

# SCWD Leak Detection 2018

SCWD/Water Systems Optimization

# Project Summary - Background and Goals

Proactive leak detection Project:

1. Establish the distribution system's leakage baseline, by performing leak detection on 100% of the District's territory in the next 2 years.
2. Determine whether the apparent increase in calculated monthly leakage volumes is truly caused by increased leakage (instead of data or instrumentation inaccuracies)
3. Assess leakage patterns across the distribution system in preparation for future leakage and pressure management



# Leak Detection Methodology

## Leak Detection Method

Acoustic leak detection is the most familiar and common leak detection methodology employed in the drinking water industry.

Typically, geophones and leak noise correlators are only used for pinpointing leaks. While a general survey proceeds quickly, most service connection leaks go undetected, especially in areas where infrastructure is primarily non-metallic.

- **General (valve and hydrant):** only distribution system fire hydrants and valves are sounded for leak noise.
- **Comprehensive:** all available fittings on mains, service connections, and appurtenances are sounded for leak noise, and geophones are used to sound above mains when contact points are far apart. Once a leak sound is detected, geophones and leak noise correlators are used to pinpoint leaks.

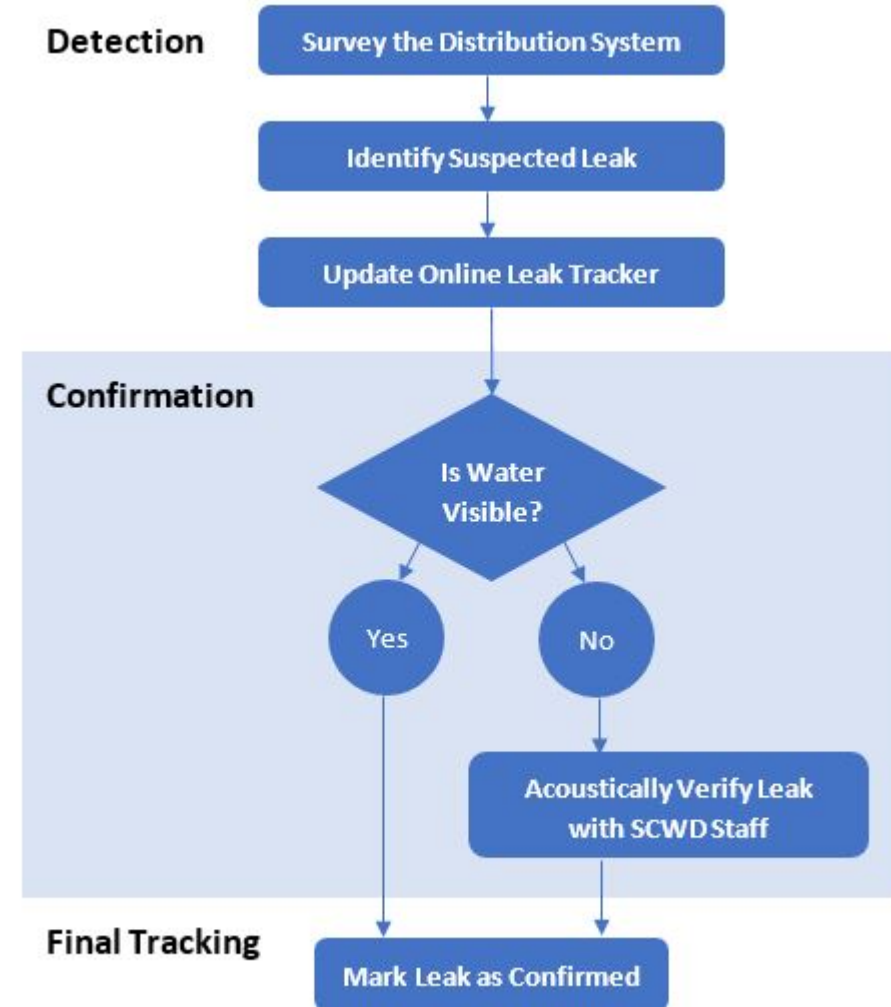


Figure 2: Leak detection, confirmation, and tracking protocol

# SCWD Leak Detection Project Results Summary

## Leaks Identified

WSO leak detection specialists identified 61 distribution system leaks on a variety of infrastructure types along the 97.7 survey miles. No leaks were discovered on main lines. The cumulative flow rate of discovered leaks was roughly estimated to be 134 gpm (see Table 1).

*Table 1: Distribution system leaks identified*

Infrastructure Type	Count of Leaks	Estimated Flow Rate (gpm)
Main	0	0
Service	2	25
Meter	55	88
Blow-Off	0	0
Valve	1	10
Hydrant	1	1
Other	2	10
<b>Total</b>	<b>61</b>	<b>134</b>

WSO technicians also identified 14 customer-side leaks. To estimate the volume of customer-side leakage, WSO assumes that the leaks will flow for 30 days (approximately one billing period) before discovery. However, because customer side leakage is almost always registered by a customer meter and then billed, customer-side leakage does contribute to SCWD's total water loss volume. Instead, it is categorized as billed metered consumption in the water audit.

*Table 2: Customer-side leaks identified*

Infrastructure Type	Count of Leaks	Estimated Flow Rate (gpm)	Estimated Monthly Volume (CCF)
Customer	14	24	1,386
<b>Total</b>	<b>14</b>	<b>24</b>	<b>1,386</b>

# SCWD Leak Detection Project Results Summary

## Leak Frequency

WSO surveyed 87.7 miles of SCWD's potable distribution system and 10.0 miles of the recycled water system. Though WSO does not have an exact tally of the number of service connections surveyed, SCWD reports an average service connection density of 76.7 connections per mile of main. Therefore, WSO estimates that the surveyed cover approximately 7,500 service connections and, correspondingly, 7,500 customer meters. The count of leaks and infrastructure surveyed produce the leak frequencies presented in Table 1 and on the following page. Leak frequencies are typically normalized to 100 miles of main or 1,000 service connections.

*Table 1: Distribution system leak frequency*

<b>Infrastructure Type</b>	<b>Count of Leaks</b>	<b>Normalized Leak Frequency</b>
Main	0	0.0 leaks / 100 miles of main
Service	2	0.3 leaks / 1,000 service connections
Meter	55	7.3 leaks / 1,000 meters
Blow-Off	0	0.0 leaks / 100 miles of main
Valve	1	1.0 leak / 100 miles of main
Hydrant	1	1.0 leak / 100 miles of main
Other	2	2.0 leaks / 100 miles of main
<b>Total</b>	<b>61</b>	

*Table 2: Customer-side leak frequency*

<b>Infrastructure Type</b>	<b>Count of Leaks</b>	<b>Normalized Leak Frequency</b>
Customer	14	1.9 leaks / 1,000 service connections
<b>Total</b>	<b>14</b>	

These leak frequencies indicate a well-managed system in good condition. Particularly notable is the absence of main line leaks. Though main pipe is likely subject to modest seeps at joints and fittings, no audible leakage on main pipes was uncovered in the surveyed portion of the system.

# 2018 Leak Detection Project Conclusion

- Distribution system experiences minimal volumes of acoustically detectable leakage.
- Findings are supported by both the water audit and proactive system leak detection results.
- Proactive leak detection establishes the distribution system's leakage baseline.
- Allows for a full component analysis of real loss, lays the groundwork to study geographic patterns in leakage.

