



Corrosion Control Optimization

Feb. 23, 2022 | Cheryl Porter, COO Water & Field Services



Agenda

Federal Lead and Copper Rule Compliance

- GLWA
- Member Partners

Value of Corrosion Control

Why Perform a Corrosion Control Study?

- Benefits
- Current Status and Preliminary Results
- EGLE Partnership
- Timeline

Member Partner Action

- Actions residents can take

Federal Lead and Copper Rule Compliance

**Federal Lead and Copper Rule Compliance
GLWA has an optimized corrosion control program**



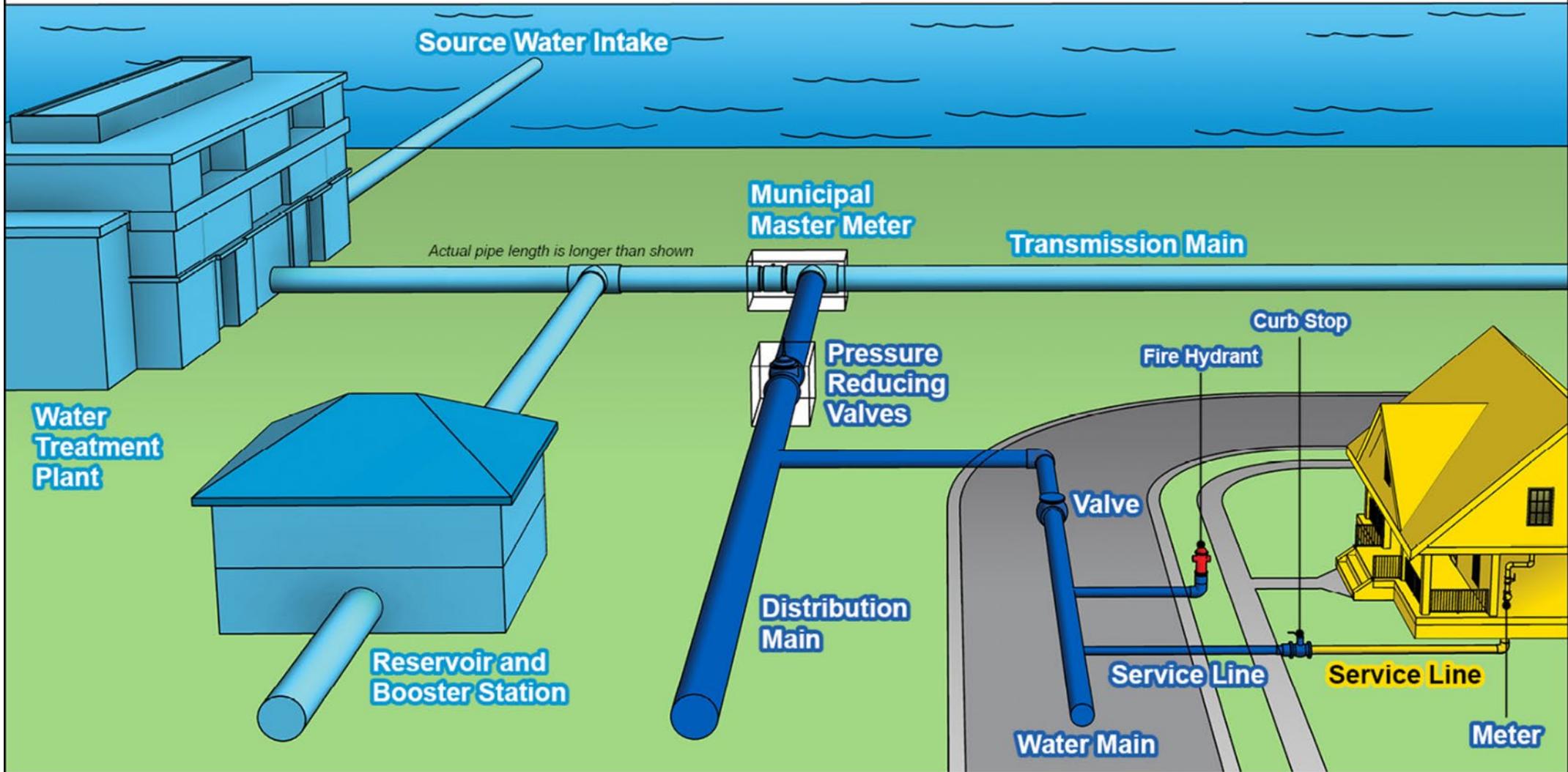
GLWA's Corrosion Control Program

- Optimal dosing study conducted in the 1990's
- Requires maintaining pH levels and orthophosphate dosage at treatment tap
- Orthophosphate level is measured regularly. Meter accuracy is verified every 8 hours.

GLWA's Water Quality Parameters

	Original Corrosion Control Study Recommendations	GLWA Water Quality Parameter Goal @ Plant
pH	7.2 – 7.6 Range for orthophosphate effectiveness	≥ 7.0
Orthophosphate Residual	1.2 mg/L as PO ₄	≥ 0.8 mg/L as PO ₄
Chlorine Residual	Higher residuals (at or above 1.0 mg/L) support the formation of the protective layer	≥ 1.0 mg/L

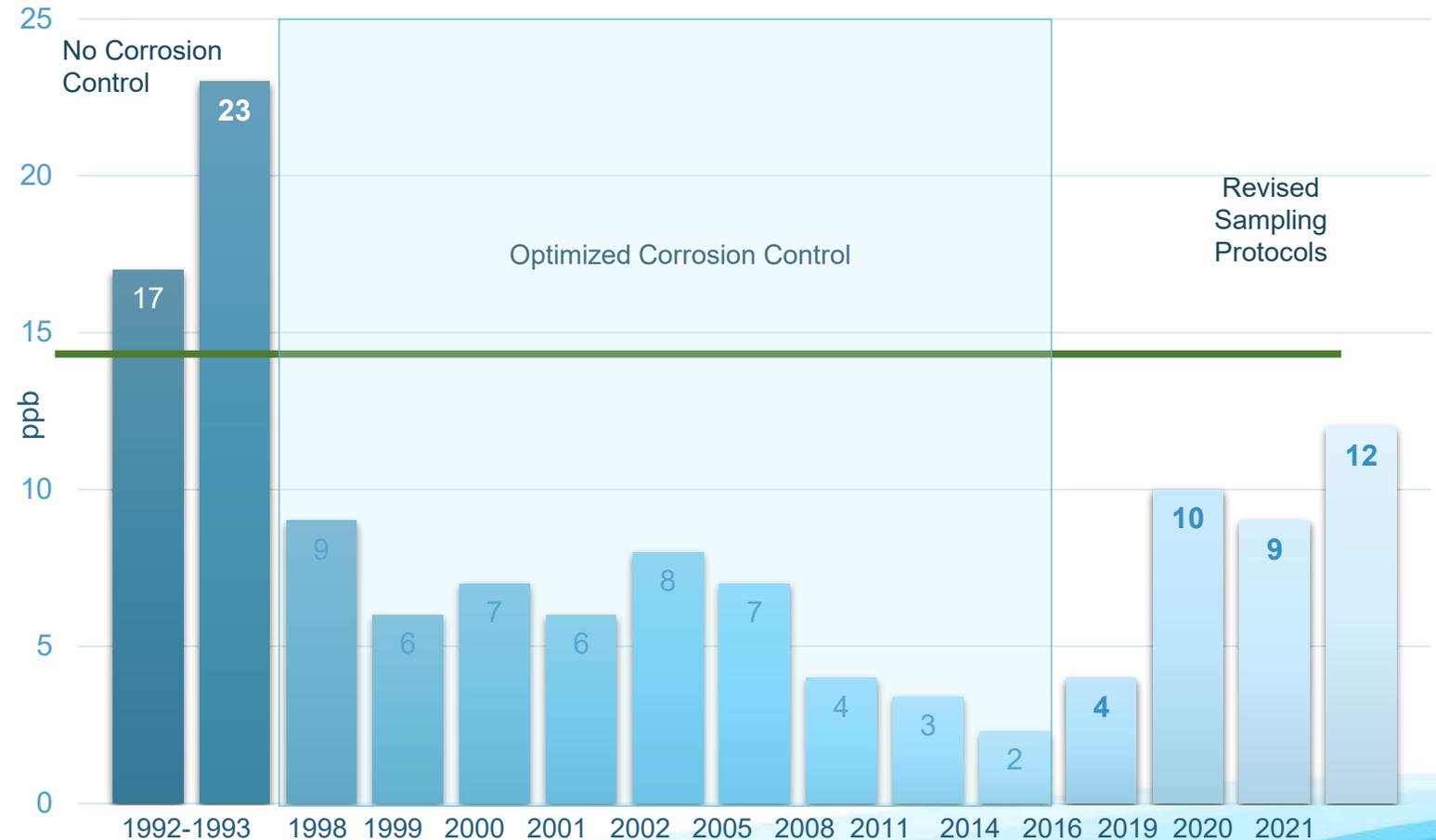
Our water system is a shared responsibility.



- Great Lakes Water Authority
- Municipality
- Property Owner

Detroit Historical 90th Percentile Lead

- Ortho-phosphate treatment began in 1996
- Reduced monitoring in 2002 (every 3 years)
- Reduced monitoring discontinued in 2018



Action Level Exceedances

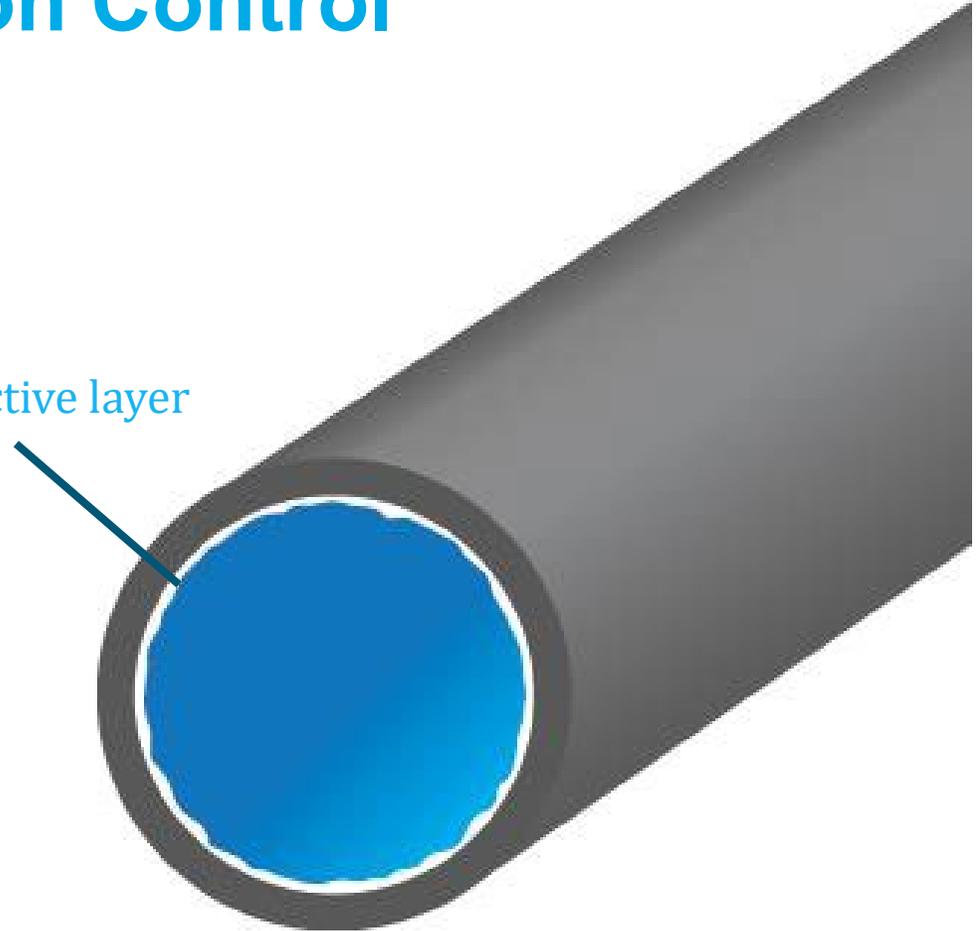
- **What are the reason for their exceedance?**
 - Sampling protocol changed to include first draw and fifth liter on Lead Service Line (LSL)
- **Improvements Following Michigan's 2018 LCR Revisions**
 - 12 communities exceeded in 2019
 - 6 communities exceeded in 2020
 - 2 communities exceeded in 2021
- **Recommendations for further improvement**
 - LSLs (lead service lines) removed
 - Maintain water quality in distribution system (flushing to maintain residuals and reduce water age)

Value of Corrosion Control

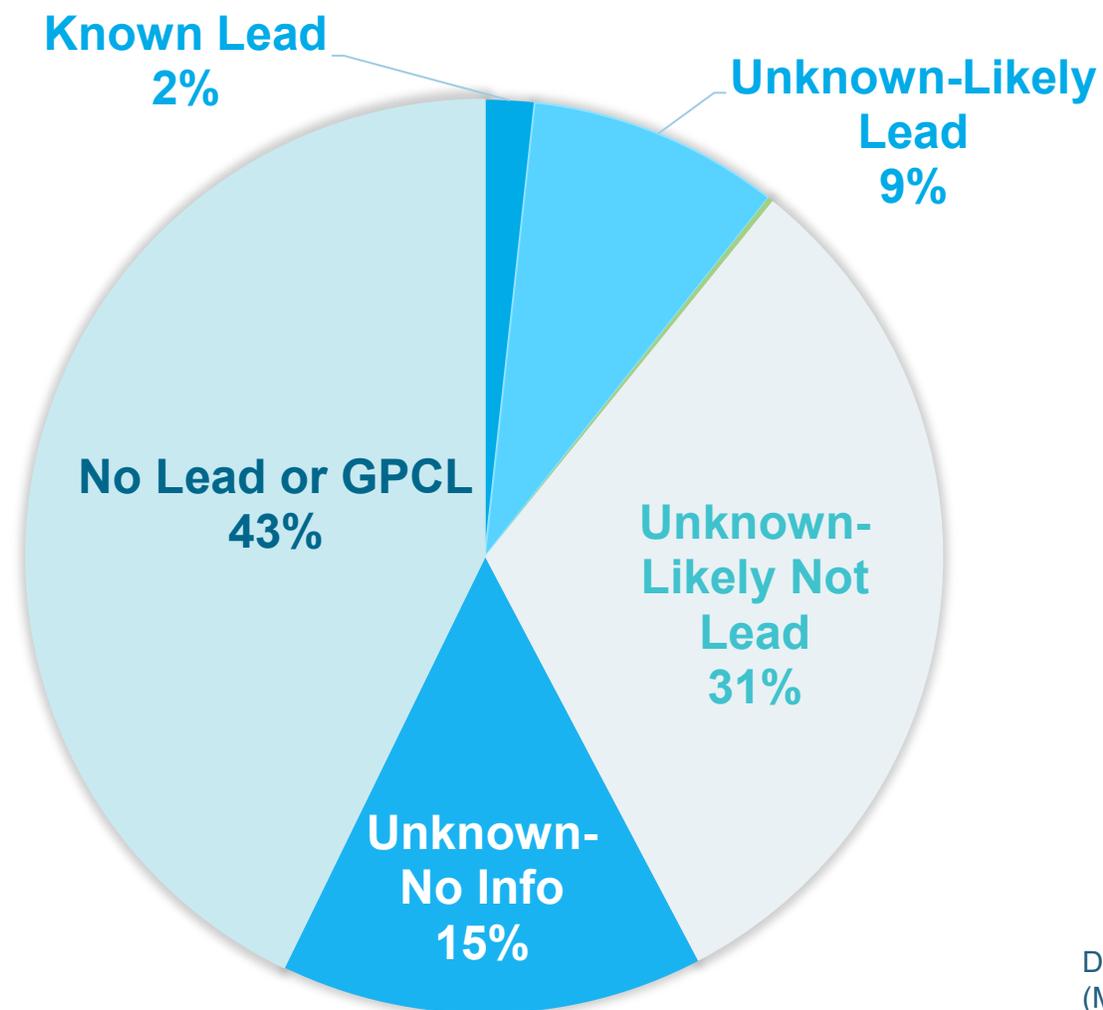
Value of Corrosion Control

Forms a protective layer inside plumbing materials to prevent lead and other metals from dissolving into the water

protective layer



Member Partner Service Line Materials



DSMI Data from EGLE website
(March, 2020)

Too Much of A Good Thing ?

Could an increased ortho-phosphate dosage impact phosphorus removal at WRRF?

- If water supply increases the orthophosphate residual, then WRRF will need to increase removal of phosphorus to meet NPDES permit limits
- Phosphorous reduction prevents or reduces algal bloom formation

Corrosion Control Study

GLWA's Optimization Study

Proactive Study



Voluntarily Initiated
and Funded by GLWA



Confirm Water Quality
is Optimized



Findings are specific to
GLWA water and Member
Partner pipes

Study is *ongoing*



Harvesting Partners

- ◆ Oakland County WRC
- ◆ Southeastern Oakland County Water Authority
- ◆ Hazel park
- ◆ Detroit
- ◆ Royal Oak
- ◆ Birmingham
- ◆ Warren
- ◆ Ypsilanti
- ◆ Southgate
- ◆ Melvindale
- ◆ Farmington
- ◆ Plymouth
- ◆ Pontiac

Thank you

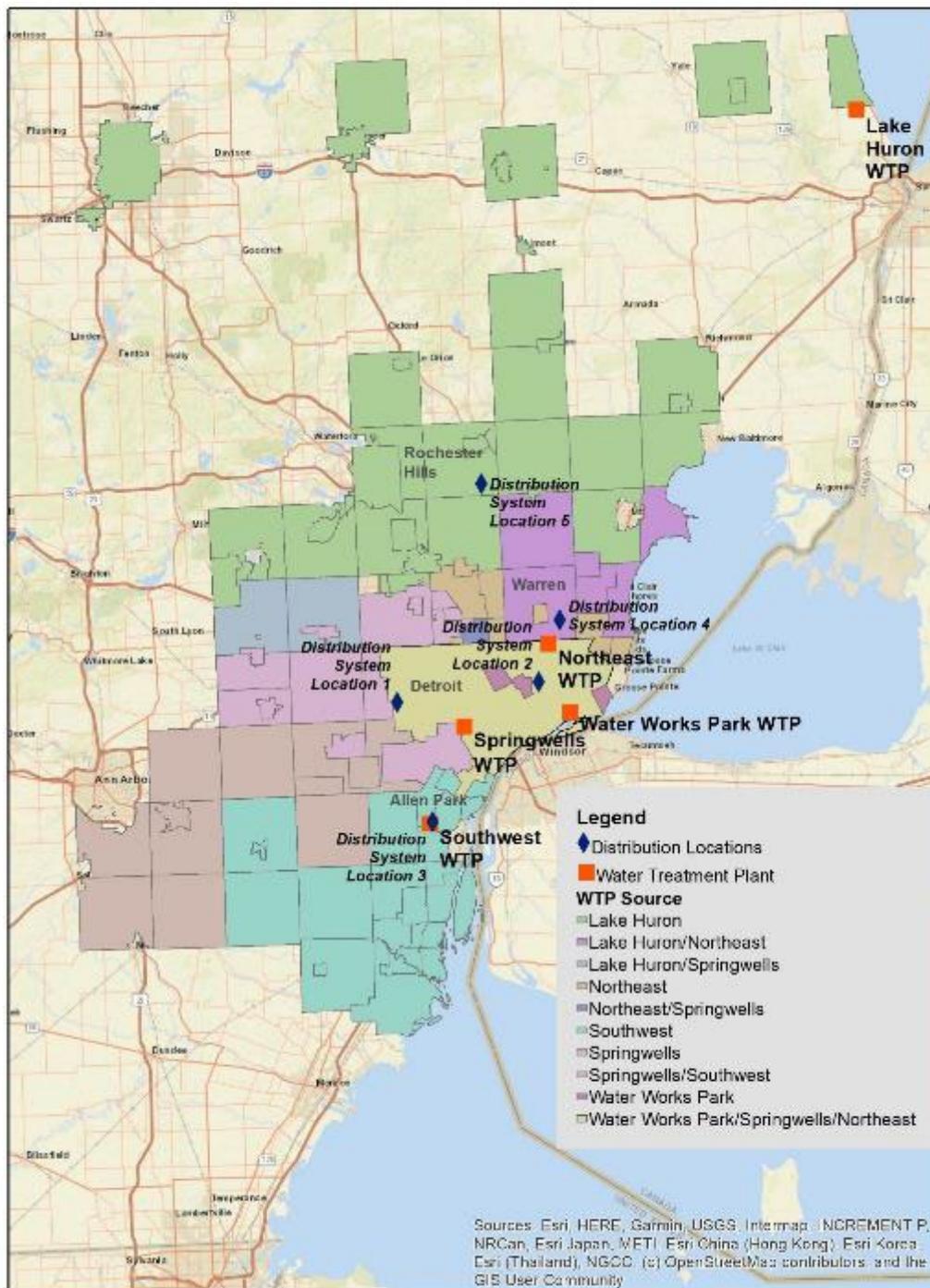
10 Pipe Rig Locations

Water Treatment Plants

- Water Works Park WTP
- Lake Huron WTP
- Springwells WTP
- Southwest WTP
- Northeast WTP

Distribution Locations

- Allen Park
- Detroit (CSF)
- Detroit (West Yard)
- Rochester Hills
- Warren



Water Treatment Plant Rigs



Lake Huron WTP



Southwest WTP



Northeast WTP



Springwells WTP



Water Works Park WTP

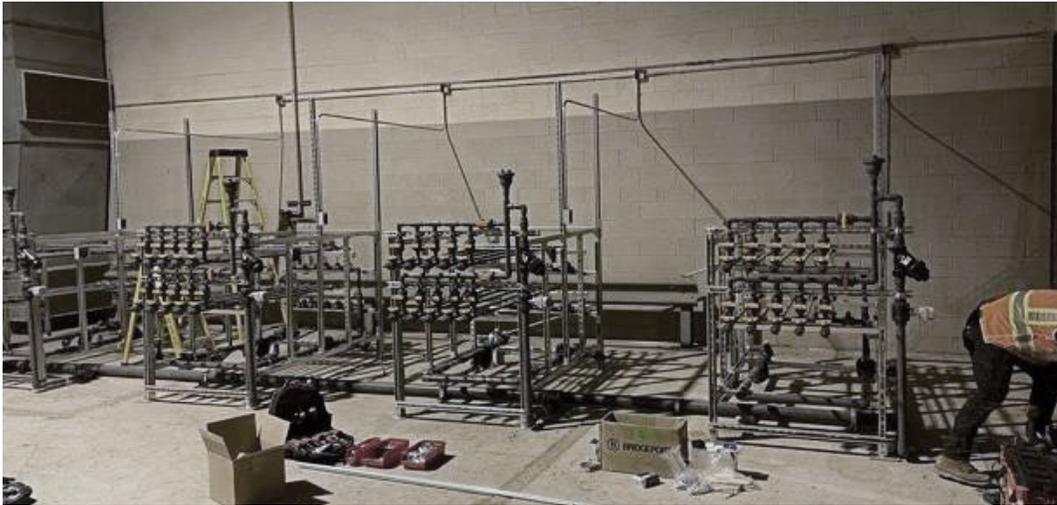
Distribution System Rigs



Allen Park



West Yard



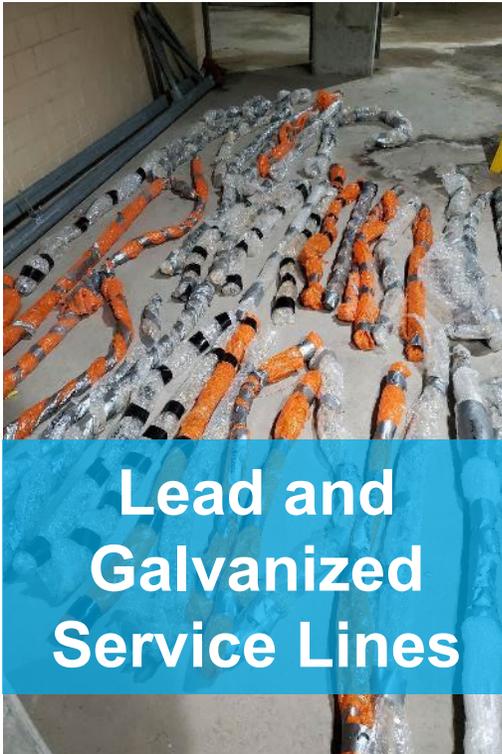
Central Services Facility



Rochester Hills

Pipe Test Materials

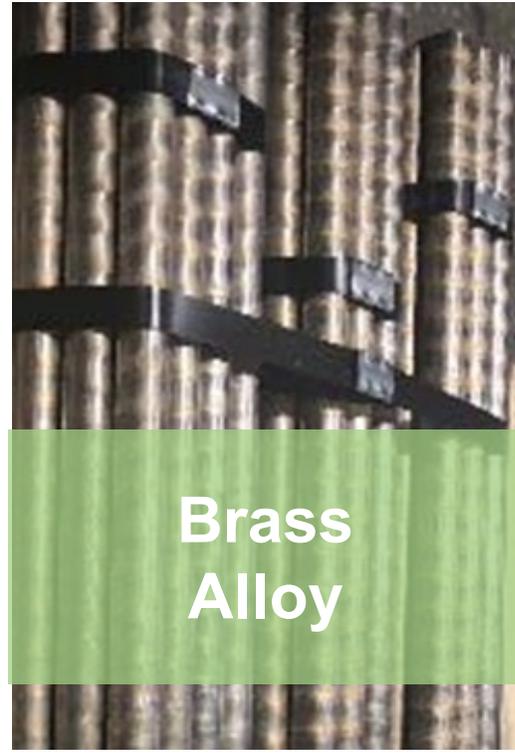
Harvested and New



Lead and Galvanized Service Lines



Copper with Lead Solder



Brass Alloy



Copper Pipe

Study Parameters

Varying Conditions



Increased
orthophosphate dose



pH changes



Chlorine Residuals

Modified conditions will be compared to the control rig.

Corrosion Control Study Timeline

Jan. – Feb. 2022

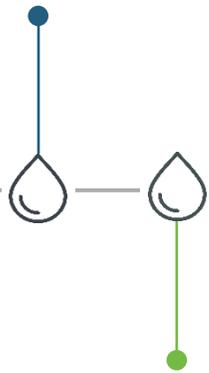
Complete Remaining Rig
Fabrication and Installation

Feb. – July 2022

Begin Conditioning

May–Nov. 2023

Final Report and
Recommendations



Determine CCT Strategies for
Test Conditions
Jan. 2022



Begin Testing
Aug. 2022



Water Quality Actions

- Maintain Orthophosphate residual of 1.2 mg/L at plant tap
- GLWA Member Partners must maintain an active water main flushing program
- Communicate with residents on the importance of flushing in their homes

Keep the water flowing

2. How do I determine what material my service line is made of?

Service lines can be made of galvanized steel, lead, copper, or plastic. Local construction practices and ordinances impacted the type of pipe material used in communities at specific times. Local ordinances in the Detroit area began prohibiting the use of lead pipe in plumbing codes as early as 1947. Some communities used a small connector pipe made of lead, commonly called a gooseneck, to connect a galvanized steel service line to the water main. The presence of a lead gooseneck cannot be determined by examining plumbing in your home. If you are unsure about the type of service line at your home, contact your local municipality.

Two simple tests can be performed using a screwdriver and a magnet to help determine the service line material entering your home. Locate where the service line comes through the floor or wall into your home (see bottom right picture). This should be near your main water shutoff valve and water meter.

If you have a metal pipe below the first shutoff valve, use the flat edge of a screwdriver to carefully scratch through any corrosion that may have built up on the outside of the pipe. Place a magnet on the scratched area. If the magnet sticks to the pipe, it is galvanized steel. If the magnet does not stick and the scraped area is:

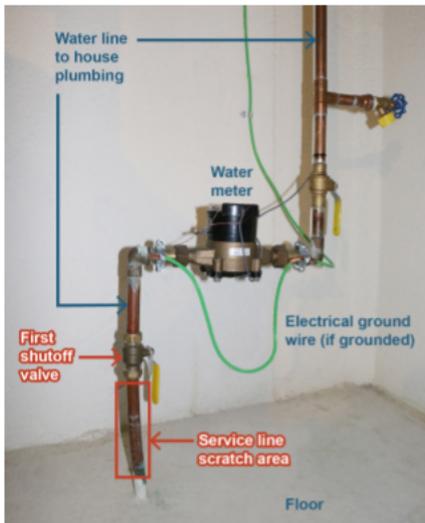
- shiny, silver in color, and looks like a nickel, the pipe is made of lead.
- copper in color and looks like a penny, the pipe is made of copper.

If the pipe feels like plastic, is white or gray in color, and joined with a clamp, glued or screwed together, it is plastic and no further tests are required.

3. How can I tell if my plumbing fixtures have lead or lead solder in them?

If your home was built before 1986, your home's plumbing likely contains faucets and pipes with some lead content and lead solder. Brass and chrome-plated brass faucets and fittings contain some lead. Brass fixtures and copper pipes can be joined with lead solder. From 1986 to 2014, brass faucets and fittings sold in the US that were labeled as "lead free" could contain up to 8% lead. In January 2014, the Reduction of Lead in Drinking Water Act redefined "lead free" as "not more than a weighted average of 0.25% lead when used with respect to the wetted surfaces of pipes, pipe fittings, plumbing fittings, and fixtures."

PIPE MATERIALS USED IN SERVICE LINES



Identify a test area on the pipe between where the service line comes into the home (typically the floor) and the first shutoff valve. If the pipe is covered or wrapped, expose a small area of metal. Follow instructions in response to Question 2 to determine the pipe material.

NOTE: The piping above the shutoff valve, known as the water line to house plumbing, should not be tested as it is likely made of a different material than the service line.

GLWA Resources for Residents

- Sources of Lead and Copper and Health Effects
- Corrosion Control and Water Testing
- Drinking Water Quality in the Home
- Water Heater Flushing
- Service Lines and Plumbing Fixtures

