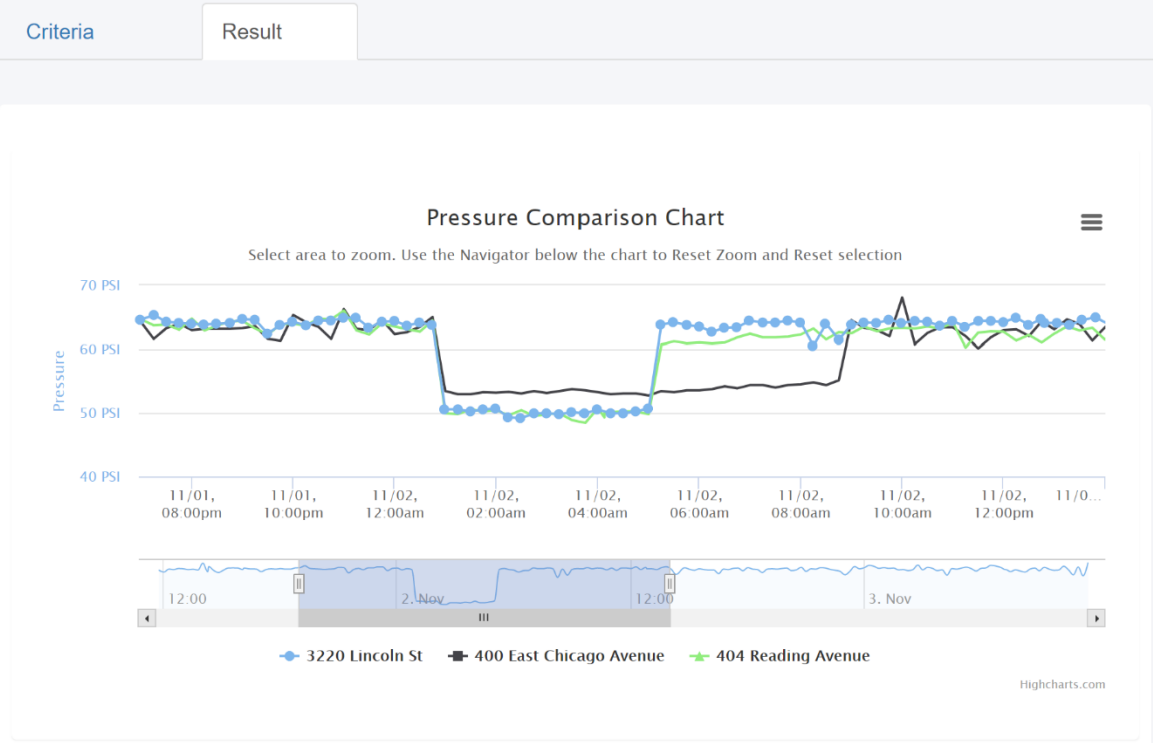


◆ Pressure (PSI) ■ Temperature (°F)

Closed Valve



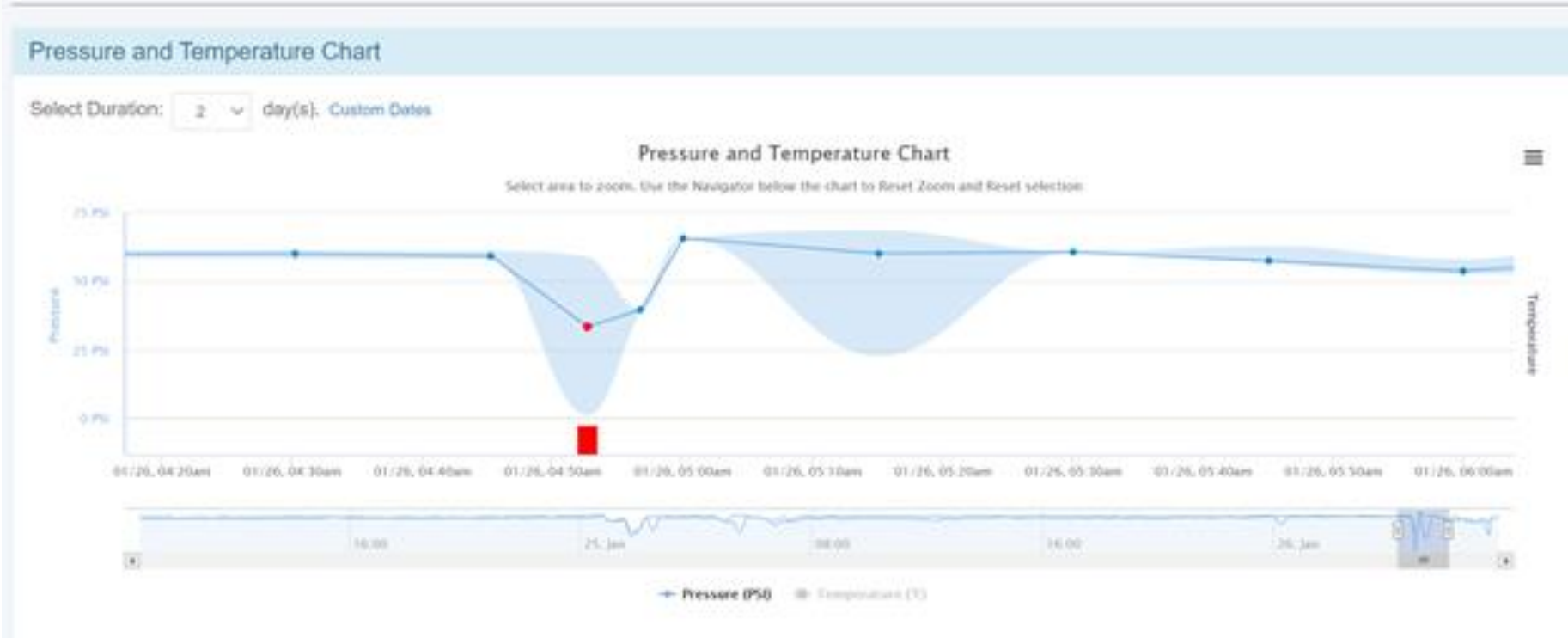
Compare Hydrant Pressures





Power Outage

9319 Scott Road





Remote transmission line break



Start Date: 07/26/2021 12:24 PM

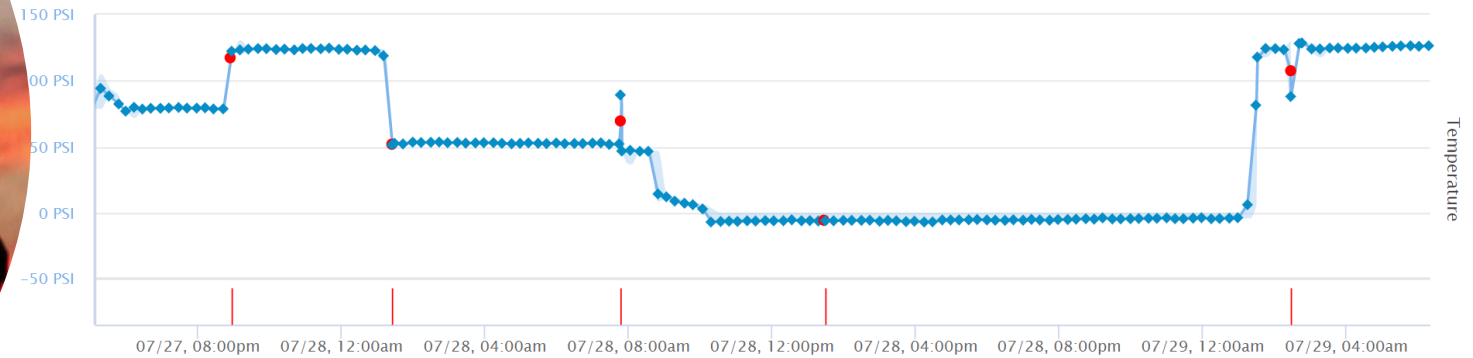
End Date: 07/30/2021 12:24 AM

[Update chart with revised date](#)

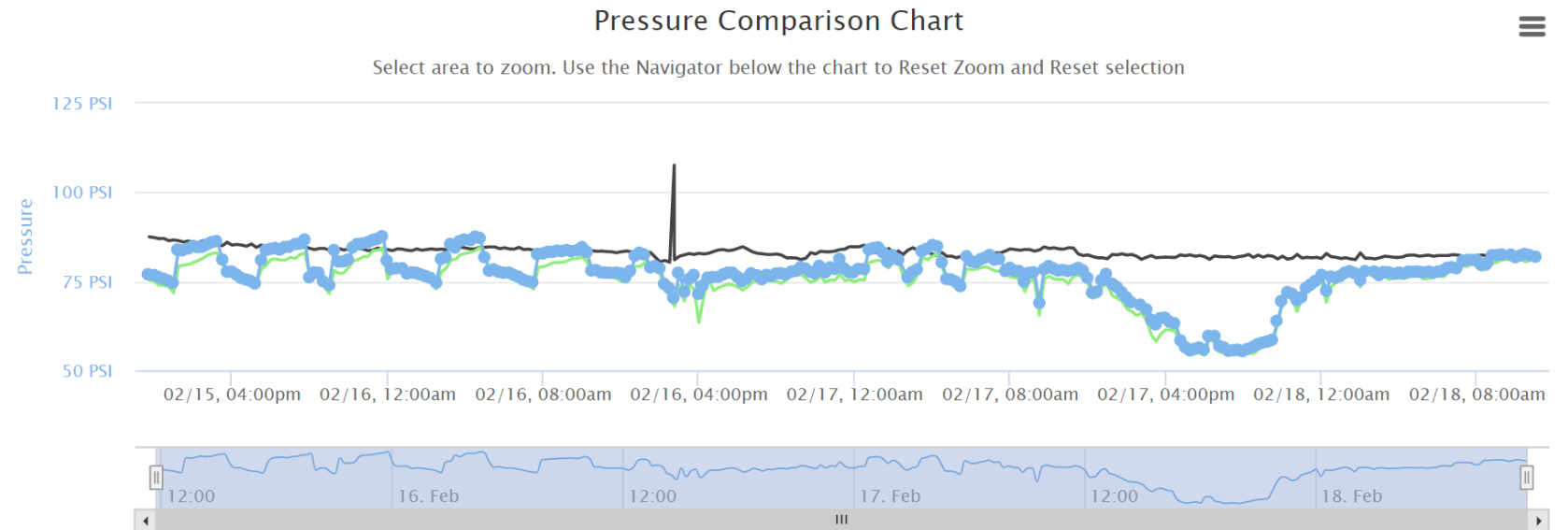
[Hide Custom Dates](#)

Pressure and Temperature Chart

Select area to zoom. Use the Navigator below the chart to Reset Zoom and Reset selection



Severe Weather- Texas Freeze 2021



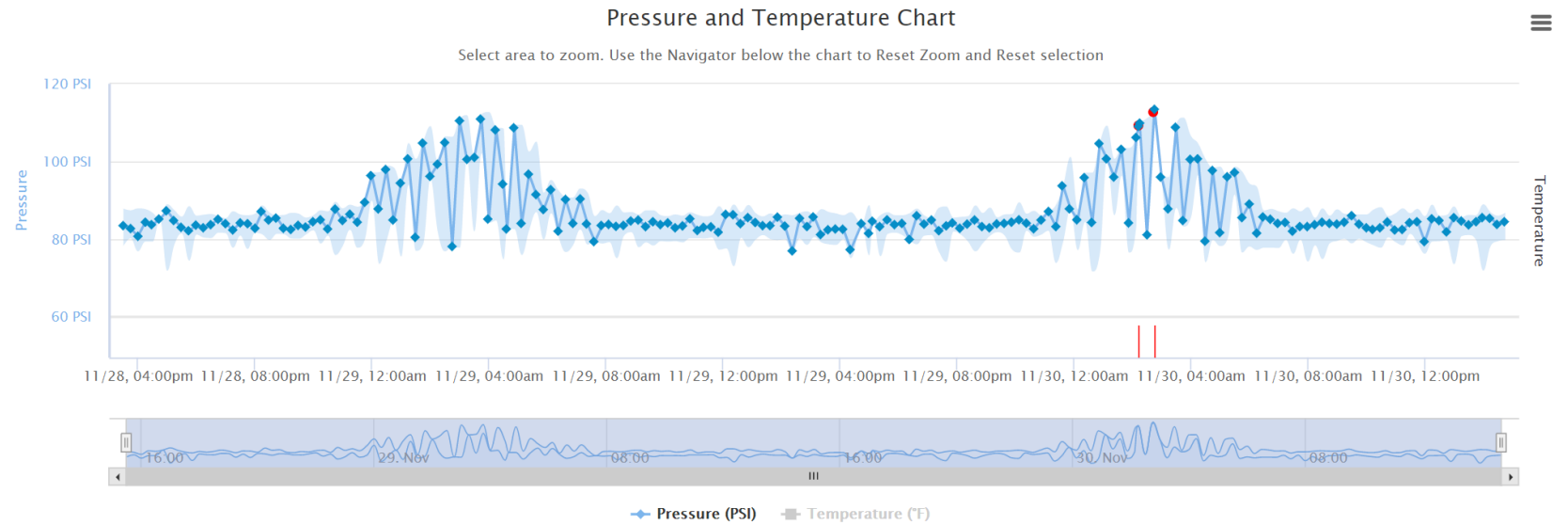
PRV Failure and Open Bypass



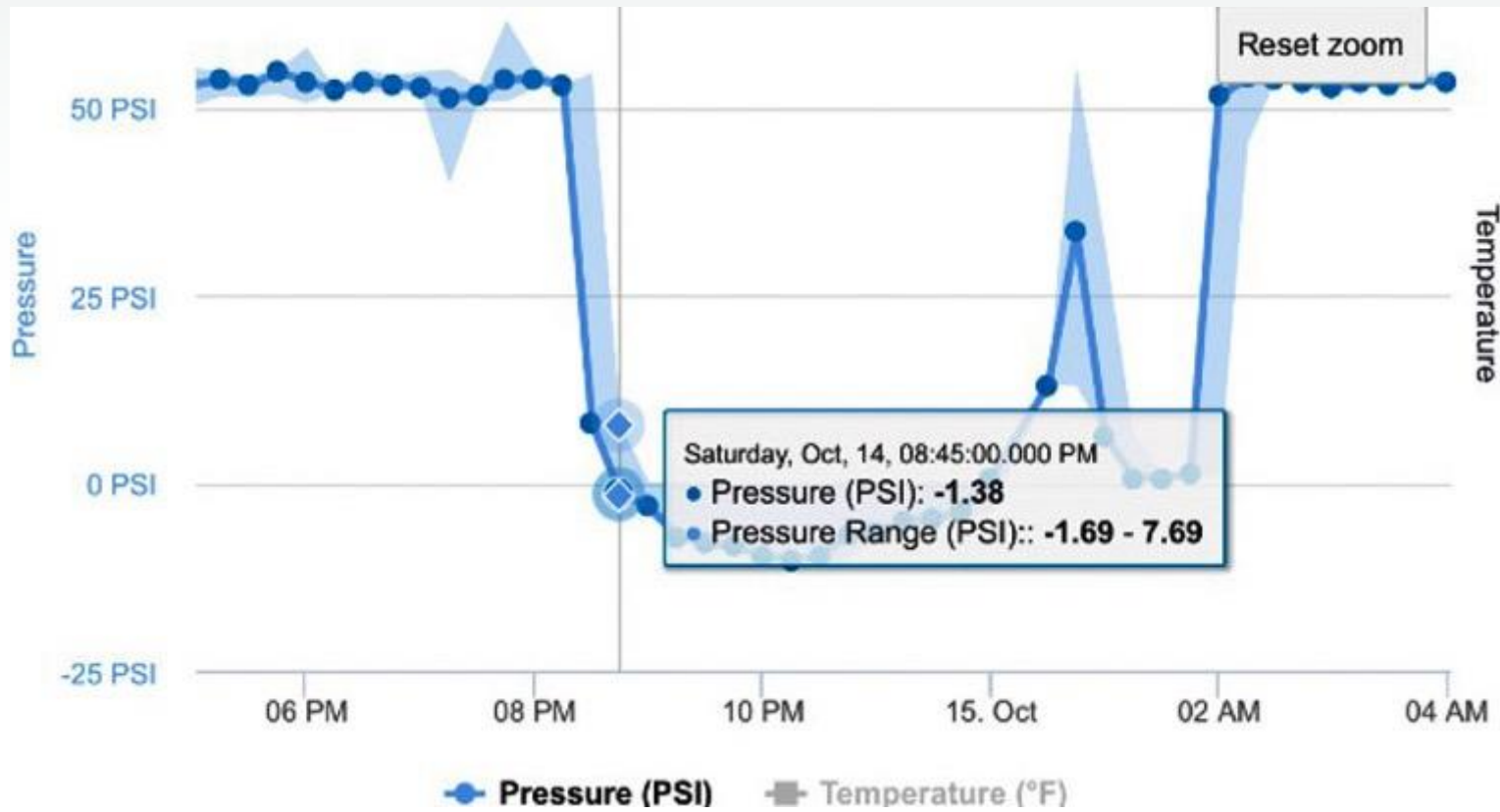
95 Circuit Ave

Pressure & Temperature Chart

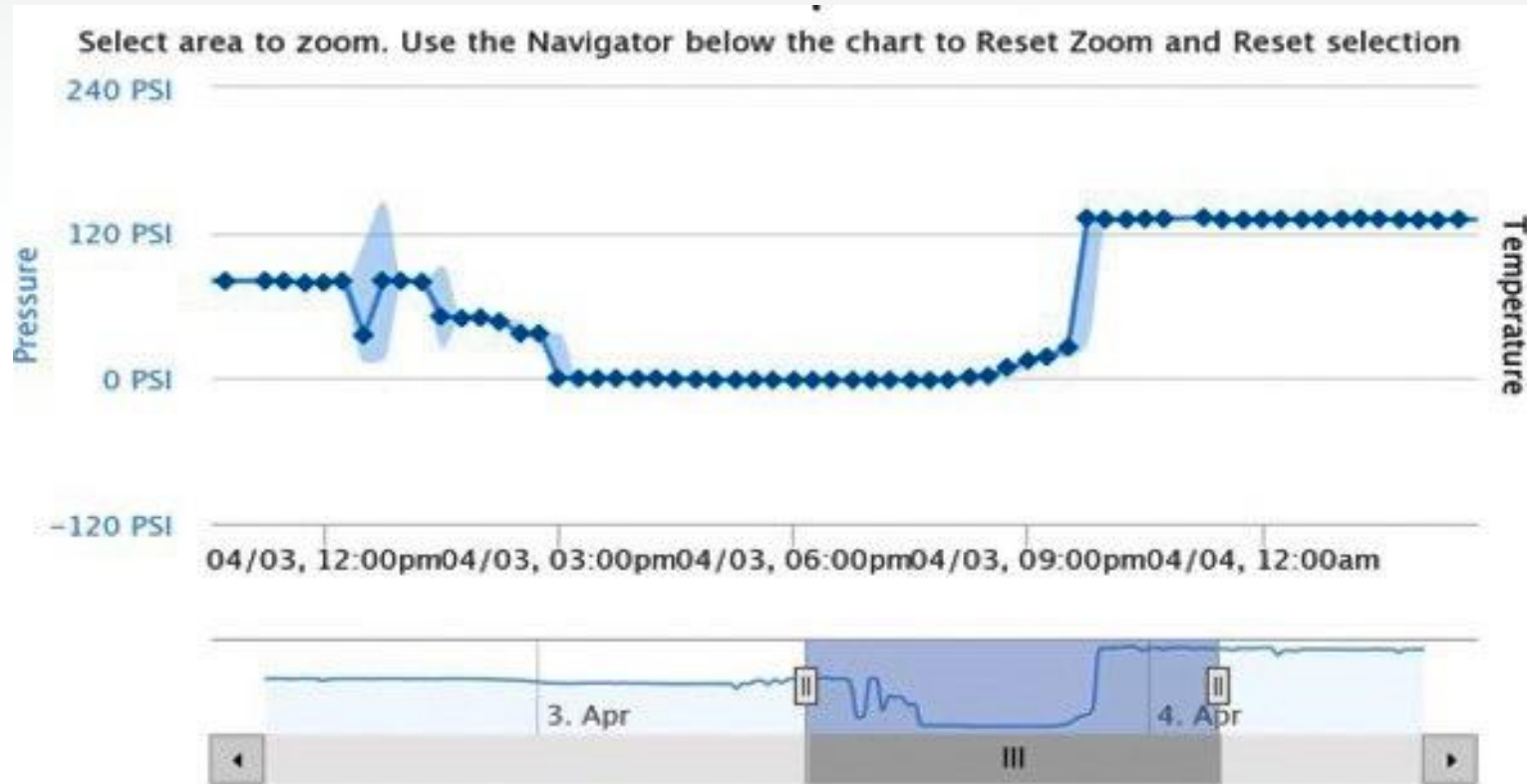
Select Duration: day(s). Custom Dates



San Francisco Main Break



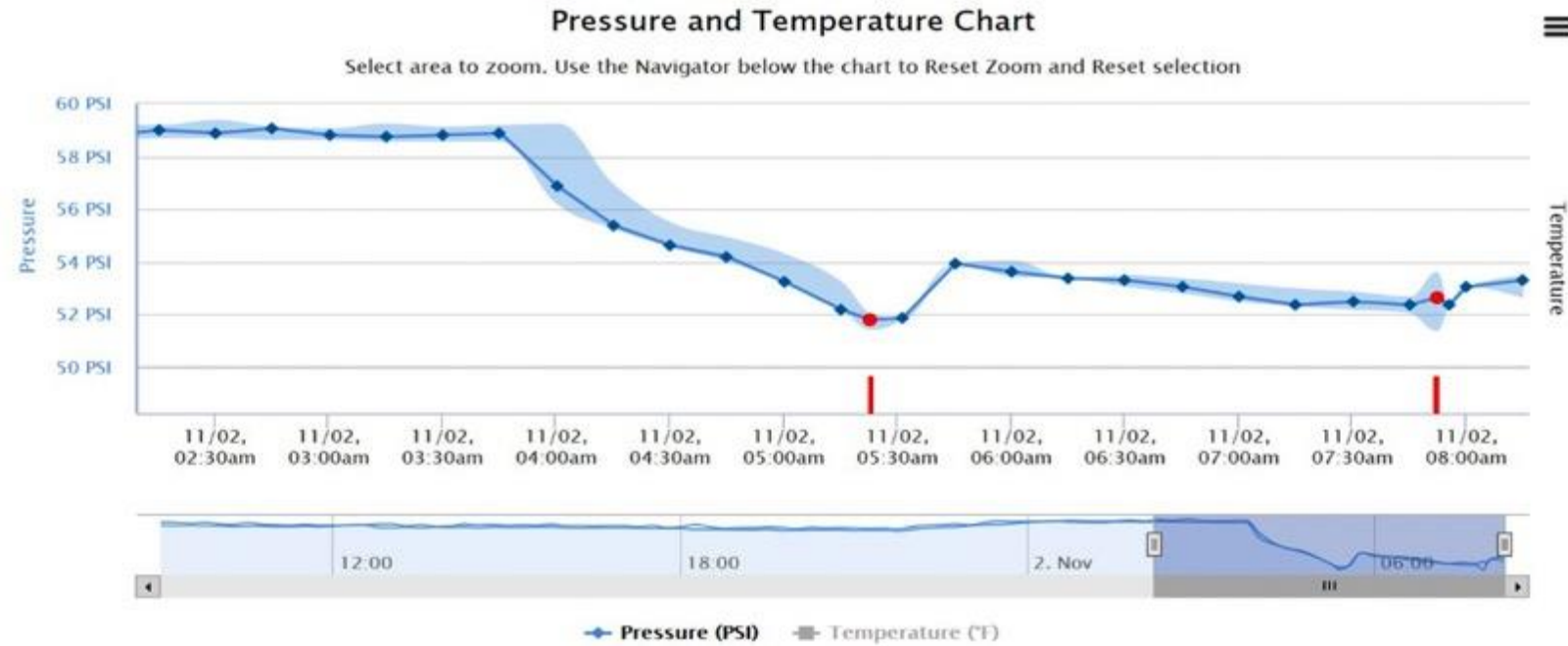
Faulty Pressure Reducing Valve



Indiana Main Break

Pressure & Temperature Chart

Select Duration: day(s). Custom Dates



iHYDRANT® | INSTALLATION

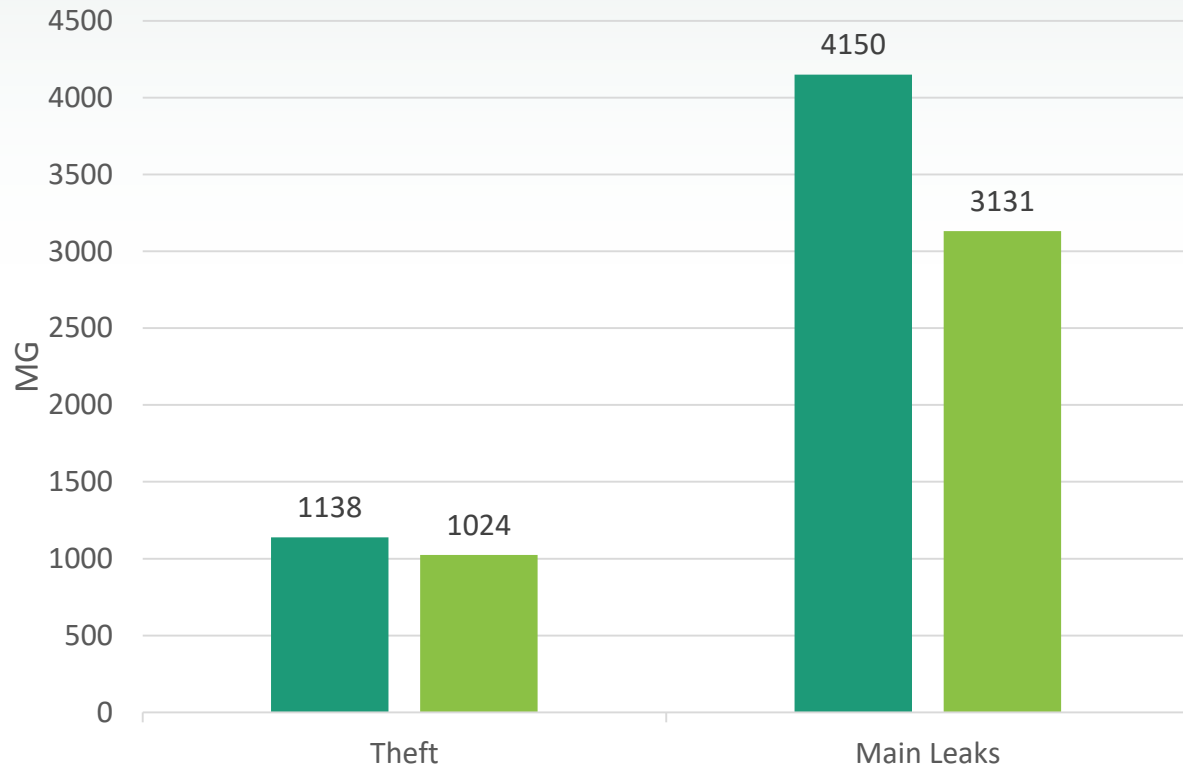


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Financial Savings

Water Loss Reduction

- City of Atlanta 29.4% water loss



Water Savings from Prevented Main Breaks

\$ 924,115

Water Loss Theft

\$ 315,067

Energy Savings Cost

\$ 204,034

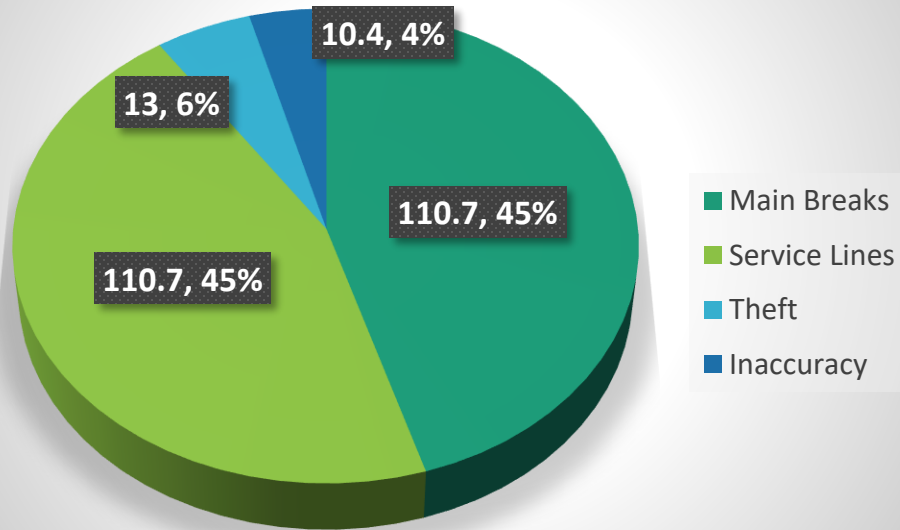
Total Cost Recoverable Losses per Year

\$ 1,443,217 million

10 year savings: \$11 Million

Water loss recovery

Water Loss in MG



Americus GA 28% water loss

Total supply	887.7 MG
Real Losses	221.4 MG
Apparent Losses	23.4 MG
Production cost	\$255.75 /MG

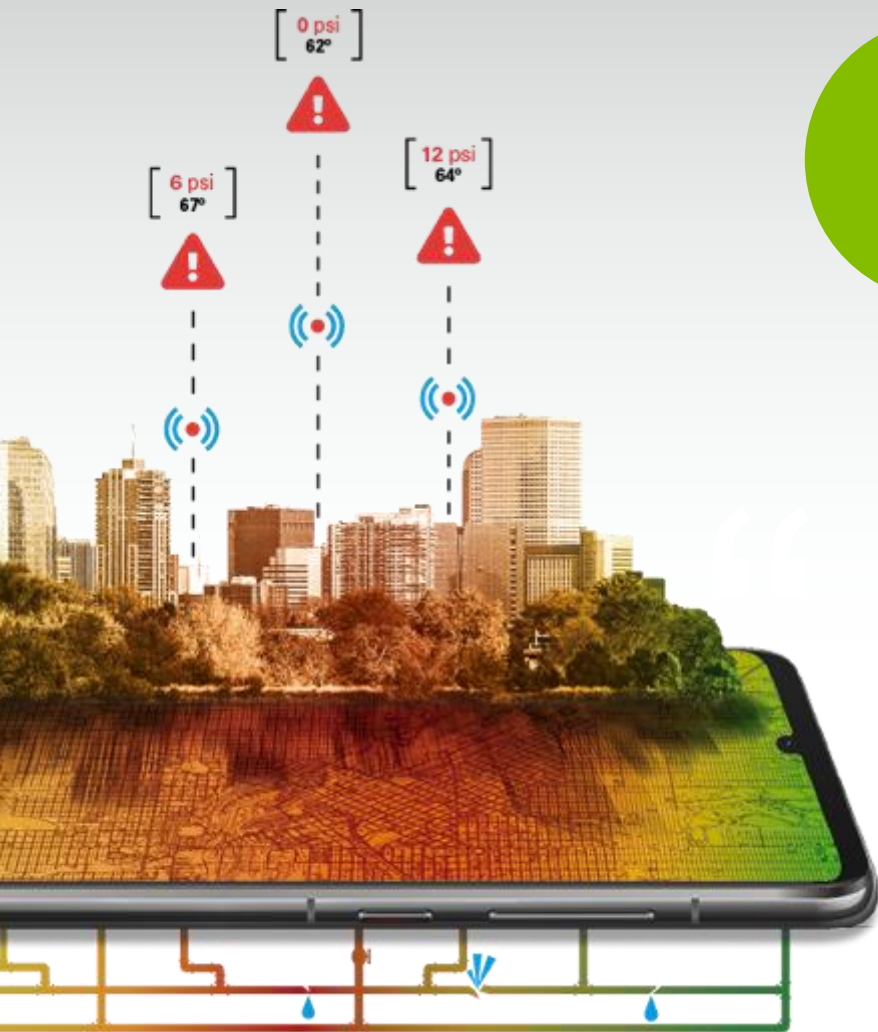
Real losses due to main breaks	$50\% \times 221.4 \times 255.75 = \28.3
Apparent losses due to theft	$10\% \times 23.4 \times 1000 \times 3.34 = 7.8$
Total Annual Savings	\$36.1K

12.5% recoverable of total supply



POWERFUL ANALYTICS.
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The iHydrant[®] Solution



About hydrant pressure sensors

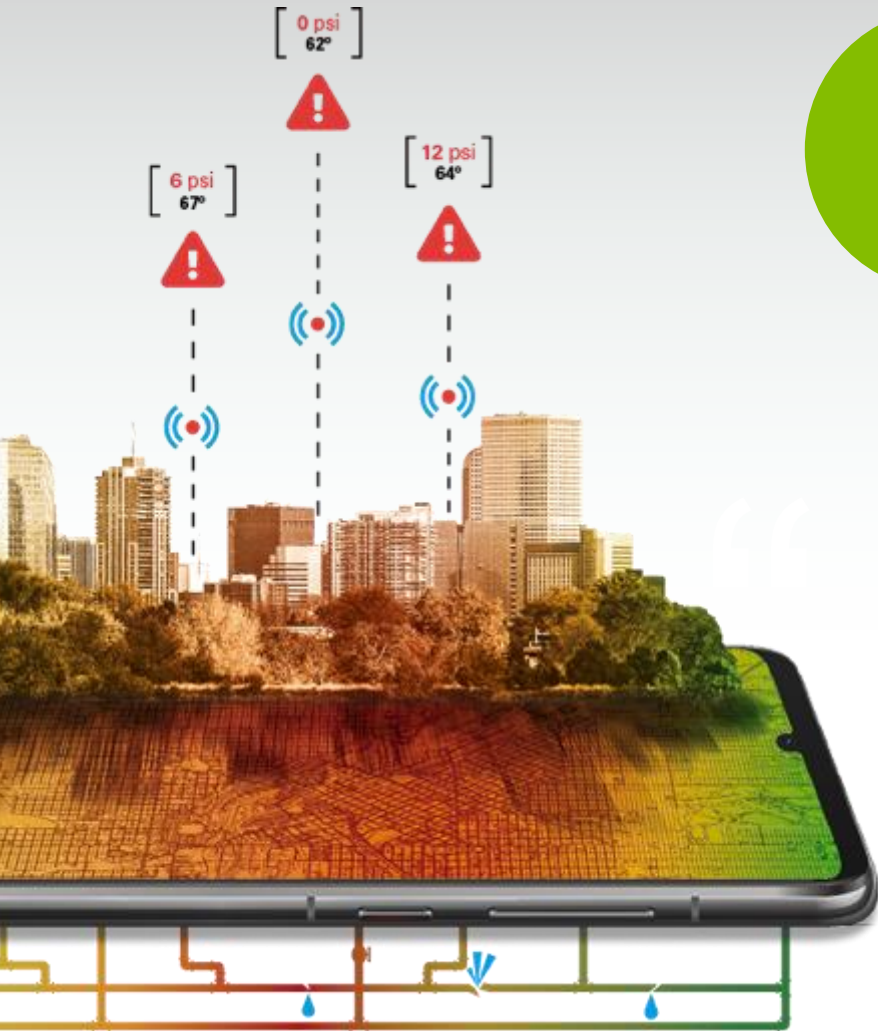
Hydrant pressure sensors reduces non-revenue water by providing powerful analytics and actionable insights.

Utilizing remote pressure, temperature and acoustic sensors, sensors provides accurate system data to promote operational optimization and the prevention of system failures and main breaks. Pressure sensors can pay for itself by preventing or alerting you in real time of water loss events.

iHydrant® sister companies include:



POWERFUL ANALYTICS.
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The iHydrant[®] Solution



Pressure & Temperature
Monitoring

Wet and Dry Barrel
Hydrants



Robust Software Interface

Real time event alerts
Operational management

The iHydrant[®] Advantage

- ▶ Battery access
- ▶ Electronics
- ▶ Future proof



The iHydrant[®] Advantage

▶ Mechanical

- ▶ Sensors located in lower valve plate (dry barrel)
 - ▶ Patented OEM design



UPPER AND LOWER ROD



COUPLING WITH PINS



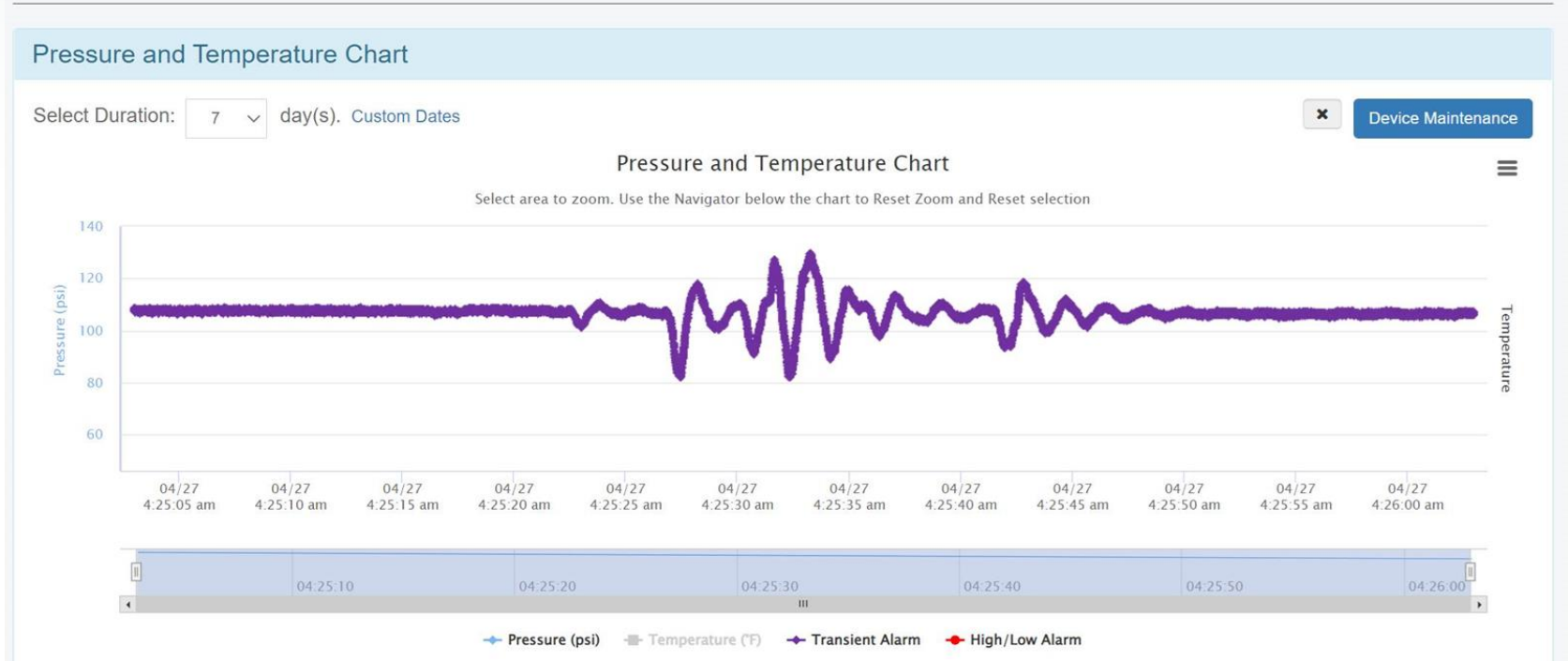
DRAIN VALVE ASSEMBLY

The iHydrant[®] Advantage

▶ Transient Detection

- ▶ High Sample rate
- ▶ Data captured pre and post event – 30 sec pre/post

150 Frank Lewis Dr



Pressure Sensor Key Differences

▶ Maintenance

- ▶ Battery access
- ▶ Additional batteries (daisy chain)

▶ Access Points

- ▶ No digging or tapping
- ▶ No depth limitation
- ▶ Utilizes distribution system components

- ▶ Existing hydrants

▶ Mechanical

- ▶ Sensors in lower valve
- ▶ Normal hydrant operation
 - ▶ No impact to fire department or operations
 - ▶ No reduction in flow
 - ▶ Patented OEM design

Pressure Sensor Key Differences

- ▶ Accuracy
 - ▶ iHydrant +/- 1%
- ▶ Certifications
 - ▶ ULFM and NSF
- ▶ Alerts
 - ▶ 24/7 alerts via text or email
- ▶ Transient Detection
 - ▶ Samples up to 256 times per second
 - ▶ Data captured pre and post event
- ▶ Data Backhaul
 - ▶ Zero infrastructure required
 - ▶ iHydrant CAT M1
 - ▶ Verizon & AT&T
 - ▶ Bluetooth direct from device
- ▶ Expandability
 - ▶ Leak detection (coming out of Beta phase now)
 - ▶ Future technology

Why measure pressure?

- **Is my system operating at optimal levels?**
- **Too High:** Increased leaks and water loss, pipe breaks, excavation, property damage and potential liability, excessive pumping
- **Too Low:** Increased customer complaints, state mandated minimum PSI, may indicate blockages, reduced revenue, may allow backflow

Why measure temperature?

- **Prevent damage from freezing**
- **Too Warm:** May indicate accelerated disinfectant breakdown and conditions for bacterial growth
- **Too Cold:** Warns when pipes are about to freeze: expensive repairs; thermal shrinkage causes leakage when cold joints open up; plastic pipe is more brittle when cold

Why measure in hydrants?

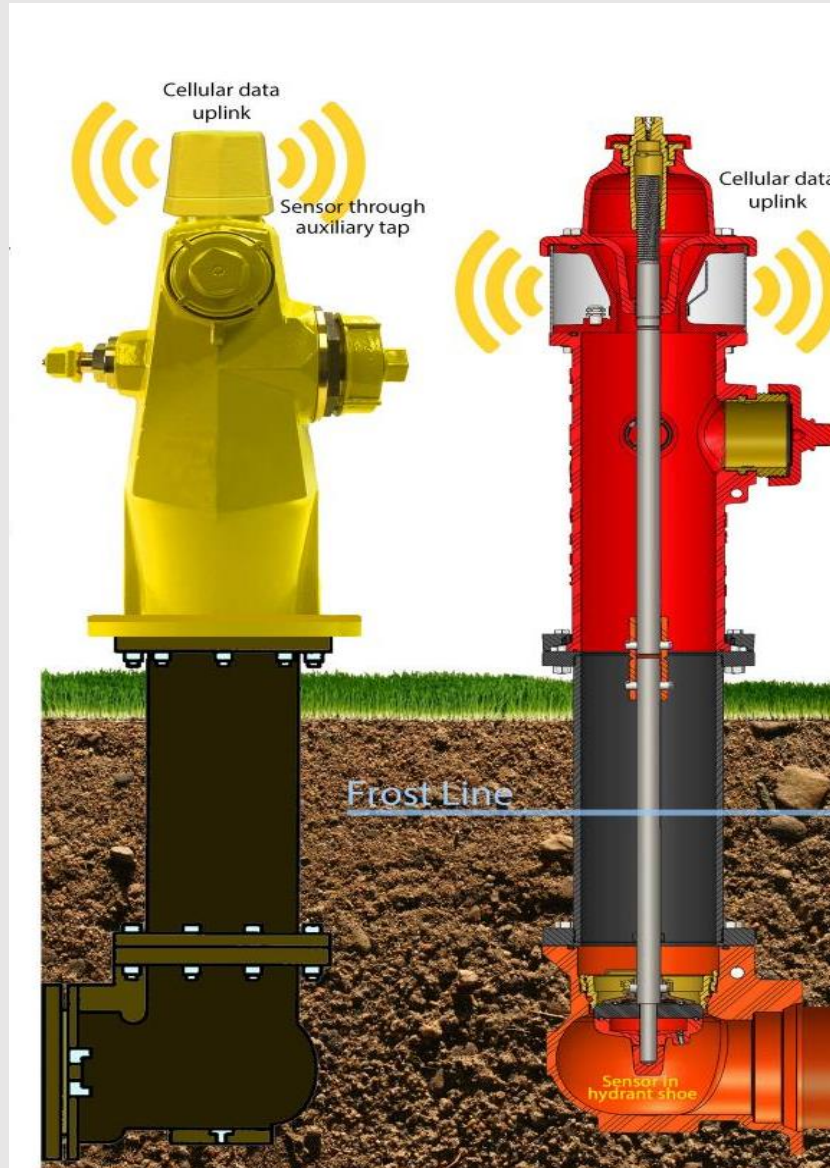
- **Evenly Distributed:** Thereby providing a representative sampling of data across the water system, especially near distribution end points (e.g. residential subdivisions)
- **Easily Accessible:** Above ground, easy to retrofit with technology and good for cellular communications

Why monitor over time?

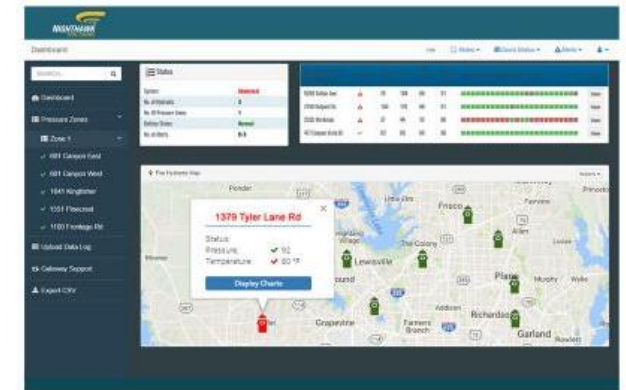
- **Identify Intermittent Conditions:** Recognize patterns of pressure variations which may be unduly straining the system, causing excessive pumping and related wasteful costs
- **Reduce Potential Damage:** Historical data can be used to reduce water loss, pipe breaks, and energy use

Intelligent Hydrant Solutions

Remote Pressure & Temperature Monitoring



Cloud-based head-end system



Optimizing pressure results in reduced leaks, fewer customer complaints, less energy use and lower water loss



Remote monitoring provides valuable insight, automates data collection, enhances SCADA systems and saves utilities time and money

If you cannot measure it, you cannot improve it

Installation Examples



iHYDRANT® | INSTALLATION, NY



iHYDRANT® | INSTALLATION, OR



iHYDRANT® | CUTAWAY VIEW

iHydrant Compatibility

Clow Medallion & Wet Barrel



M&H 129, 129S



Kennedy Guardian K81, K81DD



Mobile Compatibility

Compatible on desktop, laptop, tablet or mobile device

The desktop dashboard displays the following information:

- System Status:** System: **Warning**
- Hydrants Summary:**
 - No. of Hydrants: 26
 - No. of Pressure Zones: 5
 - Battery Status: **Good**
 - No. of Alerts: 2
 - Read Success Rate: 96%
- Pinned Fire Hydrants Table:**

Address	Status	Low PSI	Hi PSI	Low Temp
1 NE 12th St	✓	81	104	45
1253 Northwest Canal Boulevard	✓	74	92	55
1956 Southwest 42nd Street	✓	54	65	34
2844 Southwest Cascade Vista Drive	✓	38	64	46
2921 Northwest 19th Street	✓	101	122	46
655 Northwest Jackie Avenue	✓	76	92	52
- Fire Hydrants Map:** A map view showing hydrant locations with a search bar and map controls.

The mobile application interface is shown on two smartphones. The left phone displays a summary view with the following data:

- System Status:** System: **Normal**
- Summary Metrics:**
 - No. of Hydrants: 11
 - No. of Pressure Zones: 1
 - Battery Status: **Good**
 - No. of Alerts: 0
 - Read Success Rate: 100%
- Pinned Fire Hydrants Table:**

Address	Status	Low PSI	Hi PSI	Low Temp	High Temp	System Per
356 Rockaway Boulevard Northeast	✓	67	122	66	72	■■■■
Ark Rd and Viga Rd	✓	56	57	46	46	■■■■
Tierra del oro	✓	69	78	54	55	■■■■

The right phone displays a detailed view of the hydrant data table and a map of the area.

| Hosted Software

Reply Reply All Forward

Mon 4/1/2019 12:10 PM

A admin <administrator@nighthawkcontrol.com>

iHydrant Alert : Min. Pressure 39.81 PSI at Walnut St and No Noyack Rd

To: Brett Johnson; brett.johnson@ihydrant.com; Tom Bohrer; tom.bohrer@ihydrant.com; Wayne Young

Retention Policy: Default Email Retention - Transition (6 months) Expires: 9/28/2019

CAUTION: This email originated from outside of the organization.

Subject of alert: Minimum pressure at specific hydrant location

Alert : Low Pressure Type of alert: Low pressure

Pressure Range: 39.81 PSI - 70.19 PSI

Location : Walnut St and No Noyack Rd Location of Alert

IMEI : 89148000003839875320

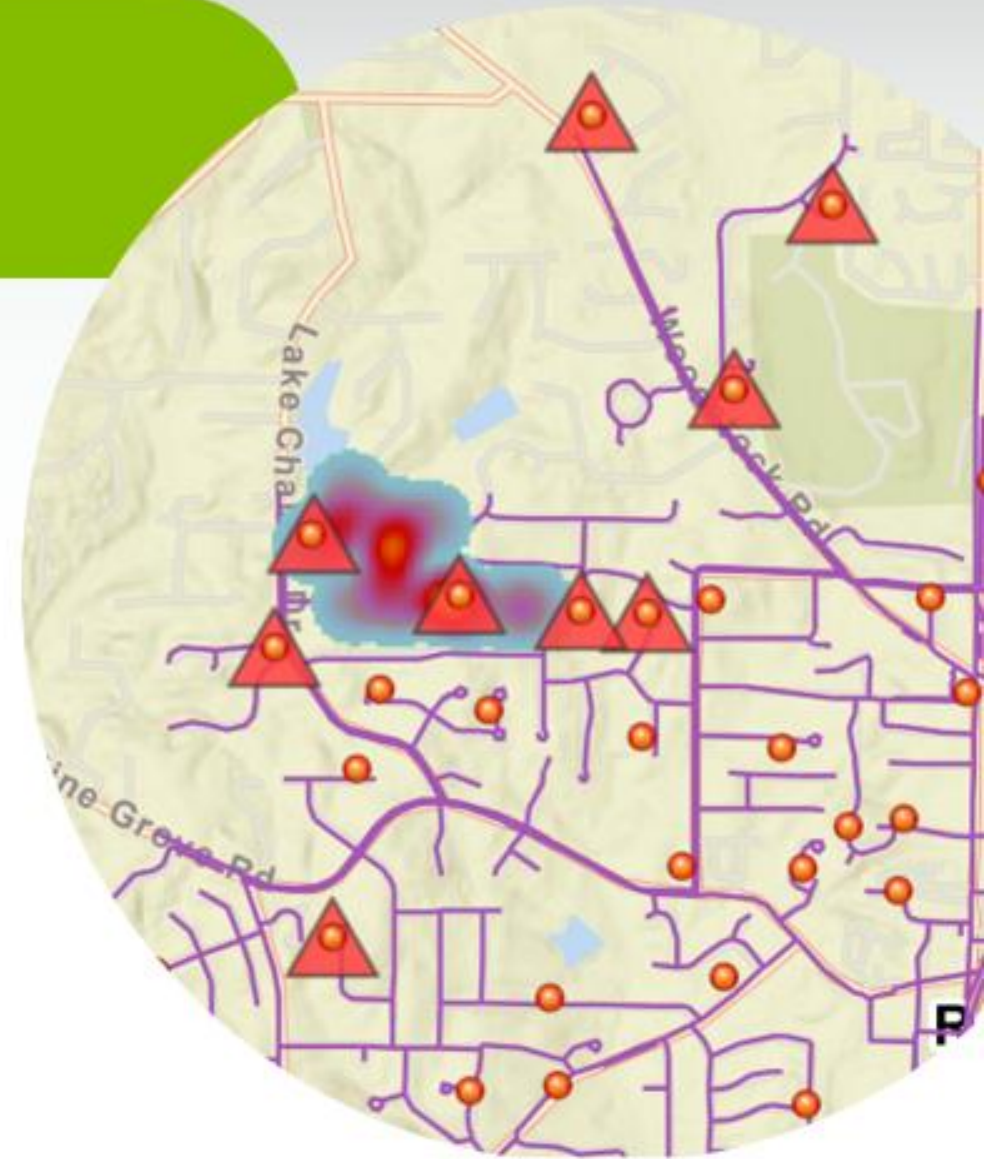
Time : Apr 1 2019 4:09PM (UTC) / Apr 1 2019 9:09AM (PST) Time of Alert

Action Required.

Email Alert

Damaged Hydrant March 2022

- Leak Started at 11:20 am
- Pressure Devices Sent First Alert at 11:28 am
- Arrived on site at 11:40 am.
- Estimated Water Loss – 425,778 Gallons (\$3,000)
- \$7632 Billed to the Contractor for Damages
- Heat Map Triangulated Area Where Leak Occurred



Data Availability

- ▶ Utility has complete access to data
- ▶ API
 - ▶ Import into SCADA or any other software platform
- ▶ FTP
 - ▶ Flat file upload



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Acoustic Leak Detection



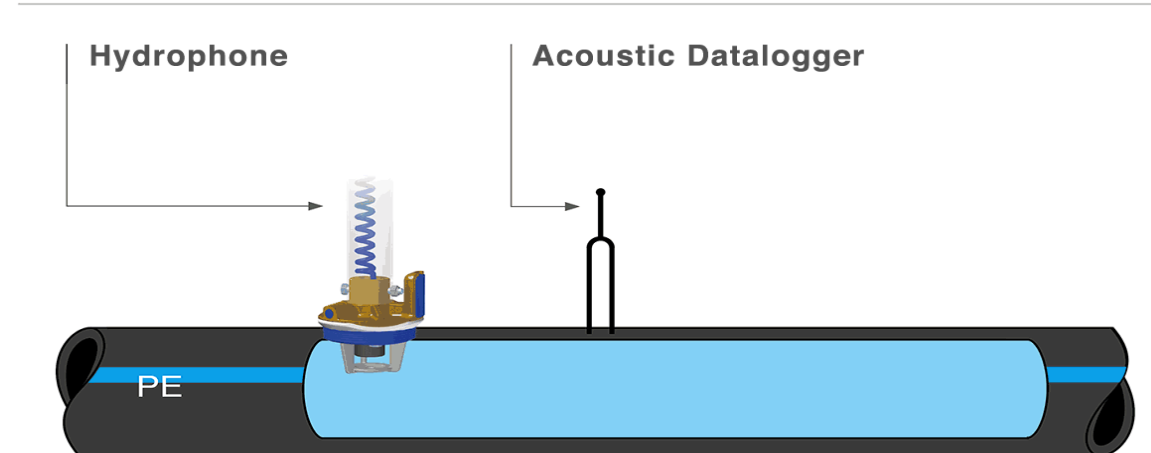
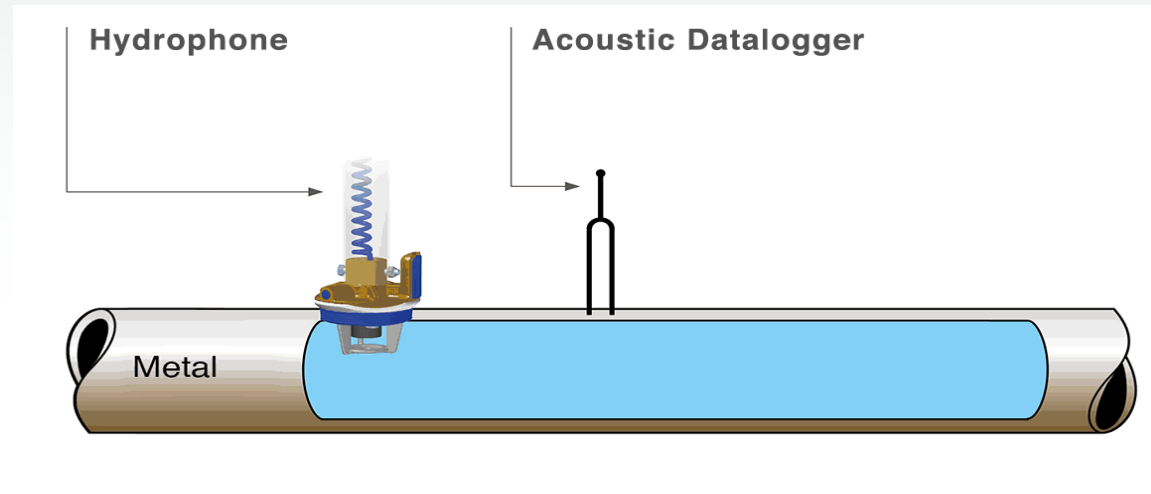
Full Time Acoustic Leak Monitoring

Pinpointing leaks before they become costly

The hydrant sensor active leak detection system finds leaks down to 1 gpm throughout your distribution system.

- ▶ Correlate Pinhole leaks before they rupture
- ▶ Repair your distribution lines on your schedule
- ▶ Minimize impact on your customers and your budget
- ▶ Avoid mass road and property damage

Leak Detection Methods





Hydrophone

Noted capabilities:

- ▶ More sensitive than acoustic
- ▶ Works on metal and plastic pipe
- ▶ Diameters up to 24"
- ▶ Currently in testing

ROI Opportunities

▶ Water mains

- ▶ Reduce main breaks due to water hammer and defective valves

▶ Water loss

- ▶ Reduce water loss by decreasing response times
- ▶ Less reliance on customer complaints to identify leaks

▶ Contracts

- ▶ Eliminate annual engineering contracts

▶ Reduction in road and property damage

▶ Disaster recovery

- ▶ Emergency response plan and risk and resiliency assessment

| Utility Deployment Strategies

- **1 of every 20 hydrants**
Sensor recommendation
- Pressure zones
Multiple units throughout zones
- Areas of known pipe issues
or hard to reach areas

Specifications at your discretion

Allows for contractors/developers to pay for your infrastructure of pressure/temperature monitoring

Spend as part of Capital Budget when ordering hydrants

Major areas of concerns

Transmission lines under highways, etc.



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Thank you.

Ben Knoth | Field Services Engineer MW USA

Ben.Knoth@nighthawkcontrol.com

513-869-8488



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