

Post-fire Water Quality Investigation

March 27, 2018

Joint City Council and Board of Public Utilities Meeting

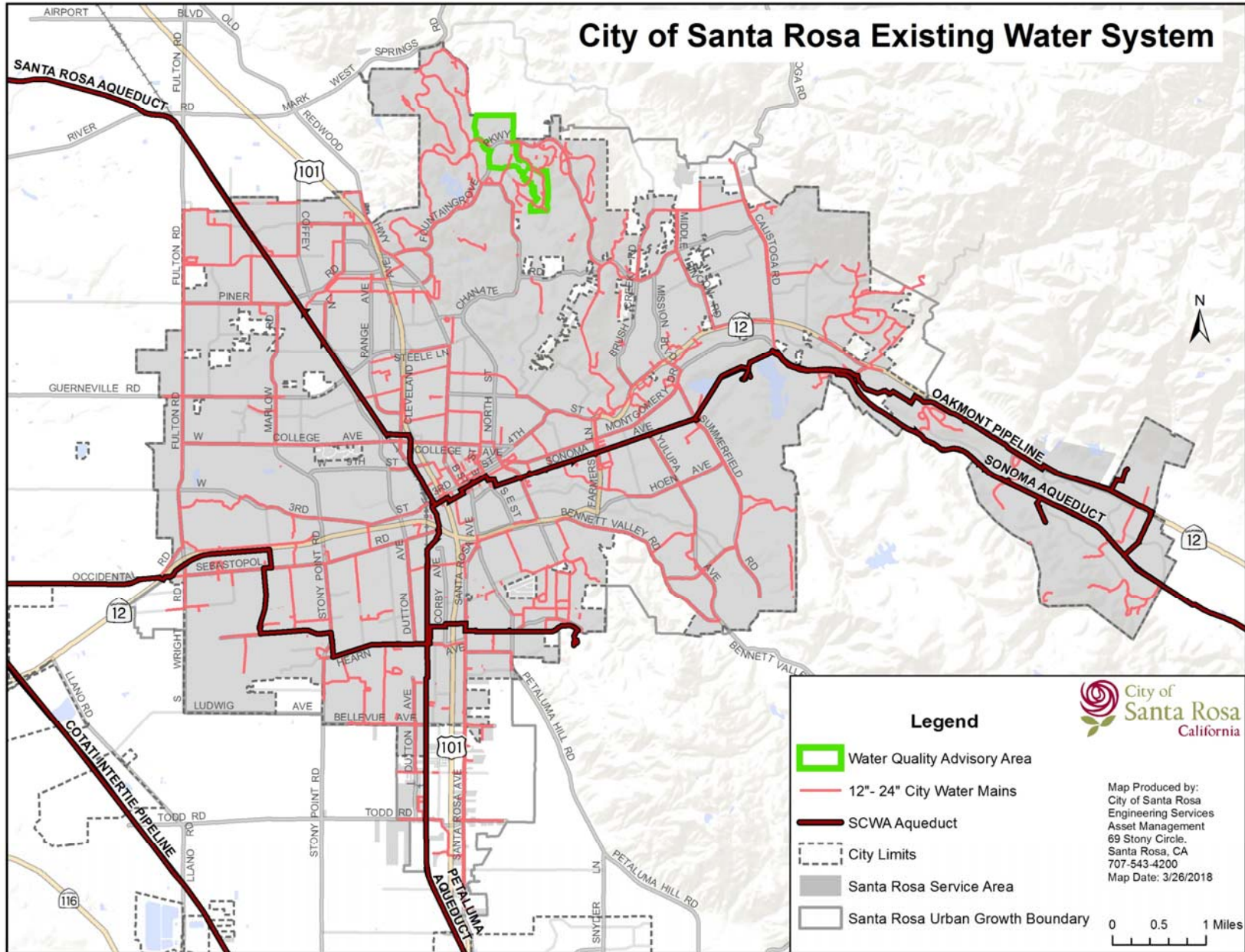


OUR FUTURE IN EVERY DRÔP

Overview

- Background
- Investigation
- Repair/Funding
- Next Steps

City of Santa Rosa Existing Water System

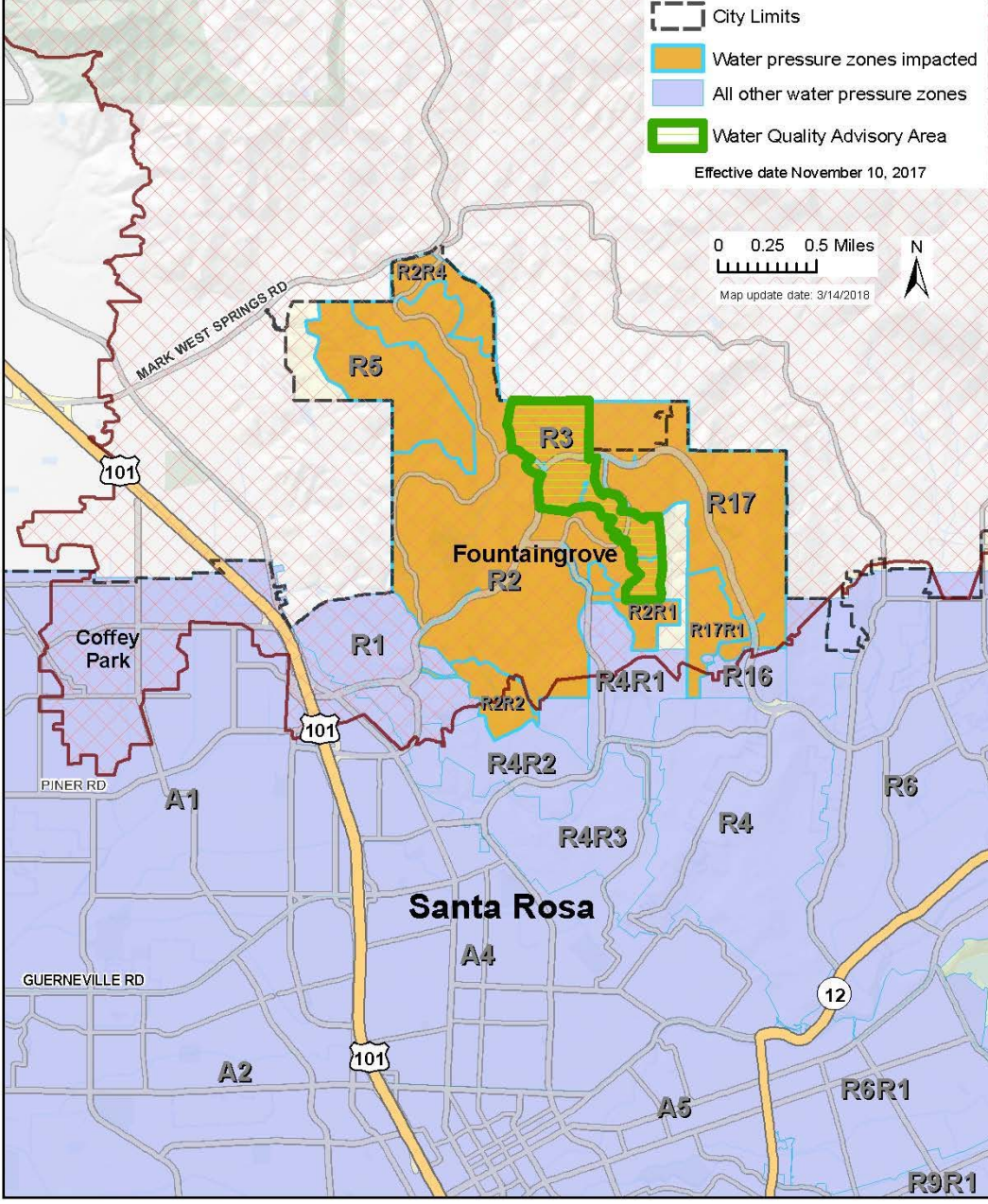




Fire Perimeter and Water Pressure Zones

- Legend**
- Tubbs Fire Perimeter
 - City Limits
 - Water pressure zones impacted
 - All other water pressure zones
 - Water Quality Advisory Area

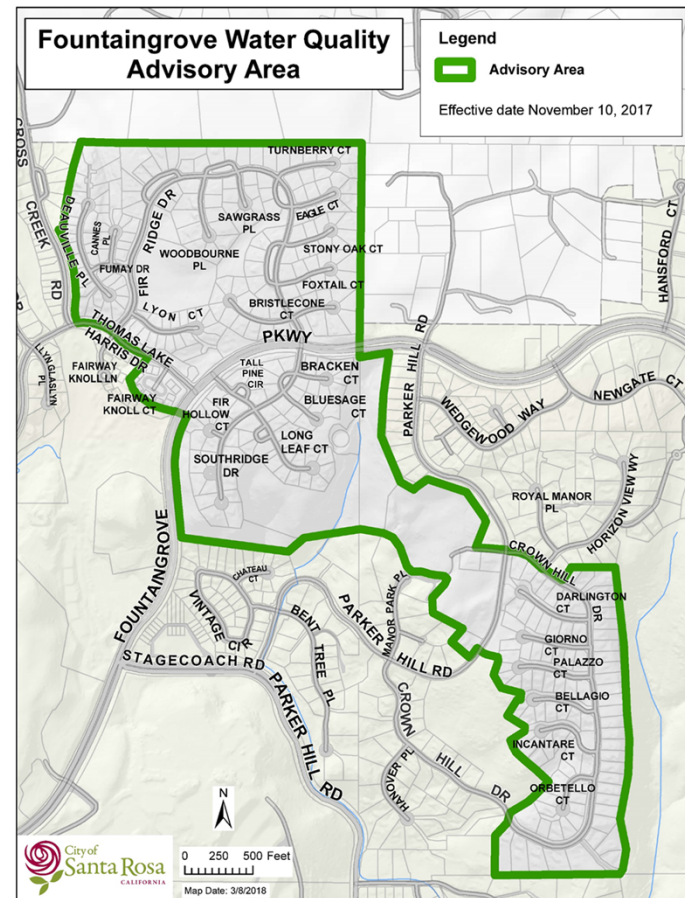
Effective date November 10, 2017



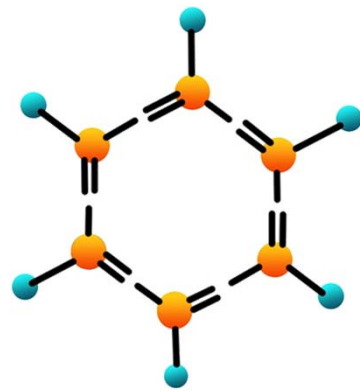
Post-fire Water Quality Advisory

Fountaingrove Area

- Odor complaint 11/08/2017
- Issued advisory 11/10/2017
- Additional precautions issued 1/23/2018



Water Contamination



● Carbon Benzene Ring C₆H₆
● Hydrogen

- Benzene - indicator chemical for post-fire contamination
- Range of contaminants related to fire damage

Benzene	California State Maximum Contaminant Level (MCL)
State Water Resources Control Board Regulatory and Water Quality Levels	1.0 ppb

Initial Action



- Notified customers
- Isolated advisory area
- Notified the California Division of Drinking Water
- Developed an action plan for sampling and investigation

Partner Agencies & Experts

- Sonoma County Public Health
- Sonoma County Water Agency
- California Division of Drinking Water
- US Environmental Protection Agency
- Forensic Chemists
- Toxicologists
- National Water Quality Experts

Expanded Investigation

- Extensive sampling throughout advisory area and the entire water system
- Additional health advisories issued 1/23/2018
 - Do not consume and limit exposure
- Providing bottled drinking water
- Adjusting water bills



Communicating with customers

- In-person
- Door tags
- Mailed letters
- Email
- Meetings
- eNewsletter
- Website
- Water quality hotline
- Social media

eNewsletter

Email updates on water quality advisory

- 1/26/2018
- 2/23/2018
- 3/23/2018

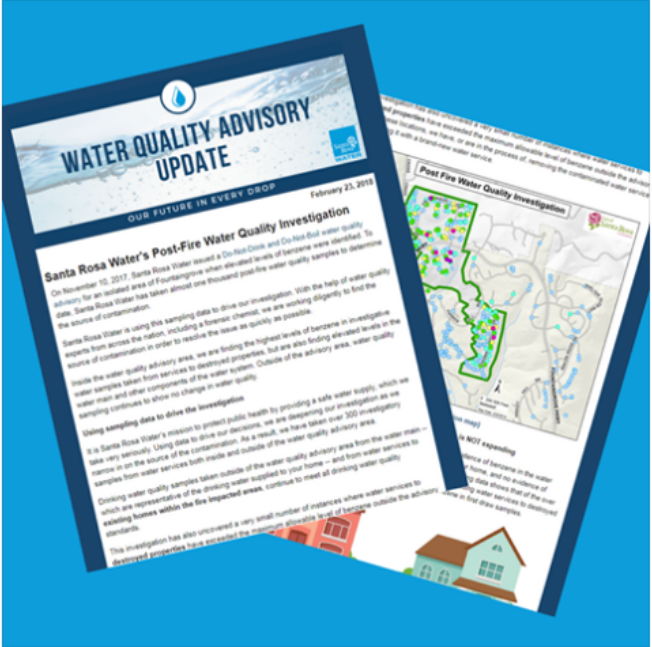
Sign-up @ srcity.org/wqadvisory



Social Media

Santa Rosa Water
Published by Katy Makstutis Ocegueda [?] · February 23 at 7:30pm ·

View the latest information on Santa Rosa Water's post-fire water quality investigation here: <http://bit.ly/2oosSoN>



WATER QUALITY ADVISORY UPDATE
OUR FUTURE IN EVERY DROP
February 23, 2017

Santa Rosa Water's Post-Fire Water Quality Investigation

On November 10, 2017, Santa Rosa Water issued a Drinking Water and On-Tap Hot Water Quality Advisory for an isolated area of Forestburg where elevated levels of benzene were identified. To date, Santa Rosa Water has taken almost one thousand post-fire water quality samples to determine the source of contamination.

Santa Rosa Water is using this sampling data to drive our investigation. With the help of water quality experts from across the nation, including a forensic chemist, we are working diligently to find the source of contamination in order to resolve the issue as quickly as possible.

Outside the water quality advisory area, we are finding the highest levels of benzene in investigative water samples taken from services to individual properties, but we also find elevated levels in the water main and other components of the water system. Outside of the advisory area, water quality sampling continues to show no change in water quality.

Using sampling data to drive the investigation

It is Santa Rosa Water's mission to protect public health by providing a safe water supply, which we take very seriously. Using data to drive our decisions, we are deepening our investigation as we narrow in on the source of the contamination. As a result, we have taken over 500 investigative samples from water services both inside and outside of the water quality advisory area.

Drinking water quality samples taken outside of the water quality advisory area from the water main in an area representative of the drinking water supplied to your home - and from water services to individual businesses within the fire impacted areas, continue to meet all drinking water quality standards.

This investigation has also uncovered a very small number of instances where water services to individual properties have exceeded the maximum allowable level of benzene outside the advisory area in four water samples.

POST-FIRE WATER QUALITY INVESTIGATION

Properties that exceeded the maximum allowable level of benzene within the advisory area are being investigated. We have identified the location of these properties and are working to resolve the issue as quickly as possible.

4,588 people reached

Boost Unavailable

Recent Activity

Review

Stephanie [redacted] reviewed City of Santa Rosa, California — 39 mins ·

I just wanted to say thank you for all the ways you have gone above and beyond in the aftermath of the fires. There are countless examples but sending someone door to door this morning in the affected areas to address any homeowner questions and concerns about the benzene alerts is just the most recent. Thank you. Thank you for acknowledging how important this is and going out of your way to get us the information we need. It is appreciated.



Communications Coordinator Elise Howard, City of Santa Rosa AGENCY

Santa Rosa Water Quality Advisory Update

View the latest information on Santa Rosa Water's post-fire water quality investigation here - <http://bit.ly/2oosSoN>

New 23 Feb · Subscribers of City of Santa Rosa in 30 neighborhoods

City Neigh 15,65

Reply

9 Thanks · 6 Replies

See 4 previous replies

Nextdoor

Communicating with the news media

Print/Online

- Press Democrat
- Water Deeply
- KQED Science
- The Environmental Monitor

Television

- KTVU Channel 2
- KPIX Channel 5
- KRON Channel 4

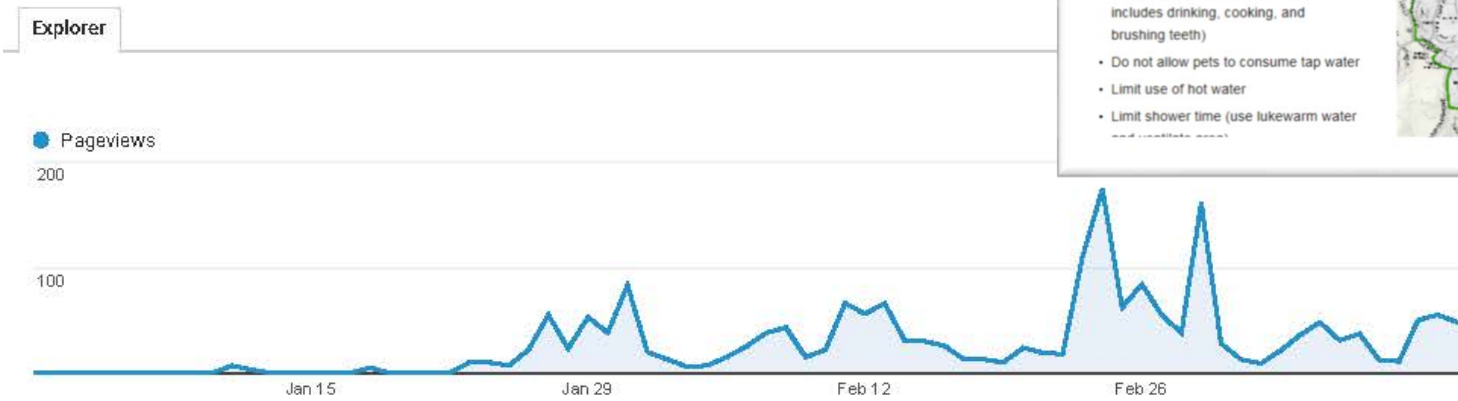
Radio

- KSRO 1350AM



Website

- srcity.org/WQAdvsior
- Almost 2,000 page views
- Interactive sampling map
- Updates
- Sonomacountyrecovers.org



POST-FIRE WATER QUALITY ADVISORY
OUR FUTURE IN EVERY DROP

Post-fire Water Quality Investigation Updates

Santa Rosa Water is working determinedly to verify the cause and repair our community's water infrastructure that was damaged as result of the October Wildfire.

Next test update:
• [February 23, 2018](#)

Fountaingrove Drinking Water Advisory

On November 10, 2017, Santa Rosa Water issued a [drinking water advisory](#) for 13 homes in the Fountaingrove area. This advisory went into effect after elevated levels of benzene were detected in the drinking water system. The advisory will remain in effect until further notice.

Residents in the advisory area are advised to:

- Do not consume tap water (this includes drinking, cooking, and brushing teeth)
- Do not allow pets to consume tap water
- Limit use of hot water
- Limit shower time (use lukewarm water)

[Click to enlarge](#)

Water Quality Sampling Results

- Sample Station
Samples taken at sample stations are representative of drinking water quality supplied to homes and businesses in the area.

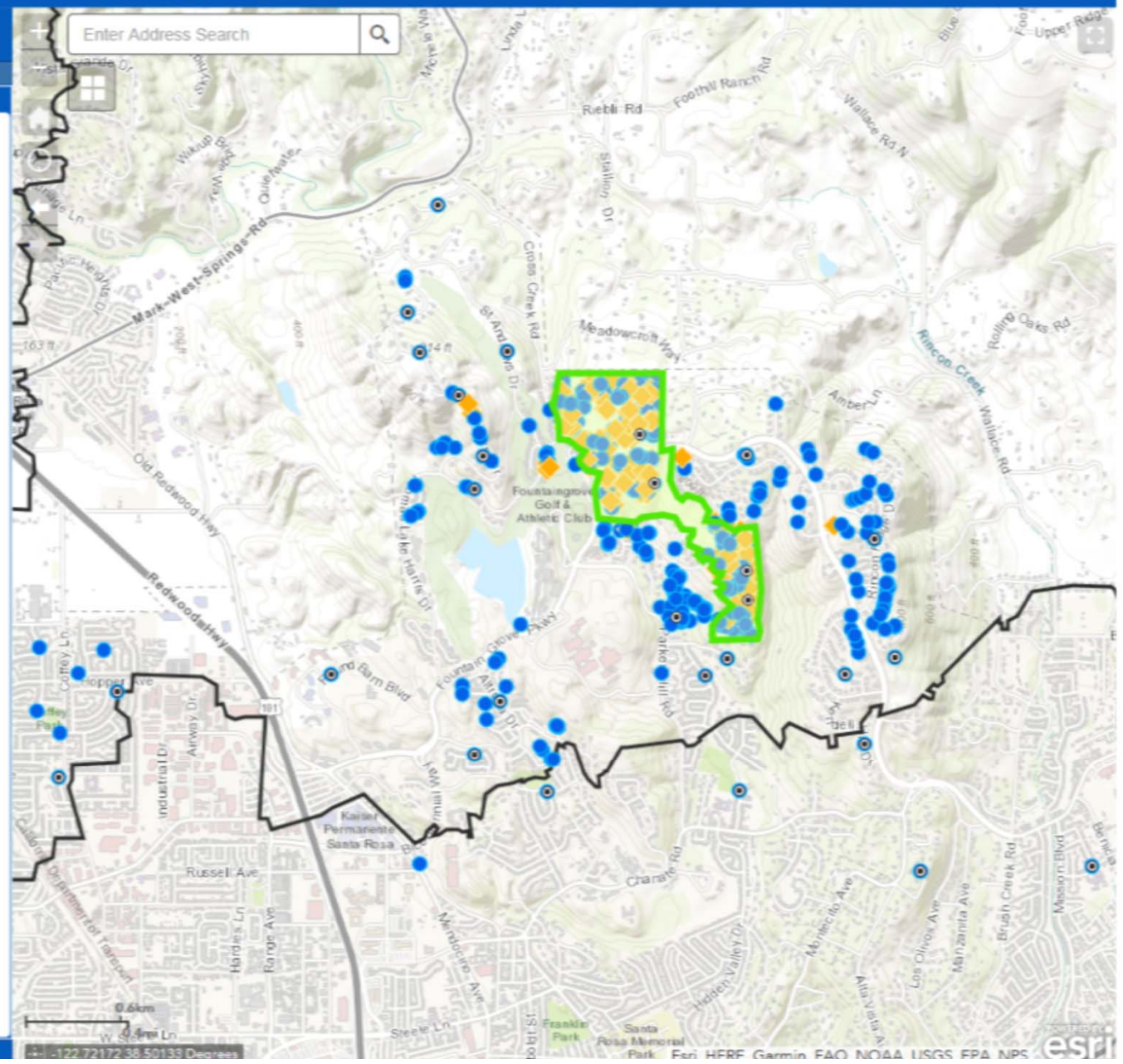
Investigative Sampling Results for Benzene

- Below MCL
 - ◆ Above MCL
- Water samples taken from water services are for investigative purposes and not representative of water quality in the area. Investigative samples are being used to help in the City's efforts to resolve the issue. Benzene is a regulated chemical with an established California MCL (maximum contaminant level) of 1.0 ppb (part per billion) for drinking water.

Water Quality Advisory Area



Fire Perimeter

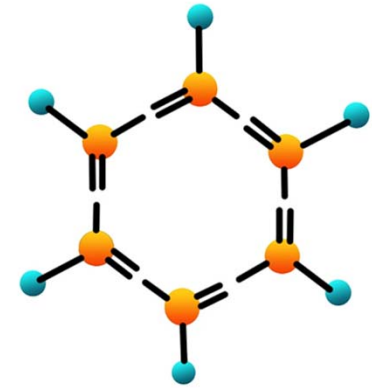


The Investigation

- What are the Possible Sources?
- Steps taken to Identify the Sources
- What Sources can we Rule Out?
- What is the Source of Contamination?



What are the Possible Sources?

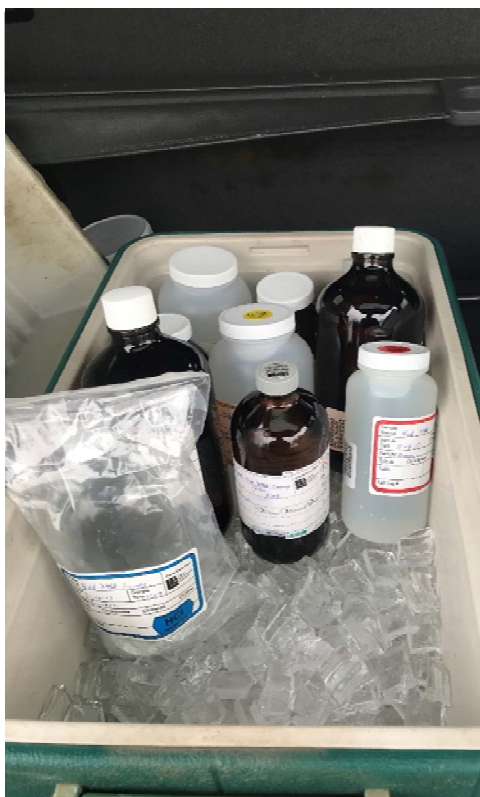


- Leaching
 - Plastics
- Permeation
 - Fuel Spill, Leaking Underground Tank
- Backflow
 - Improper Hookup, Cross Connection
 - Atmosphere, Other Foreign Materials

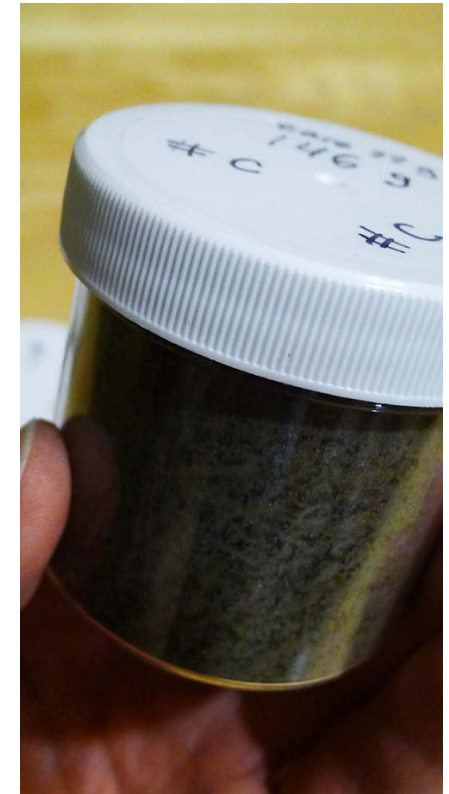
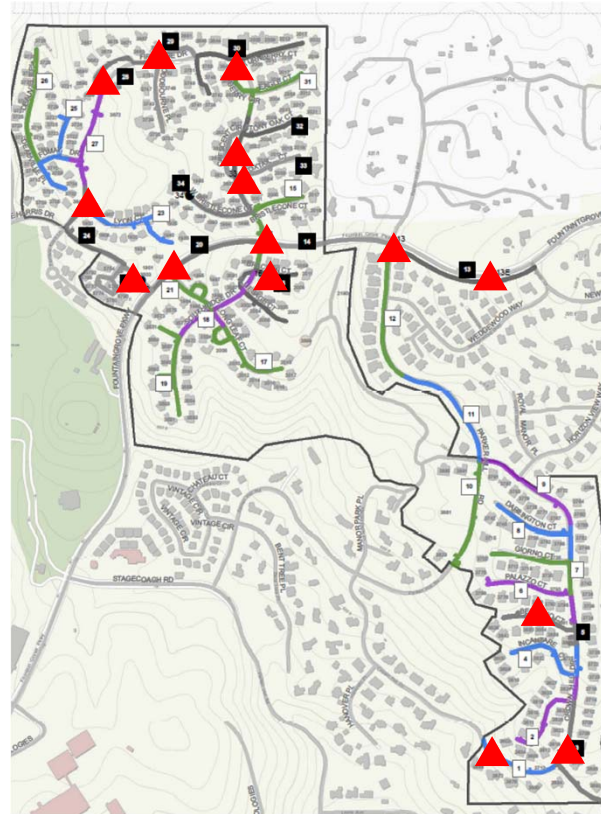
Steps taken to Identify the Source(s)

- Water Samples
- Soil Samples
- Material Samples
- Cross Connection Surveys
- Literature Reviews
- Records Research

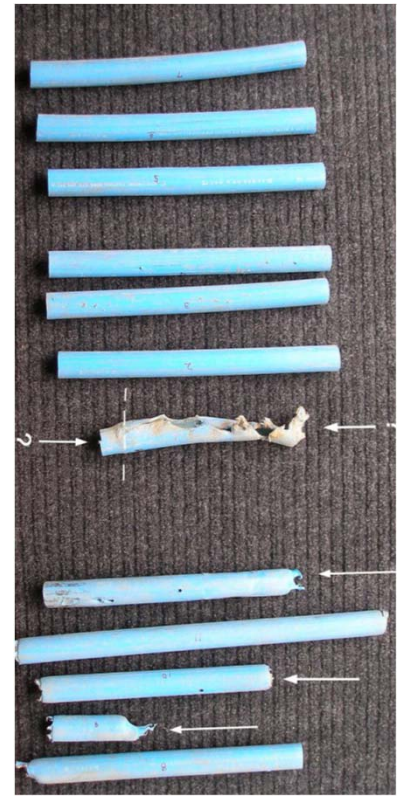
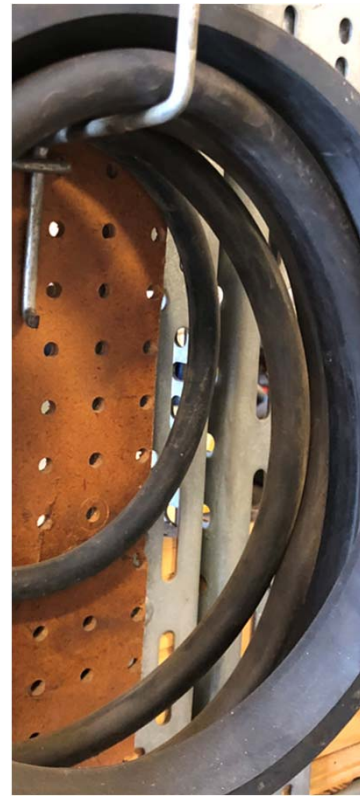
Water Samples



Soil Samples



Material Samples



What Sources can we Rule Out?

- Fuel Spill
- Leaking Underground Storage Tank

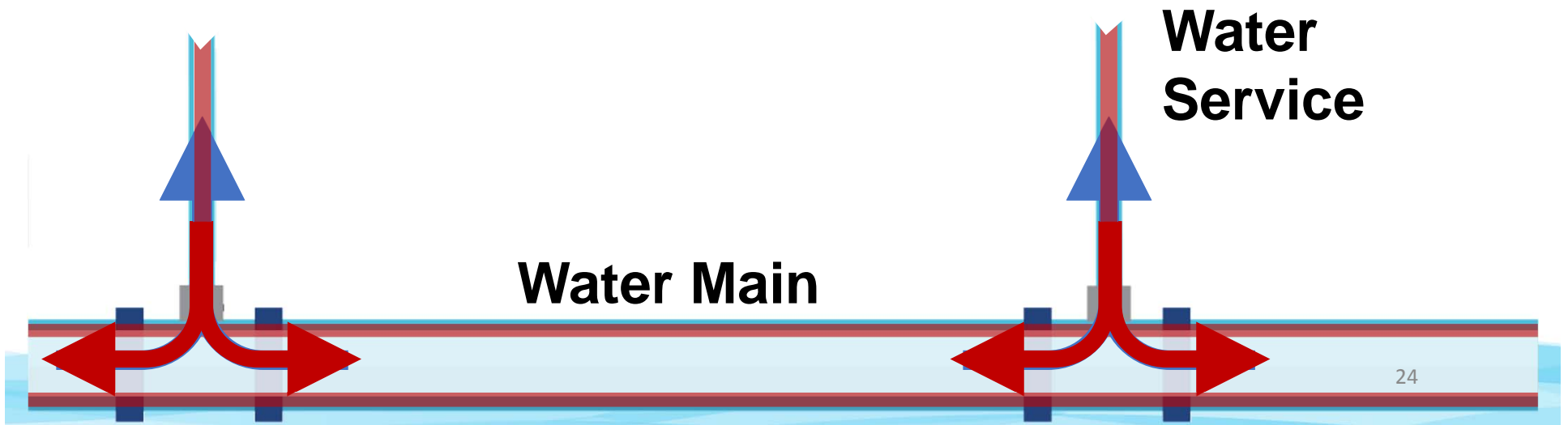


What is the Source?

- Leaching from Plastics
- Backflow of
 - Burned/Melted Plastics
 - Soot/Ash/
Fire Debris



What Happened?



Apex Laboratories LLC

Forensics: Contaminant & Source Identification

- **Chemical Testing**

Analysis of water, soil, piping, and other materials in order to identify organic and inorganic contaminants and probable sources

- **Physical Testing**

Microscopic evaluation of drinking water system components to assess their physical condition and characterize foreign particulates

Physical Testing



- Microscopic evaluation of 18 samples: PVC, HDPE, meters, valves, wedges, gaskets-ongoing
- Evaluation of damage due to exposure to high heat
- Testing has identified a variety of particles including char from smoke in some sections of the piping

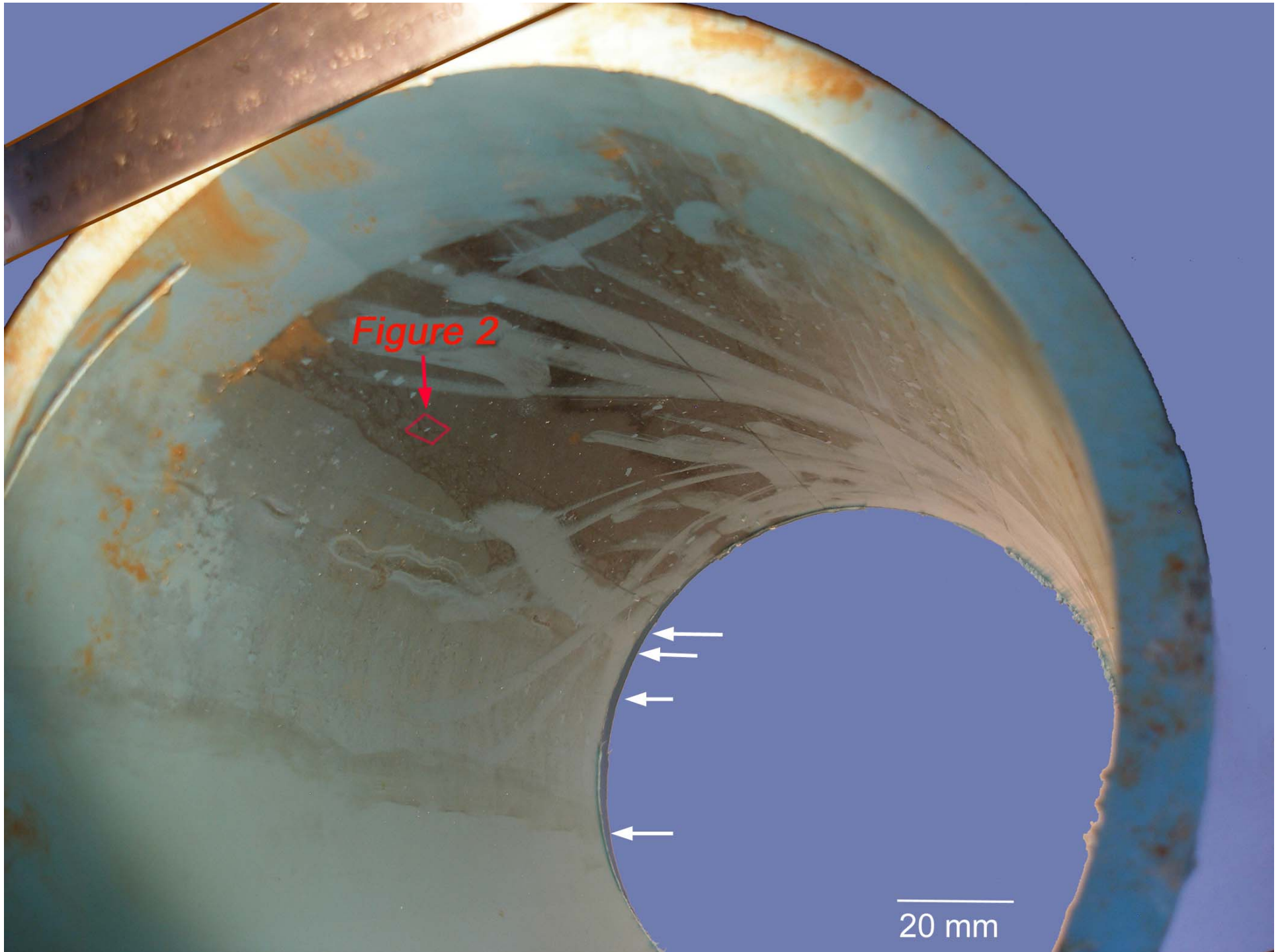
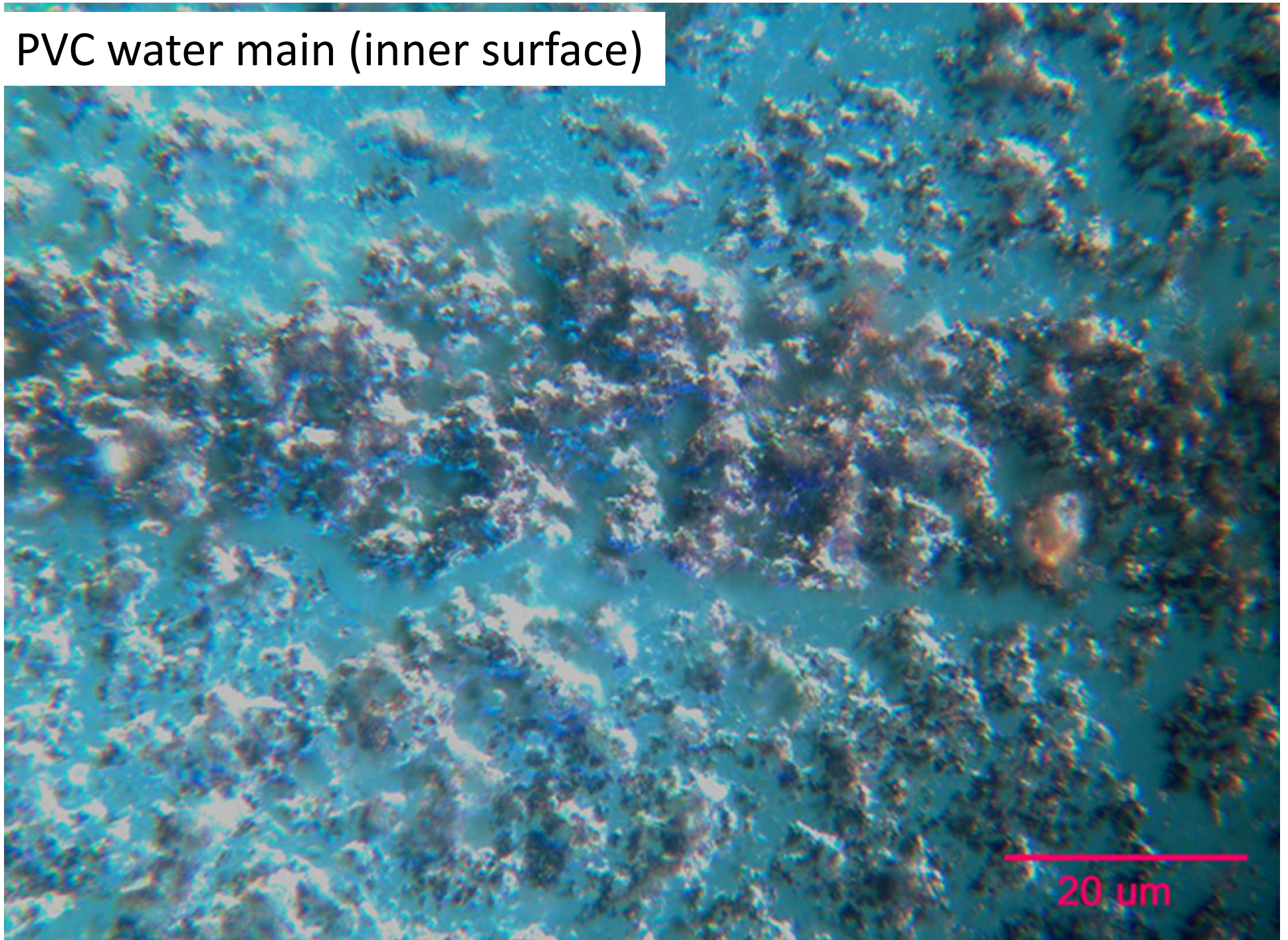


Figure 2

20 mm

PVC water main (inner surface)



Chemical Testing – Water and Soils

- Analytical evaluation of over 200 samples for organic and inorganic contaminants
 - NIST library of 70,000+ chemicals
- The results identify specific areas within the drinking water system impacted by fire damage
- The most prevalent compound identified to date has been benzene

Chemical Testing - Leachability



- Determination of leach potential of piping and ancillary equipment
- Identification of contaminants and byproducts leached from materials impacted by fire damage
- Samples are placed in ultrapure water for a minimum of 69 hours using a zero headspace extraction (ZHE) vessel to prevent loss of volatile compounds during leaching
- The leachate is then analyzed for organic compounds including benzene

PRELIMINARY FINDINGS



1. The contamination present is related to fire damage through:

- Thermal degradation of system components such as plastics
- Entry of ash, soot and other debris into the piping and ancillary equipment when compromised during the fire event

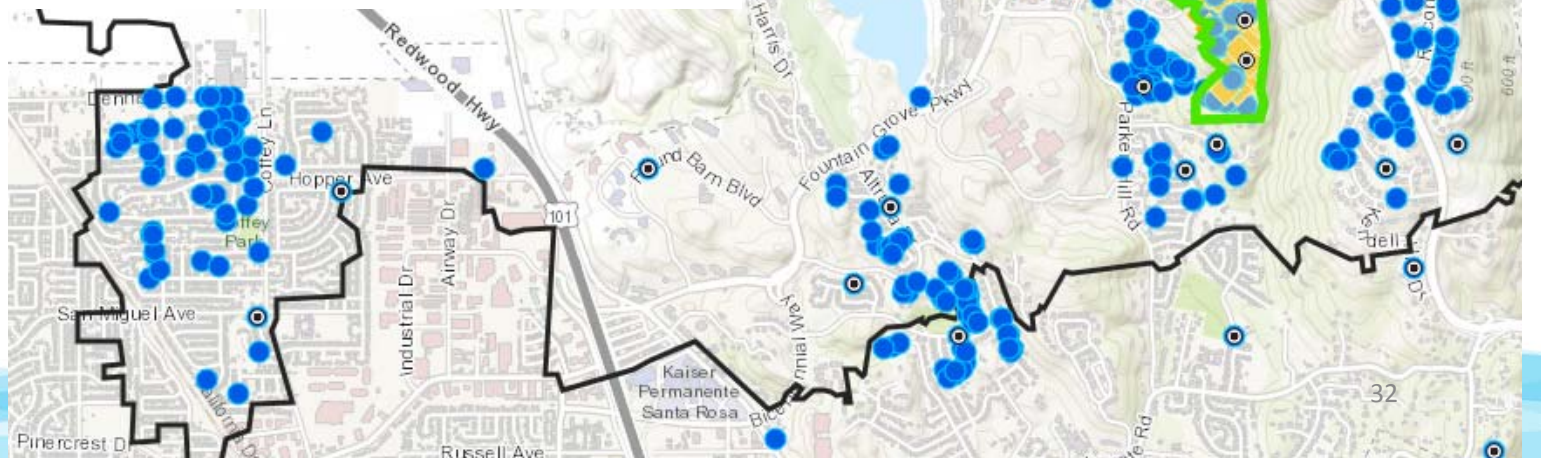
2. The contamination present is not due to gasoline

- Although benzene is a constituent of gasoline, the chemical fingerprint of the contamination found in samples submitted to Apex Forensics is not consistent with a subsurface petroleum release.

3. Complete Identification/characterization of contaminants

What is the Extent?

- Outside the Advisory Area
 - In Some Service Lines
 - Not in the Mains
- Inside the Advisory Area
 - In All Service Lines
 - In Mains



Restoring the System

- Potential Options to Restore the System
- What Didn't Work
- Current Approach to Restoring the System

System Flushing



Pigging



Partial Replacement



Alternatives Considered

- Flushing
- Pigging
- Surfactants (chemical cleaning)
- Treatment/Filtration
- Partial Replacement
- Full Replacement

Current Approach to Restoring the System

Outside Advisory Area

- Partial Replacement
 - Replacing contaminated service lines

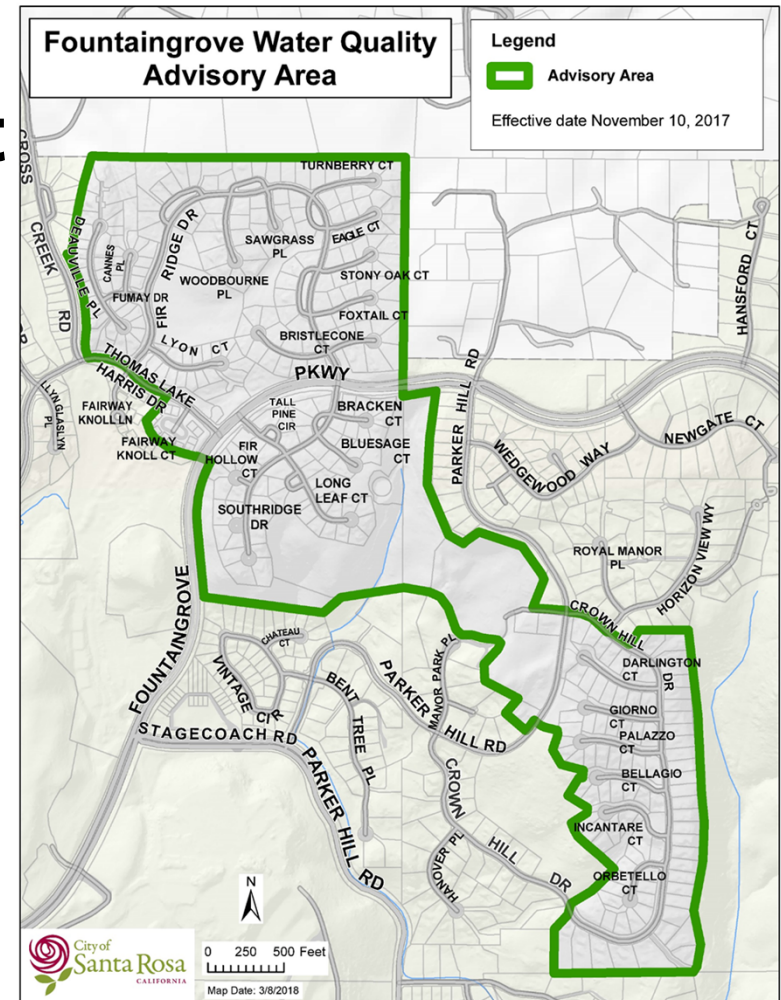
In Advisory Area

- Currently full replacement seems likely

Project Scope

Under full replacement
in advisory area:

- 5 miles of water main
- 350 service lines
- 70 fire hydrants
- 210 valves



Accelerating Design & Construction

- Consulting with experts on expedited construction options
 - e.g. – Design/Build versus Design/Bid/Build
- Use record drawings
 - Minimal design required
- Contractor incentives for early completion
- Provide separate water system to existing homes
- Dedicated staff coordinating between public and private projects

Construction Challenges

- Ensuring no recontamination
- Maintaining fire protection
- Coordination between public and private rebuild
 - Competing for space
- Underground utilities





03.06.2018 10:37

Construction Timing

Full replacement in advisory area

- Currently, best case scenario: 2 years
 - Most expedited
 - Unknowns
- External factors
 - Coordination with other construction
 - Weather
 - Unforeseen underground conditions

Funding

- Full water system replacement in advisory area
- Targeted water service replacements outside advisory area

Estimated Costs \$30-40m

- Working with BPU on funding options, including reserves and CIP
- Continuing to work with FEMA and CAL OES to provide early funding to assist in cash flow

Next Steps

- Ongoing communication with affected parties
- Continuing investigation, supported by national experts
- Expediting construction approach
- Exploring funding options
- Updates to City Council and Board of Public Utilities and recommendation for restoring water quality

Questions?



OUR FUTURE IN EVERY DRÖP