Post-fire Water Quality Investigation

March 27, 2018

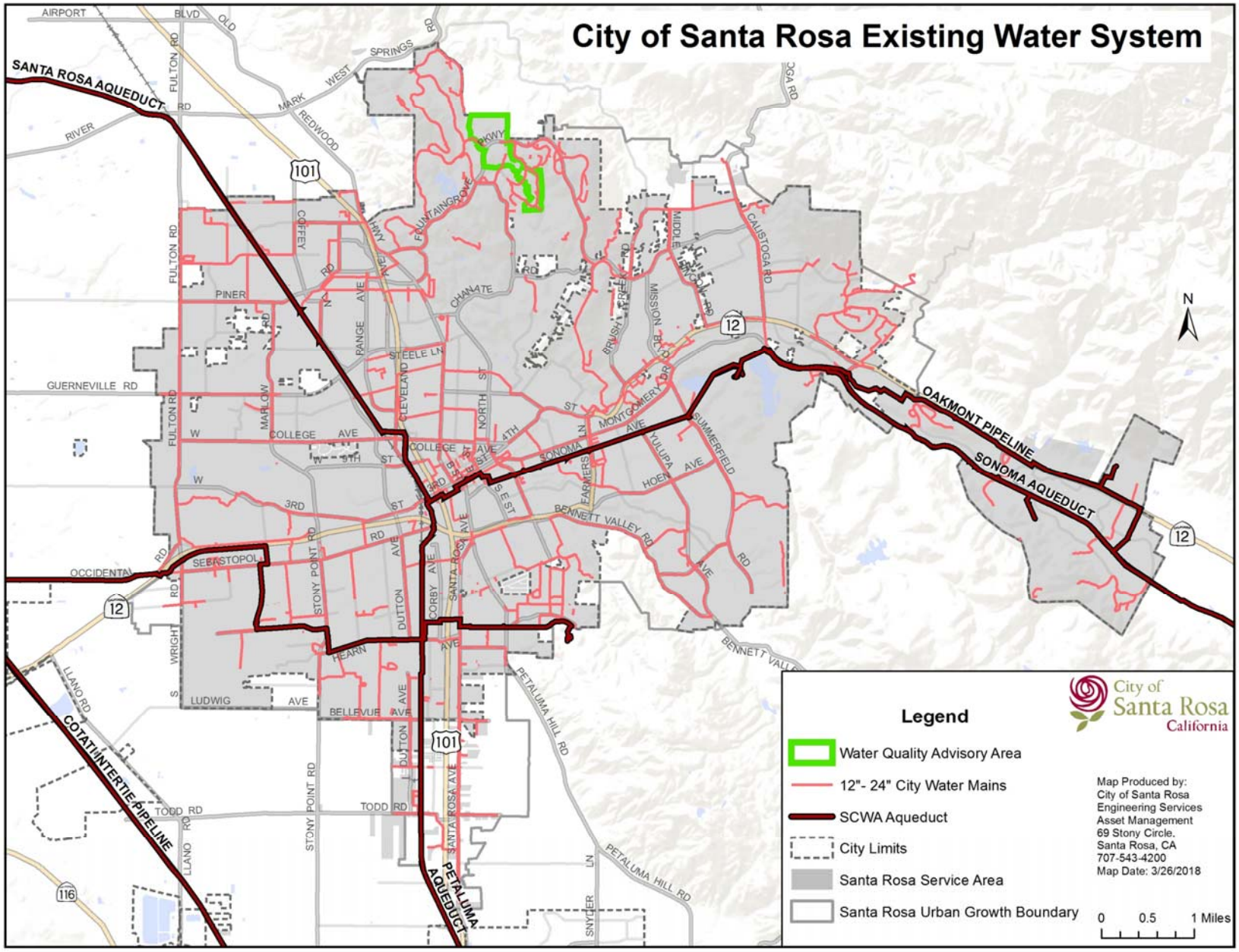
Joint City Council and Board of Public Utilities Meeting

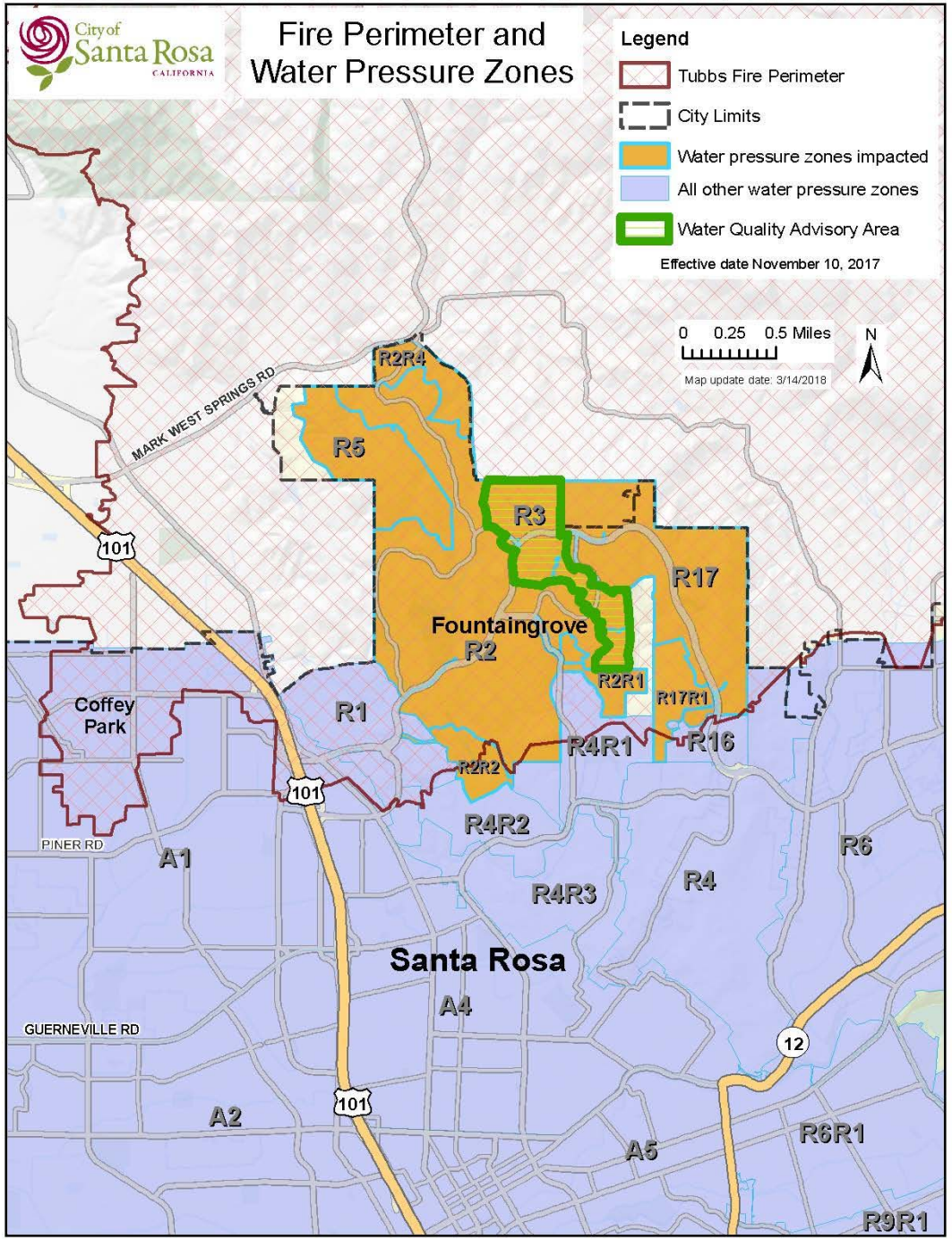
Santa Rosa WATER

OUR FUTURE IN EVERY DROP

Overview

- Background
- Investigation
- Repair/Funding
- Next Steps

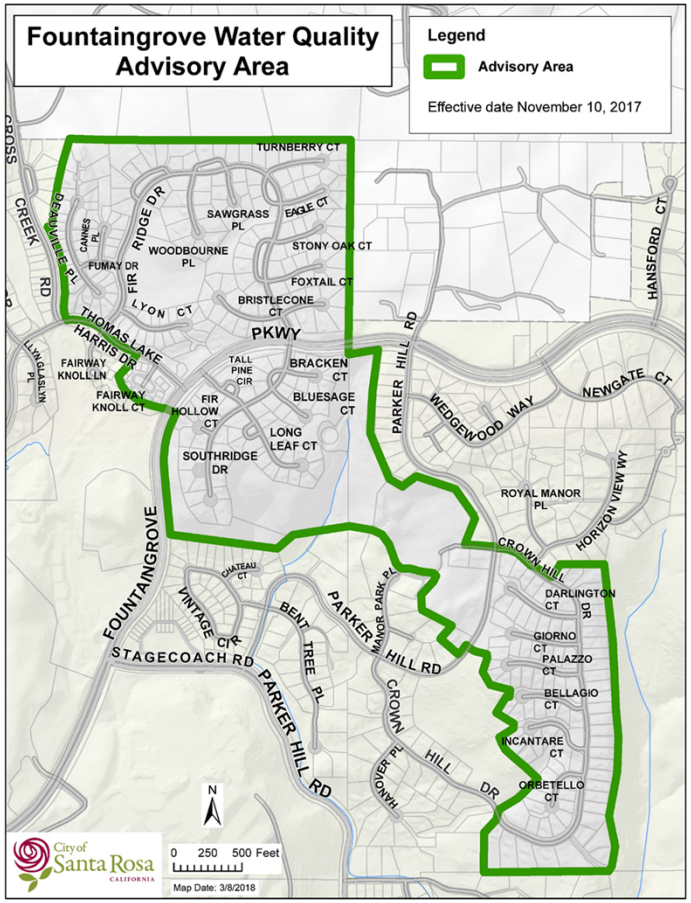

City of Santa Rosa Existing Water System
SANTA ROSA AQUEDUCT
OAKMONT PIPELINE
SONOMA AQUEDUCT
COTATI INTERTIE PIPELINE
PETALUMA AQUEDUCT
Legend
Water Quality Advisory Area
12"- 24" City Water Mains
SCWA Aqueduct
City Limits
Santa Rosa Service Area
Santa Rosa Urban Growth Boundary
City of Santa Rosa California
Map Produced by:
City of Santa Rosa
Engineering Services
Asset Management
69 Stony Circle.
Santa Rosa, CA
707-543-4200
Map Date: 3/26/2018
0 0.5 1 Miles
N


City of Santa Rosa
CALIFORNIA
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
0 0.25 0.5 Miles
N
Map update date: 3/14/2018
MARK WEST SPRINGS RD
R2R4
R5
R3
R17
101
Fountaingrove
R2
R2R1
R17R1
Coffey Park
R1
R4R1
R16
R2R2
101
R4R2
PINER RD
A1
R6
R4R3
R4
Santa Rosa
A4
GUERNEVILLE RD
12
101
A2
A5
R6R1
R9R1

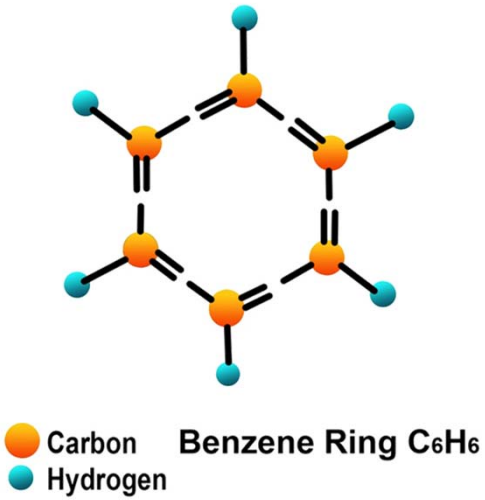
Post-fire Water Quality Advisory

Fountaingrove Area

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



Water Contamination



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

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

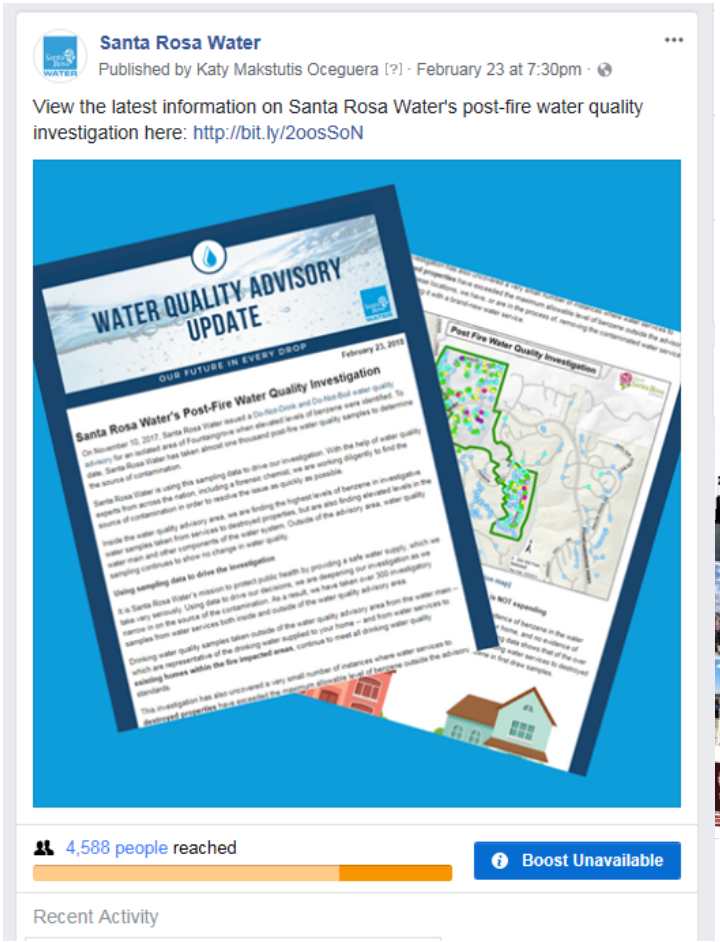
eNewsletter

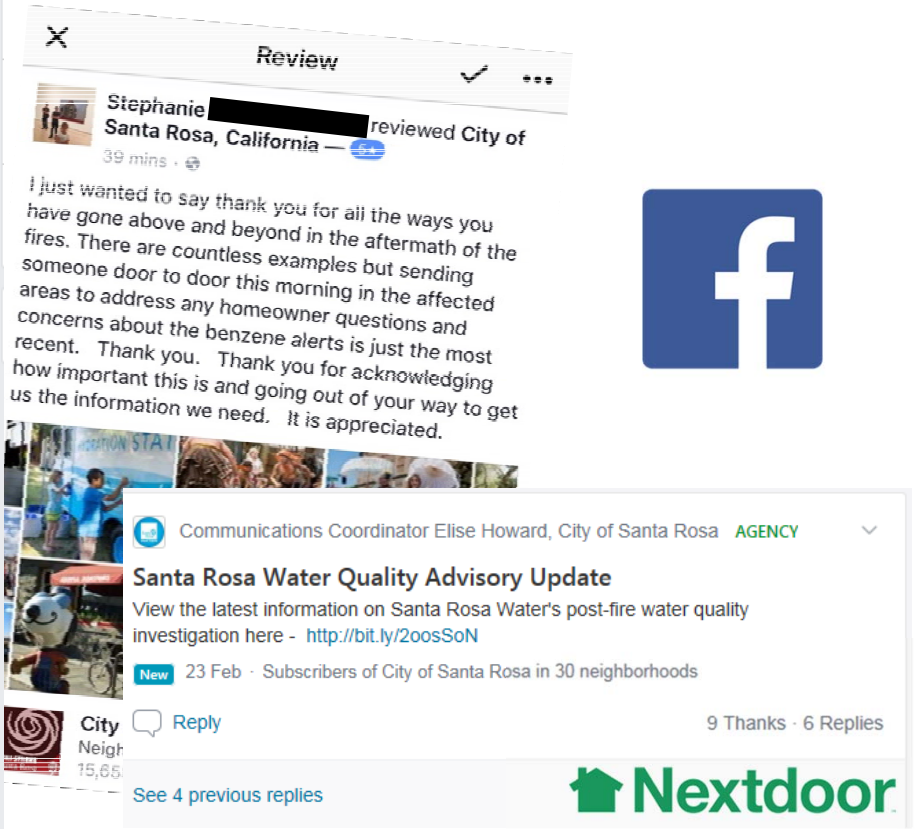
Email updates on water quality advisory

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

Sign-up @ srcity.org/wqadvisory

Social Media





Communicating with the news media

Print/Online

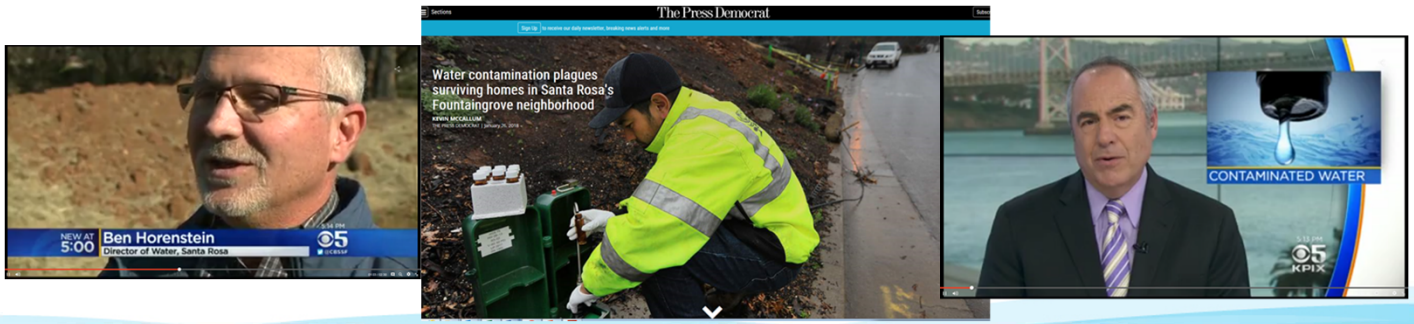
- Press Democrat
- Water Deeply
- KQED Science
- The Environmental Monitor

Television

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

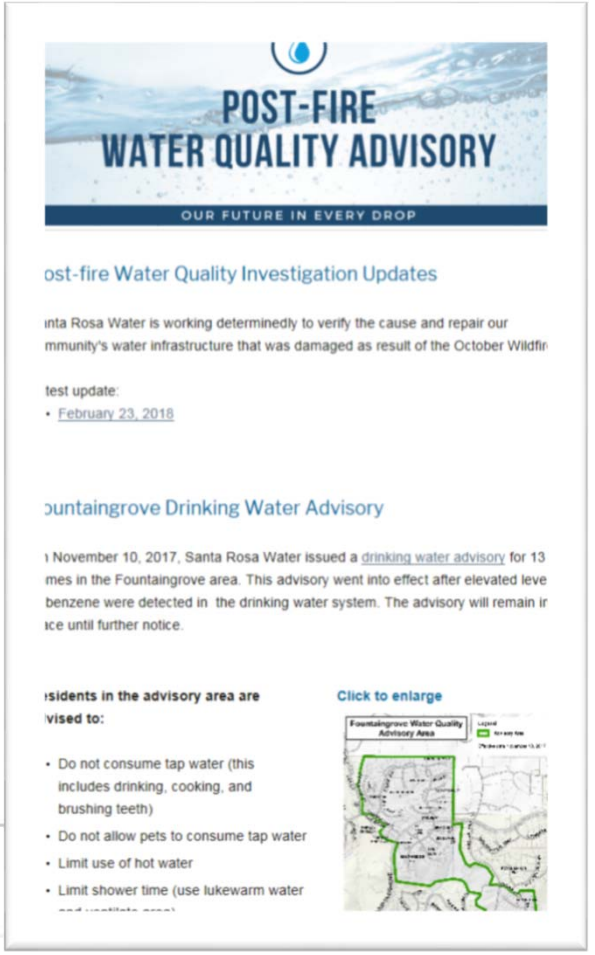
Radio

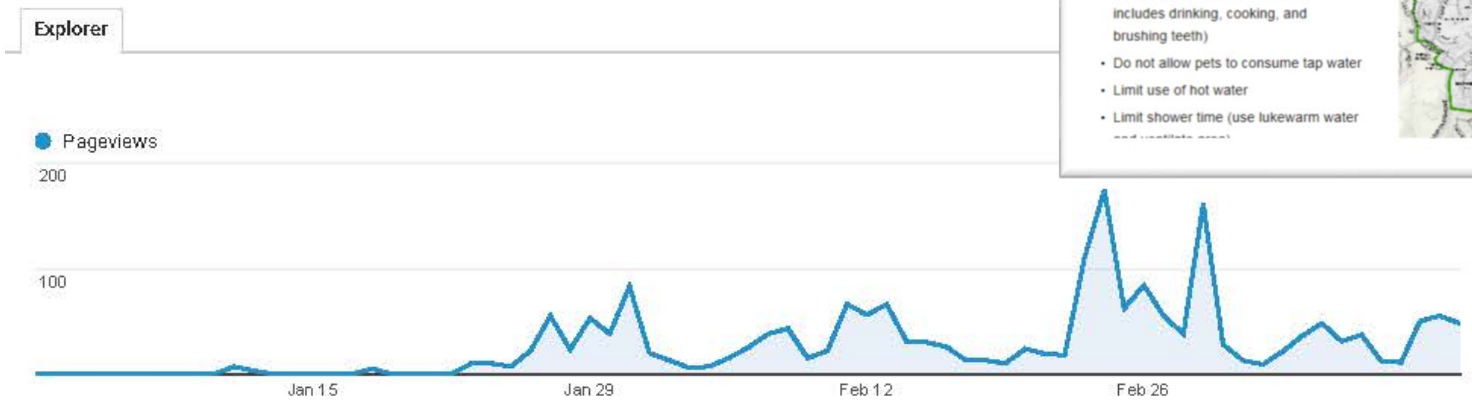
- KSRO 1350AM

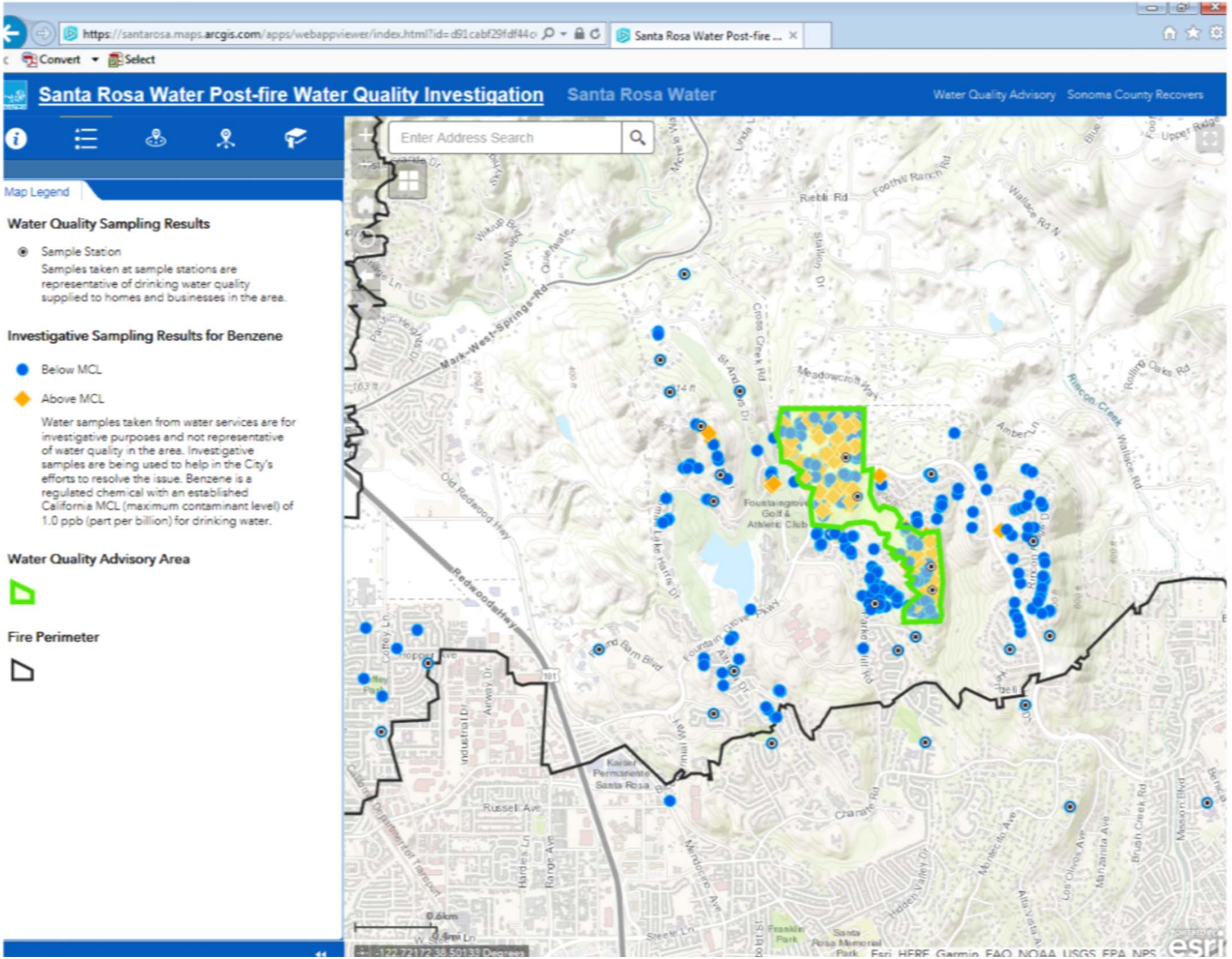


Website

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



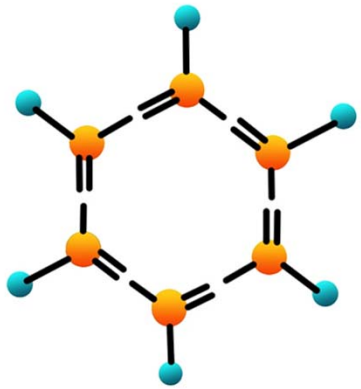



https://santarosa.maps.arcgis.com/apps/webappviewer/index.html?id=d91cabf29fdf44c
Santa Rosa Water Post-fire ...
Convert
Select
Santa Rosa Water Post-fire Water Quality Investigation
Santa Rosa Water
Water Quality Advisory
Sonoma County Recovers
Enter Address Search
Map Legend
Water Quality Sampling 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
Riebli Rd
Foothill Ranch Rd
Wallace Rd N
Mark West Springs Rd
Meadowcroft Way
Rolling Oaks Rd
Old Redwood Hwy
Redwood Hwy
Fountaingrove Golf & Athletic Club
Fountaingrove Pkwy
Parkhill Rd
Coffey Ln
Industrial Dr
Airway Dr
Kaiser Permanente Santa Rosa
Russell Ave
Chanate Rd
Hardies Ln
Range Ave
Meadowlark Dr
Steele Ln
Franklin Park
Santa Rosa Memorial Park
Brush Creek Rd
Mission Blvd
Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, NPS
esri

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?

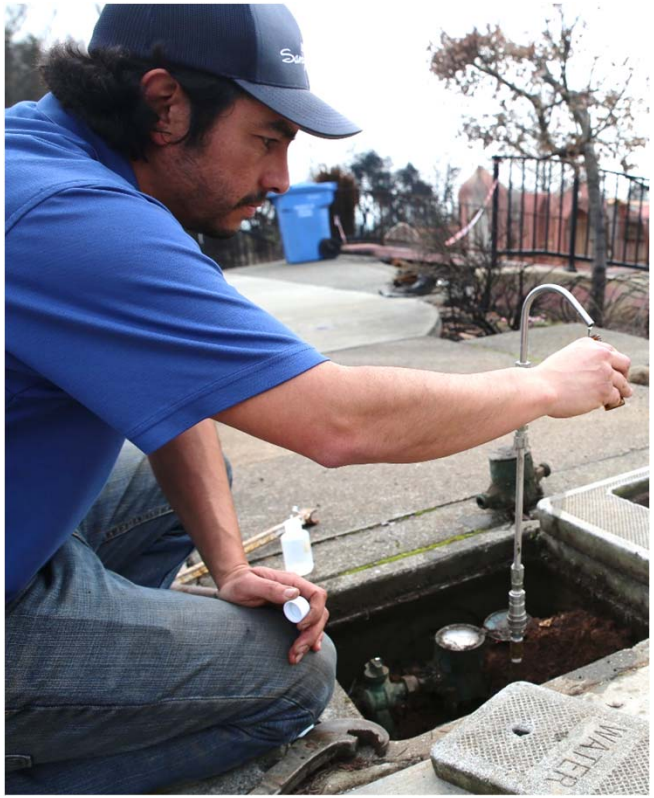


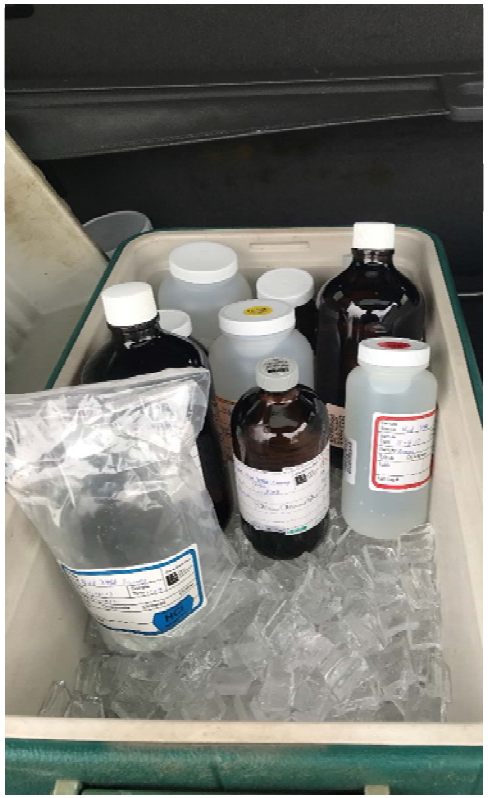
- Leaching
  - Plastics
- Permeation
  - Fuel Spill, Leaking Underground Tank
- Backflow
  - Improper Hookup, Cross Connection
  - Atmosphere, Other Foreign Materials

Steps taken to Identify the Source(s)

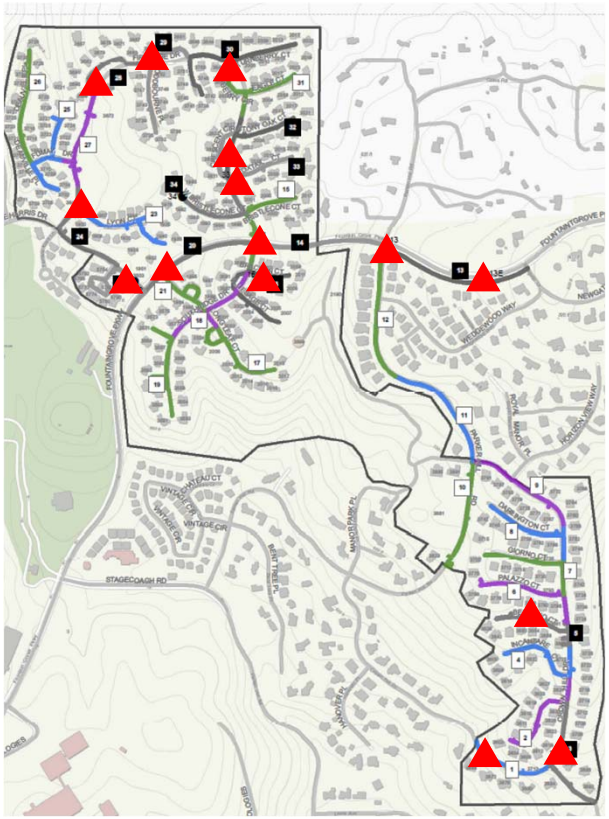
- Water Samples
- Soil Samples
- Material Samples
- Cross Connection Surveys
- Literature Reviews
- Records Research

Water Samples

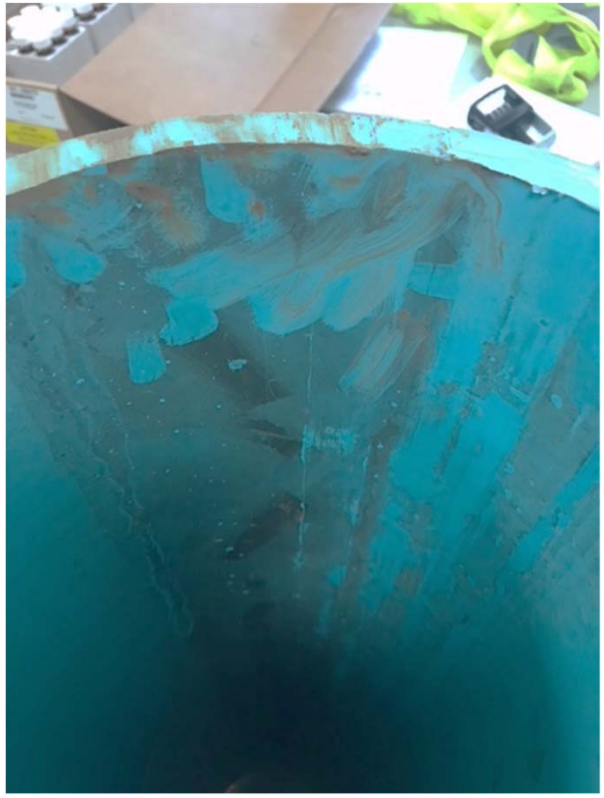
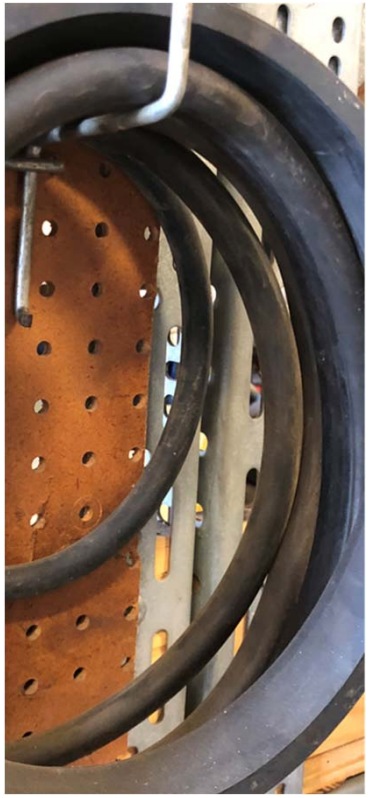
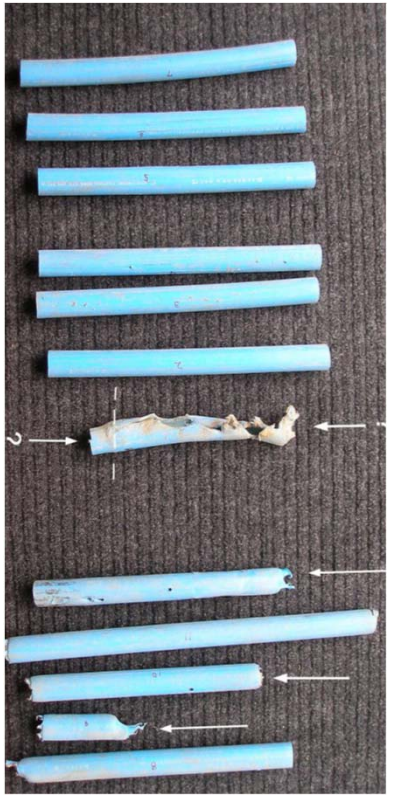




Soil Samples



Material Samples

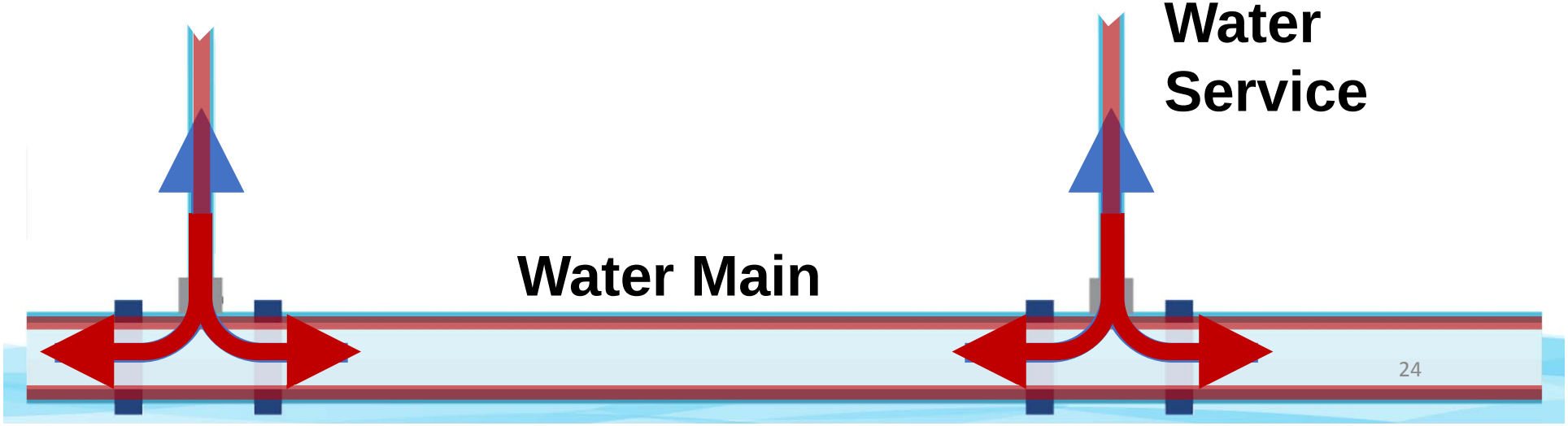
What Sources can we Rule Out?

- 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

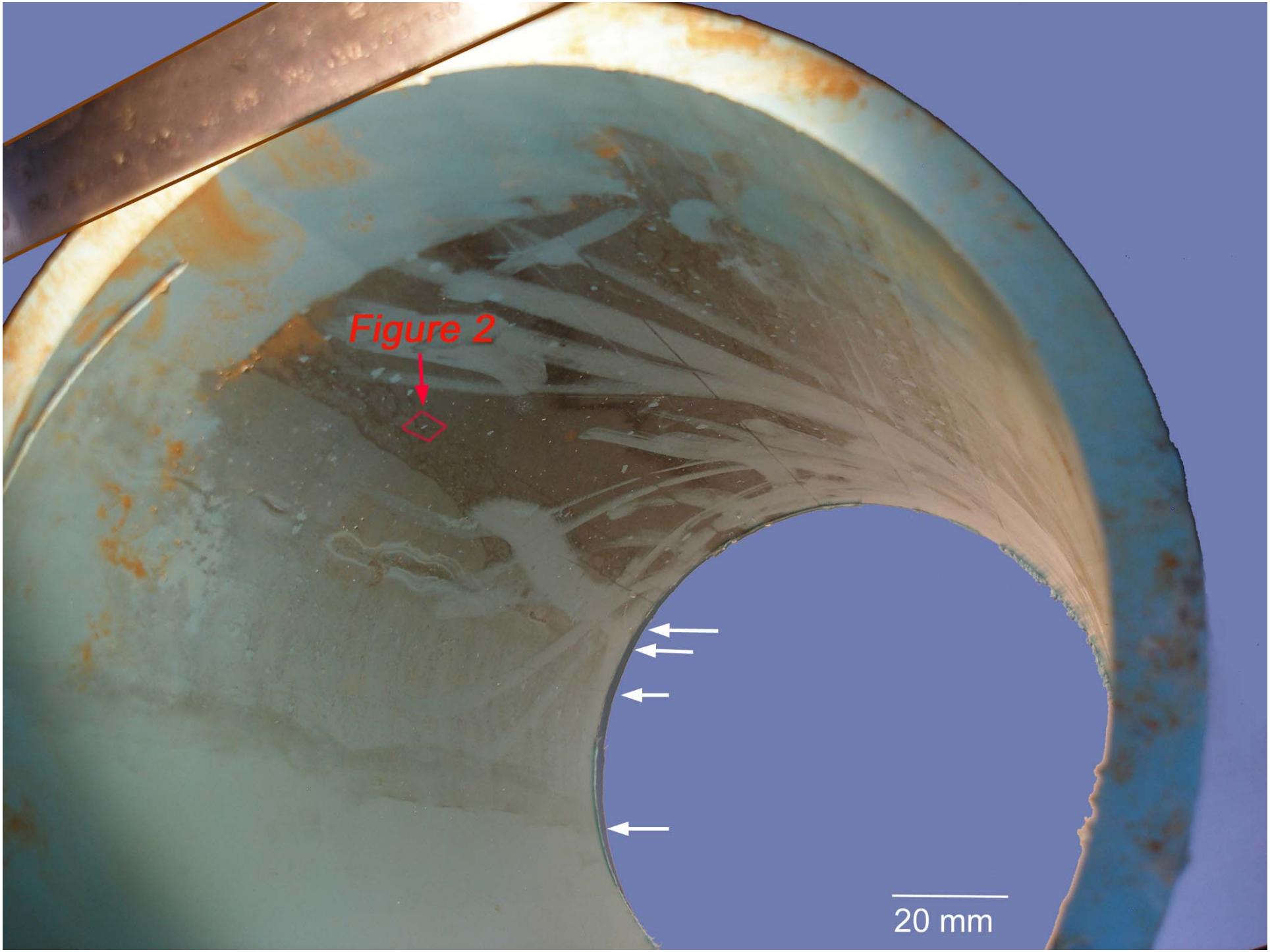
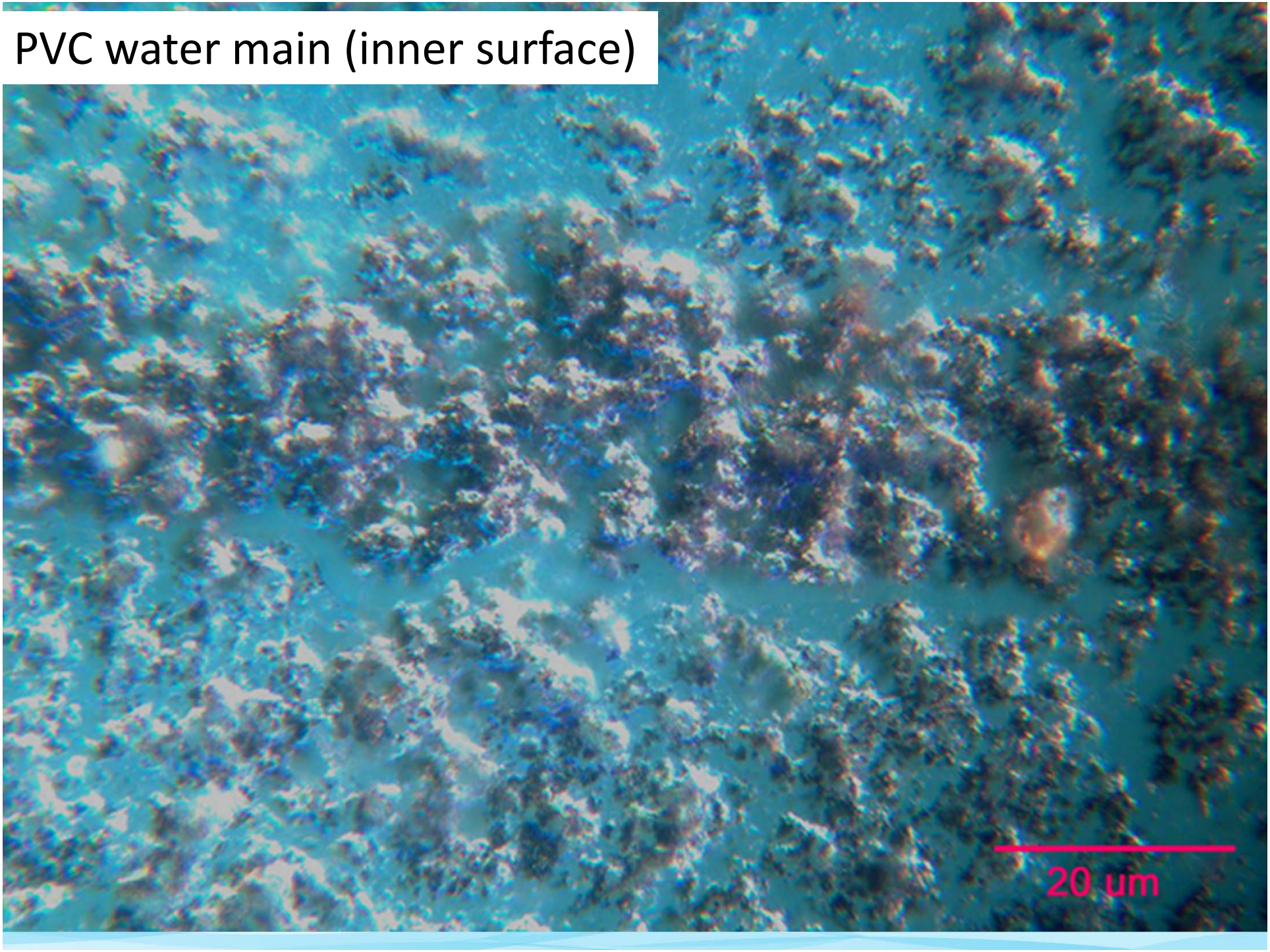


Figure 2
20 mm

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

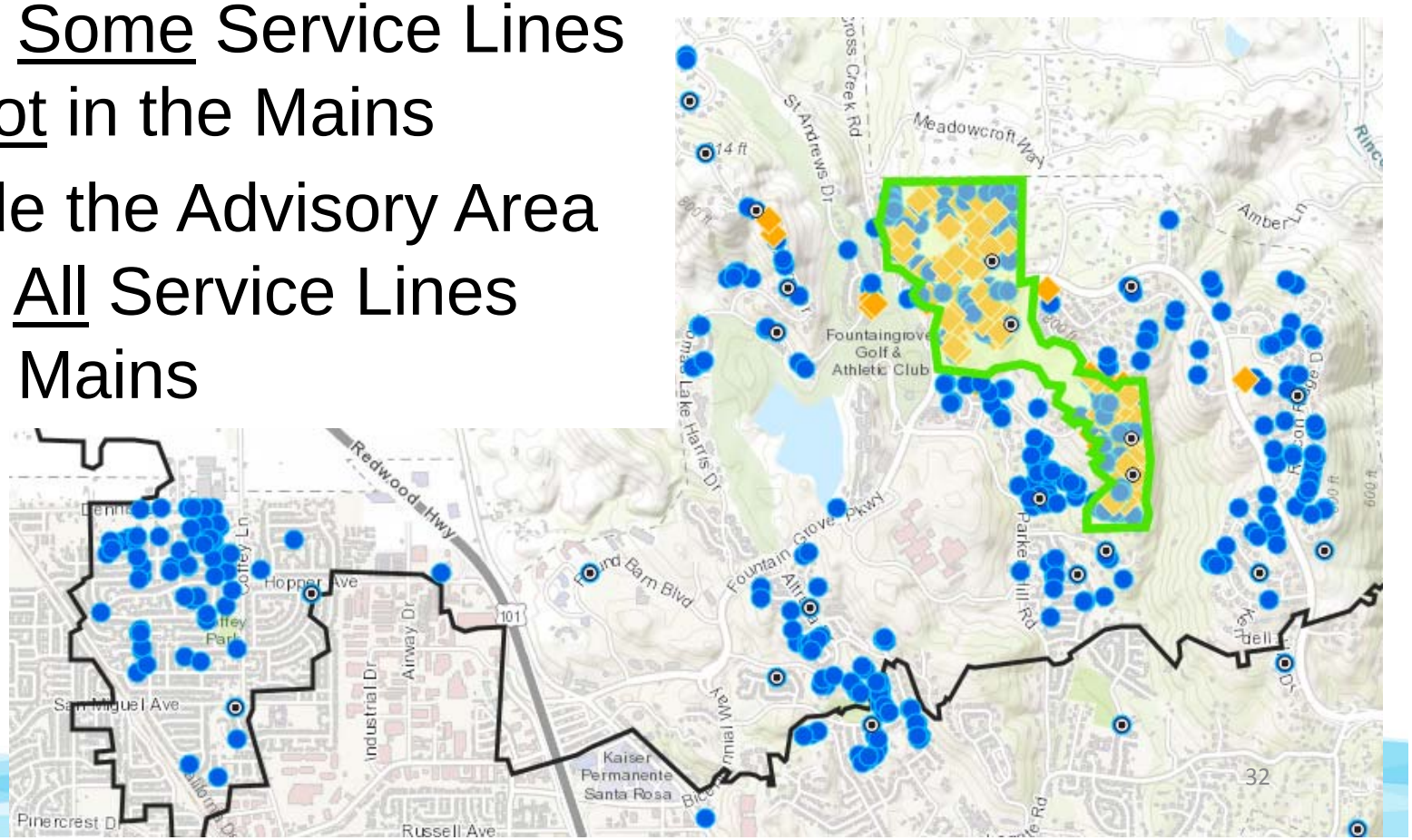
2. The contamination present is not due to gasoline

- 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 <u>Some</u> Service Lines
  - <u>Not</u> in the Mains
- Inside the Advisory Area
  - In <u>All</u> 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

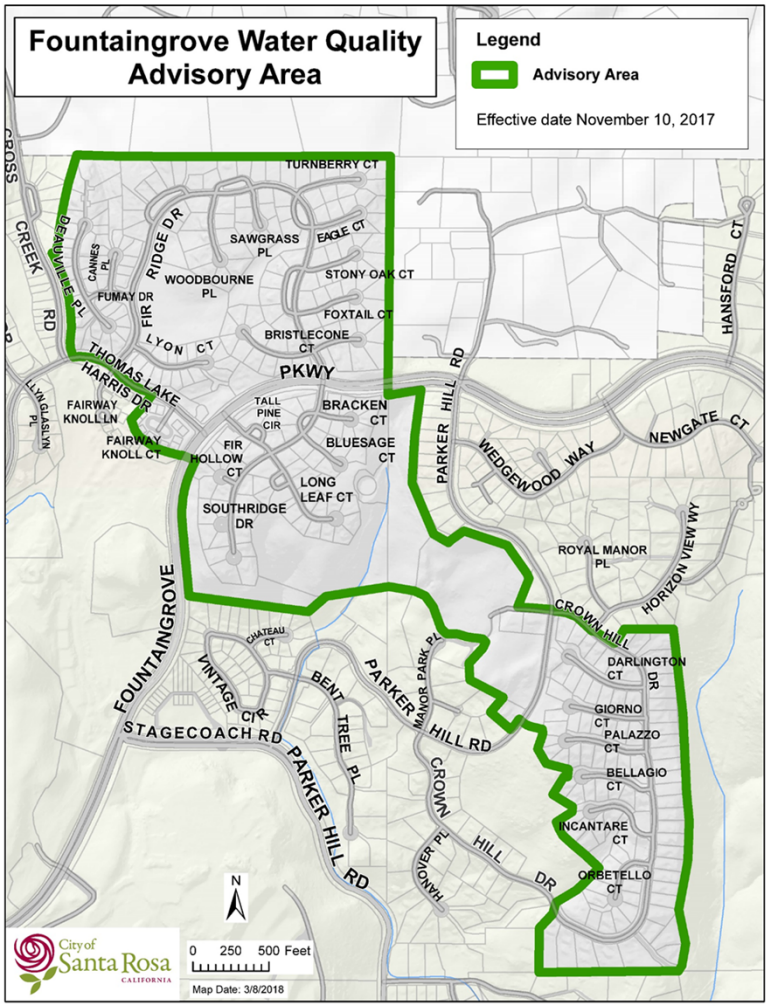
In Advisory Area

- 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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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?

Santa Rosa WATER

OUR FUTURE IN EVERY DROP