



# Pressure Loss Case Study

A large, light blue background image showing concentric ripples in water, with a single water droplet suspended in the center, creating a focal point for the text below.

**May 7, 2014**

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## Today's presentation:

- **Recent pressure loss incidents at TVWD**
- **The Bridle Hills pressure loss event**
- **Lessons learned and corrective measures**





### 2007 - Bonny Slope flushing

- Crews were performing routine mainline flushing.
- An isolation valve on a 24" transmission line had previously been closed, but this was unknown to the crew.
- Customer service staff began receiving "low pressure" and "no water" calls.
- Incident Command System was established to coordinate response.
- Cause of incident was discovered, boundaries of affected area were established, Oregon Health Authority was notified, and "Boil Water" notices were issued.



### 2007 - Bonny Slope flushing

- Individual door hangers advising approximately 300 customers to boil their water were distributed.
- Concurrently, additional crews were dispatched to restore system pressure and flush the area.
- Distribution system was re-pressurized and chlorine residuals checked. Bottled water was distributed to affected customers.
- Water quality samples were collected and delivered to the lab.
- Sample results were confirmed as negative for contaminants and “Boil Water” order was lifted the following day.

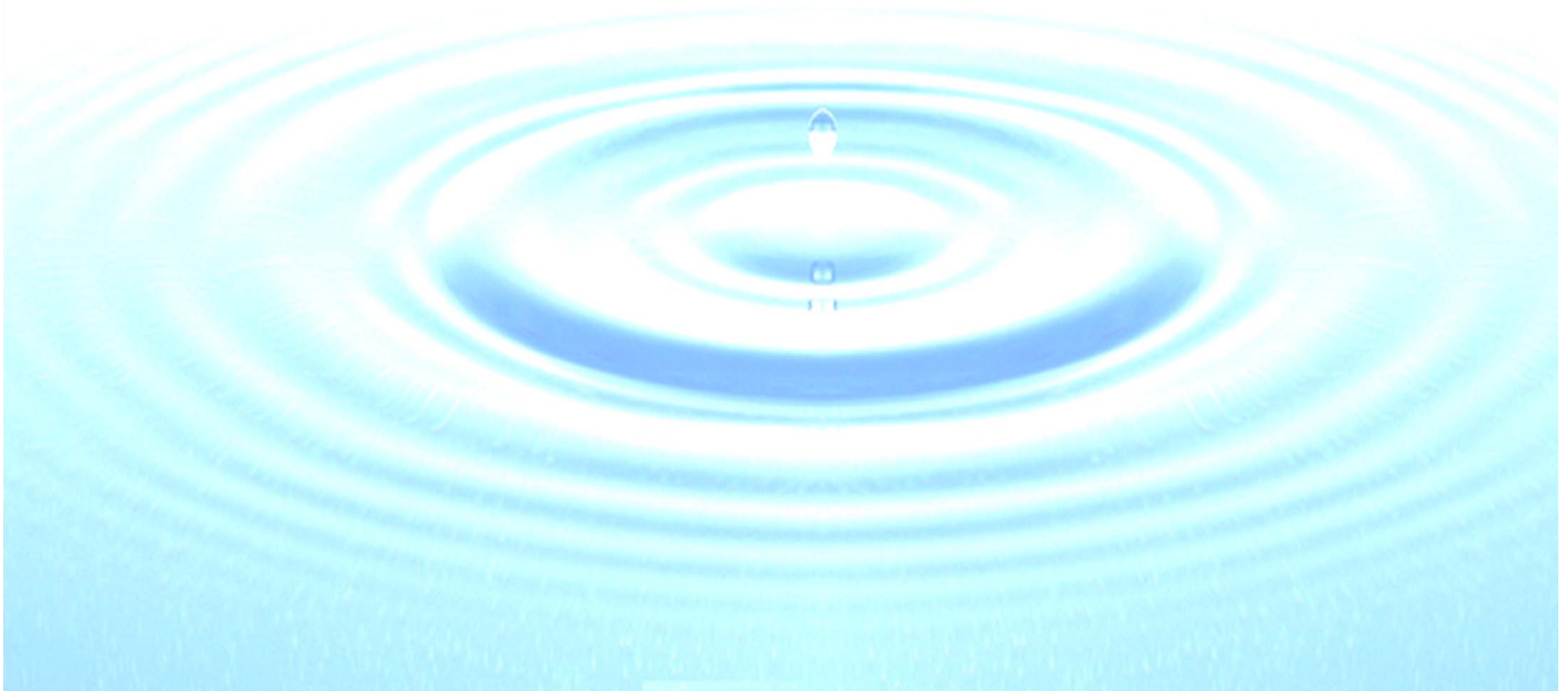


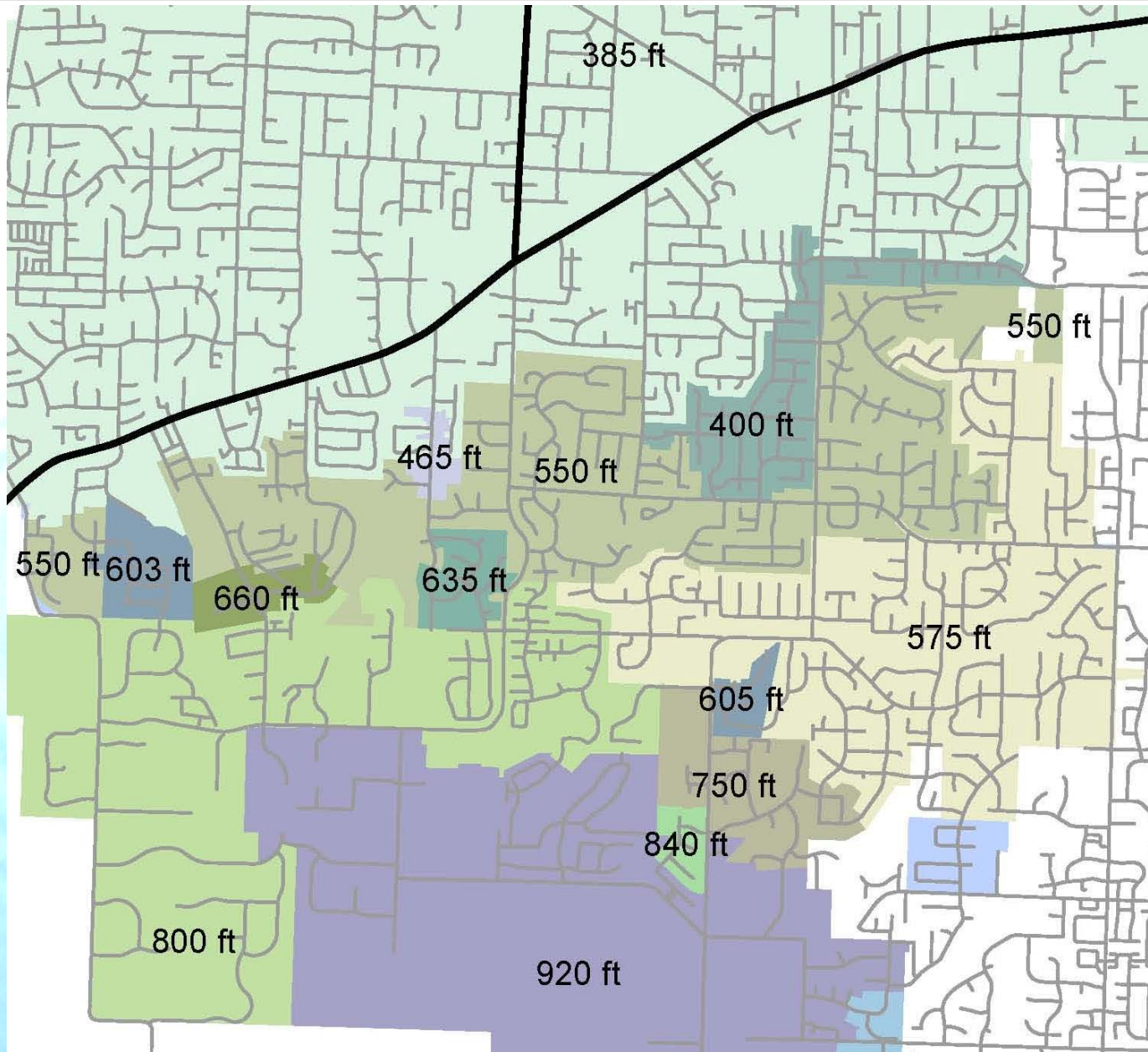
### 2013 – Valley View reservoir draining

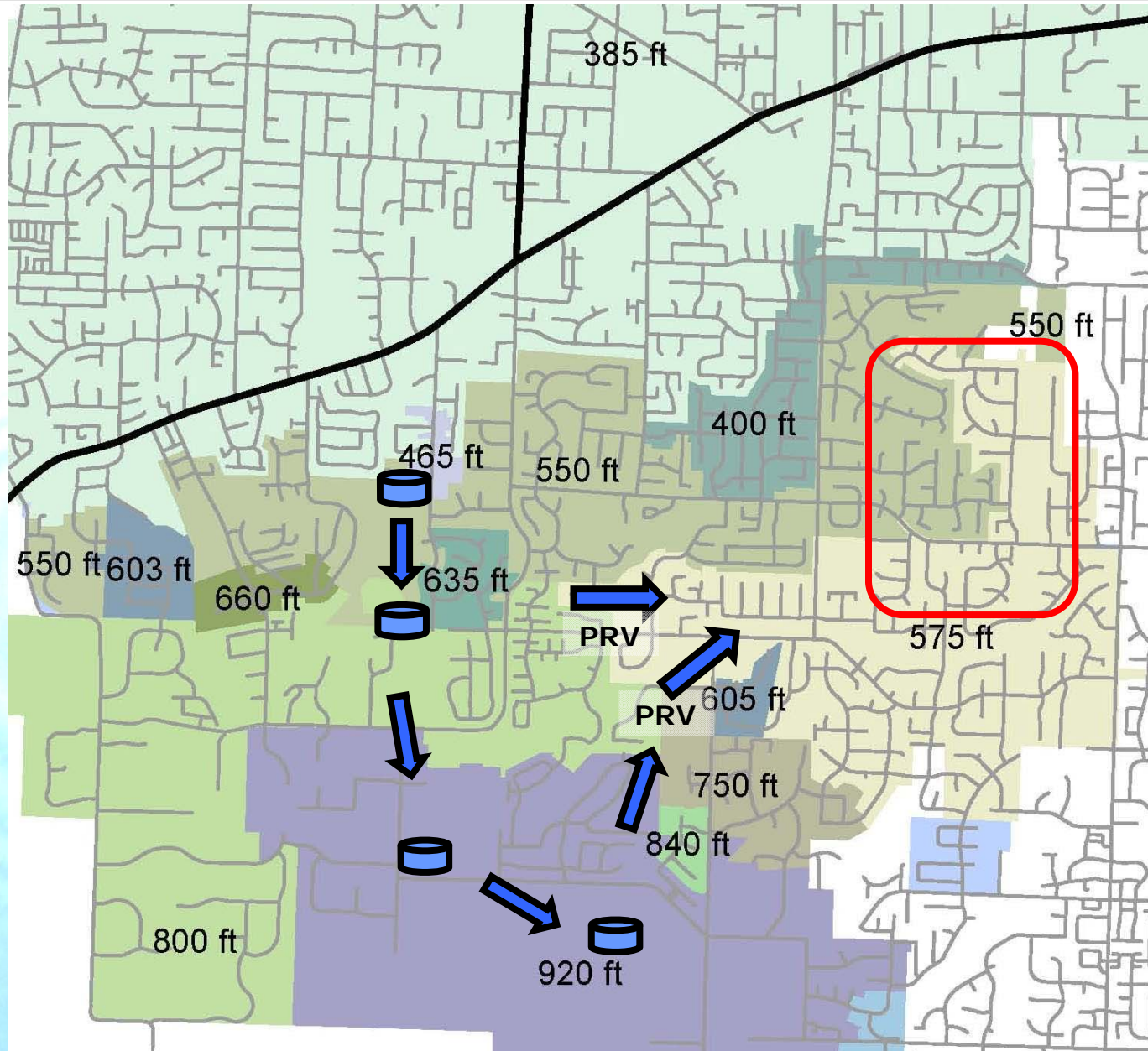
- Customer service received “low pressure” and “no water” calls.
- Field crews responded and confirmed loss of pressure.
- SCADA malfunction incorrectly showed normal water level in the reservoir but it was completely drained.
- Boundaries of affected area were determined using system pressure data, reservoir drawdown data, and customer calls.
- 32 affected customers were advised to boil water and system was re-pressurized and tested. All WQ test results were negative.
- SCADA system was improved to prevent future issues.



## 2013 – Bridle Hills pressure loss event









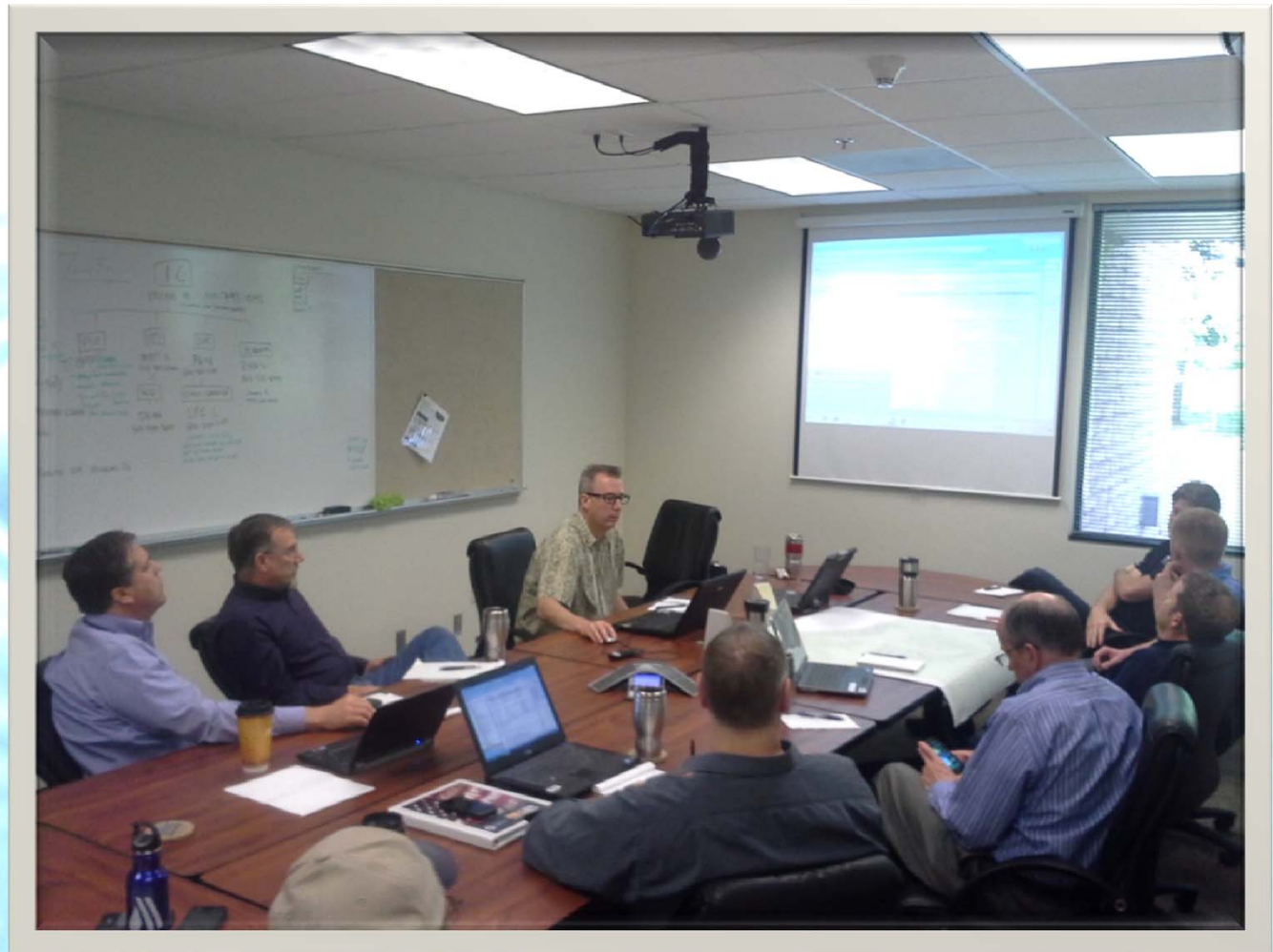
*Friday afternoon, November 22, 2013*

- 1. SCADA detected low pressure on pressure regulating valve and sent an alarm. Distribution crew responded and found high flows through PRV.**
- 2. Customer service received “low pressure” and “no water” calls. Field Customer Service responded and confirmed loss of pressure.**
- 3. Customer service received reports of a main break. FCS left “low pressure” investigation and responded to the main break.**

Recognizing that a complex situation was developing, staff implemented the Incident Command System and established an Emergency Operations Center.

Key staff:

- GIS
- Field Operations
- Engineering
- Water Quality
- Management



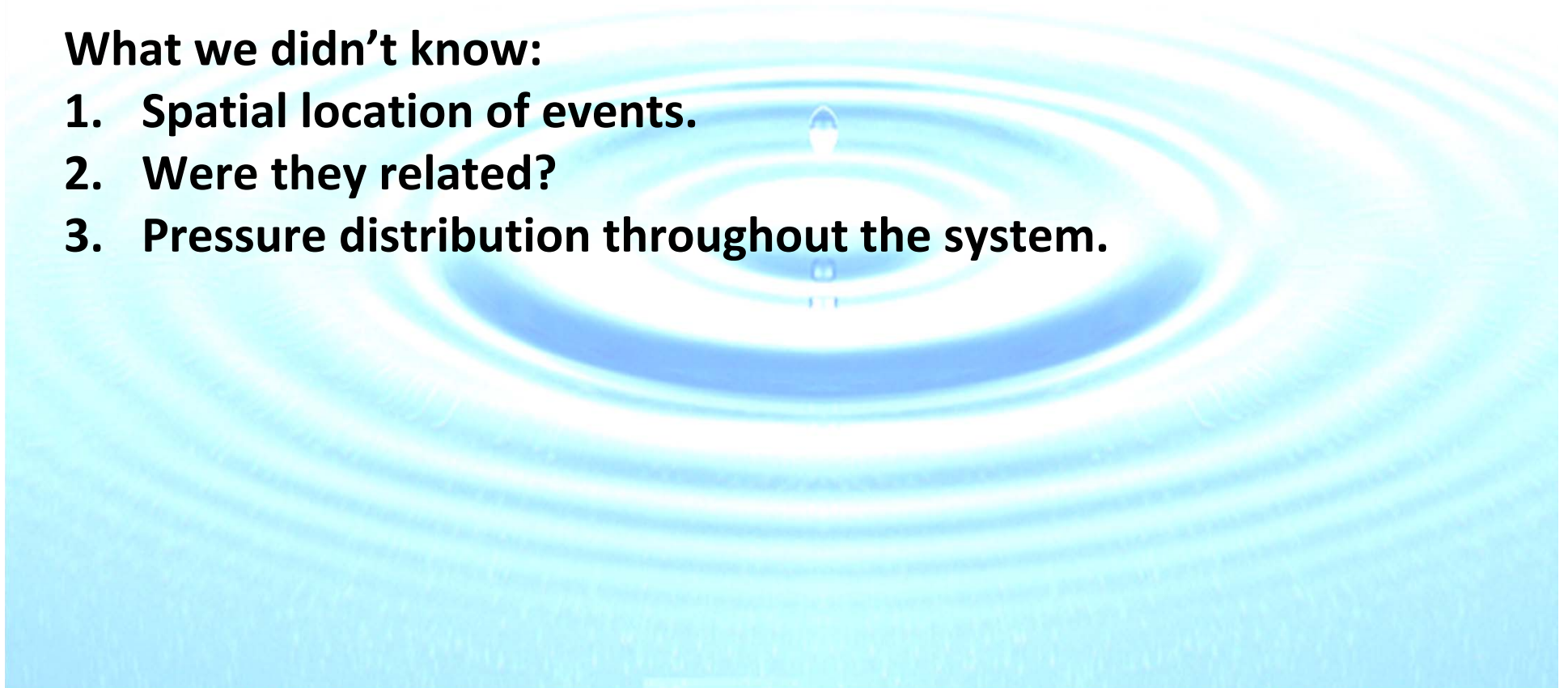


## What we knew initially:

1. High flows and low downstream pressure at 2 PRVs.
2. Active main break.
3. Customers were out of water.

## What we didn't know:

1. Spatial location of events.
2. Were they related?
3. Pressure distribution throughout the system.





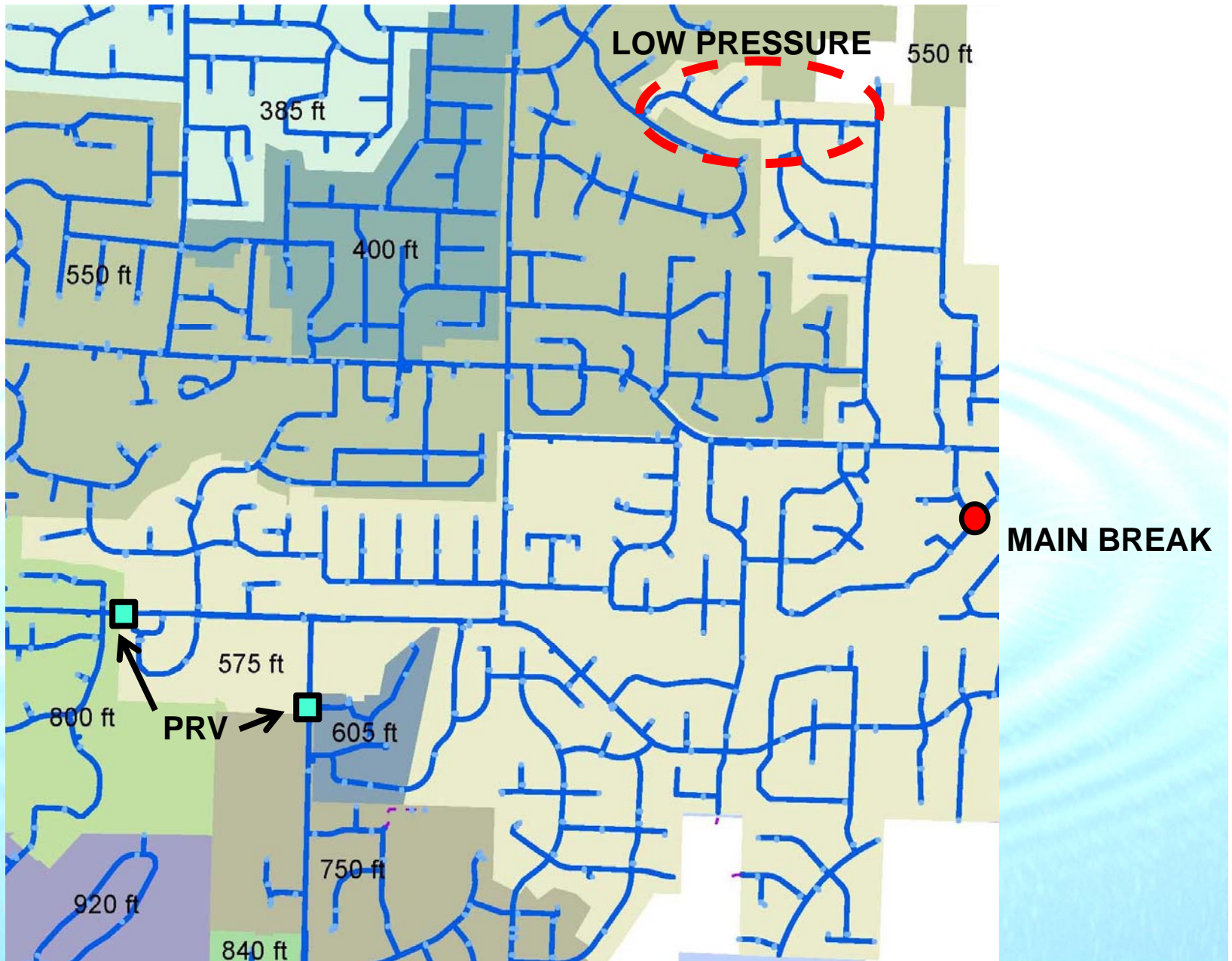
**GIS mapping was crucial to determining the size and scope of the event. GIS showed us:**

- **The spatial location of our information points**
- **How water normally moved through the system**
- **This was a single event (main break) with wide-reaching effects**



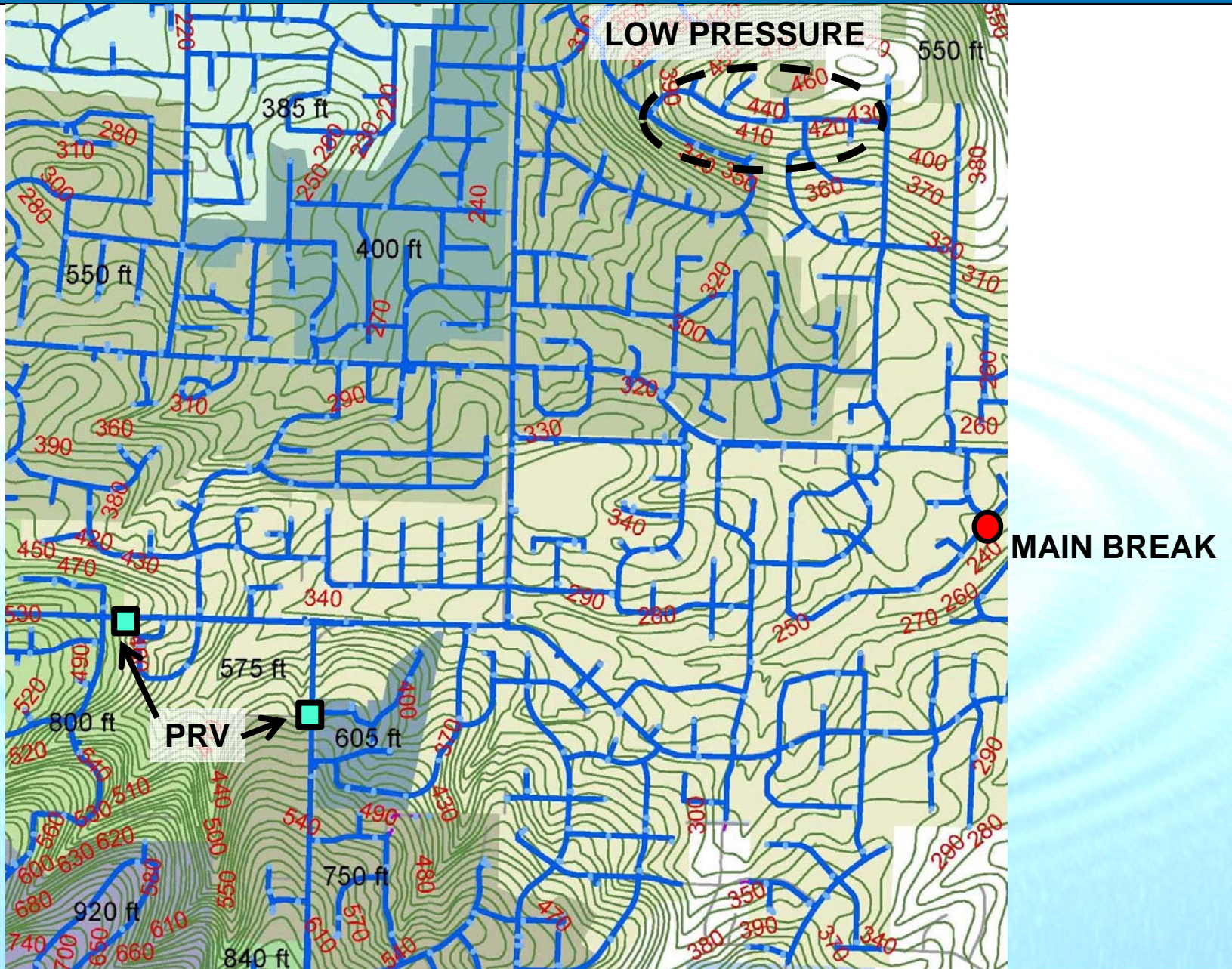


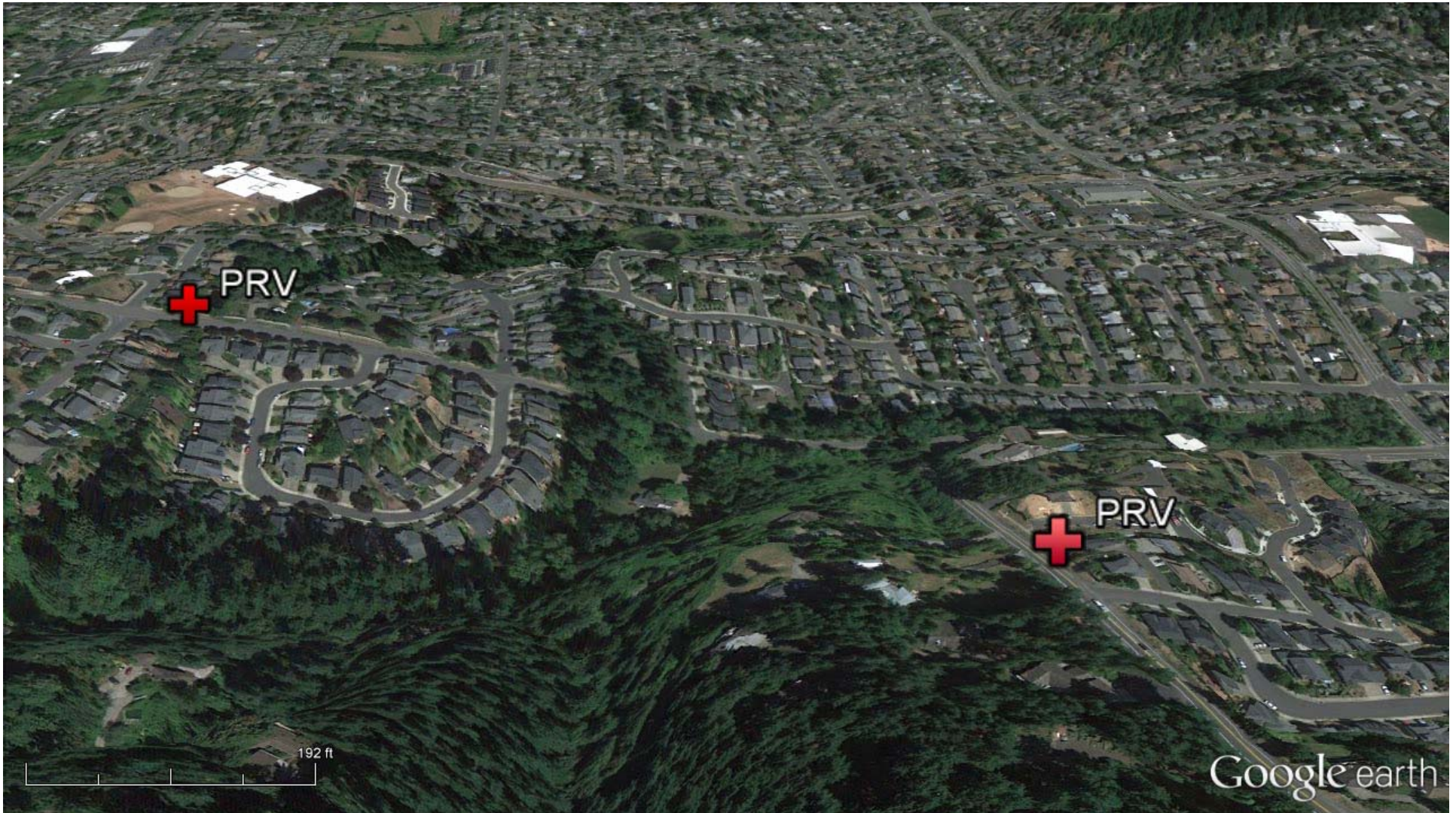
# Bridle Hills pressure loss event





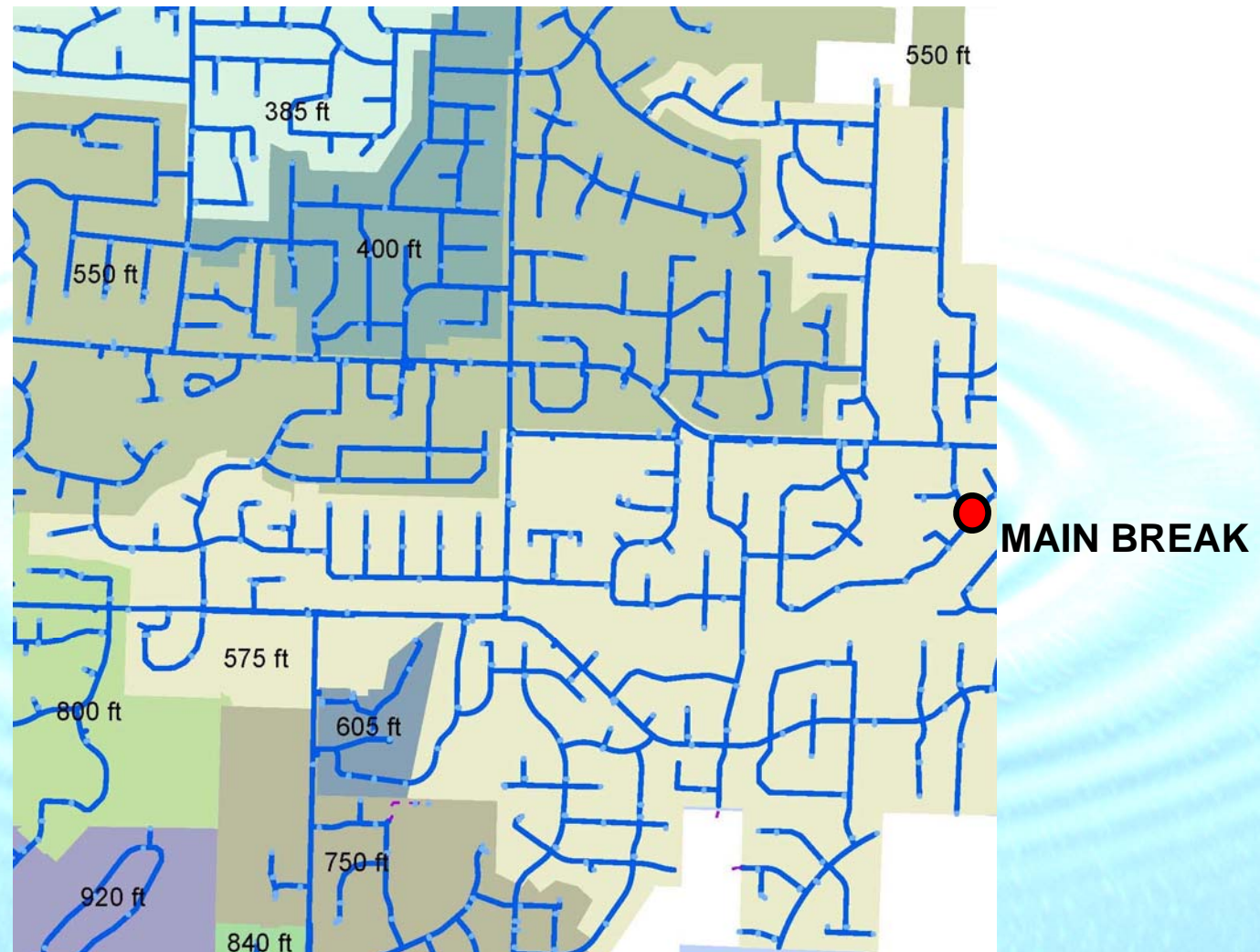
# Bridle Hills pressure loss event





## Corrective measures

### 1. Isolate the main break





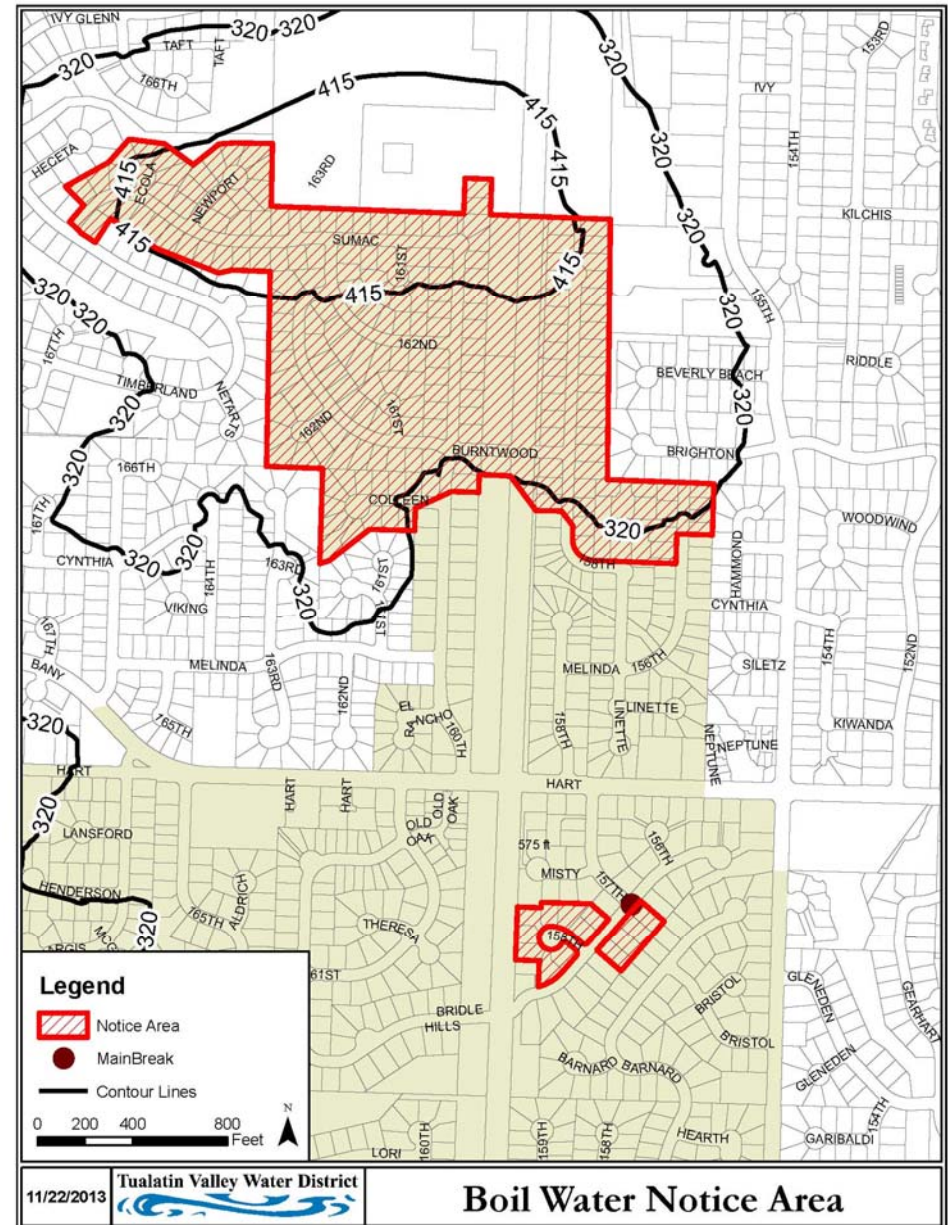


With system pressure restored, we then had to determine which parts of the system had lost pressure.

Again, we had:

- Customer reports
- PSI at PRVs
- GIS data

- “No water” calls were all above elevation 415
- Downstream pressures at PRVs remained above HGL of 535
- Normal HGL was 575





## Notification of customers

- **Coordination with state officials at OHA Drinking Water Program**
- **Addresses of customers (GIS)**
- **Door hangers for 199 homes**
  - **Messaging for field staff**
  - **Messaging for customers who call in for more information**
- **How to “unring the bell” and notify customers that water is safe?**
  - **Timing of water quality samples**

## Final resolution

- Mainline repairs were completed.
- WQ samples taken near main break and in upper elevations.
- Sample results were negative for contamination.
- Customer notification door hangers included an “all clear” time.



## Lessons Learned:

- SCADA and GIS are invaluable tools.
- Information is good, more information is better.
- Location and nature of customer calls are critical.
- Incident Command System – practice, practice, practice!
- Communication and situational awareness are crucial.
- Redundancy in the distribution system is critical.
- Events can and will occur regardless of your readiness.



## Changes for the future:

- Implementation of CMMS and integration of other systems.
- Additional SCADA sensors on critical infrastructure.
- Additional training on ICS and emergency procedures.

**QUESTIONS?**

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