The EPA Lead and Copper Rule Revisions

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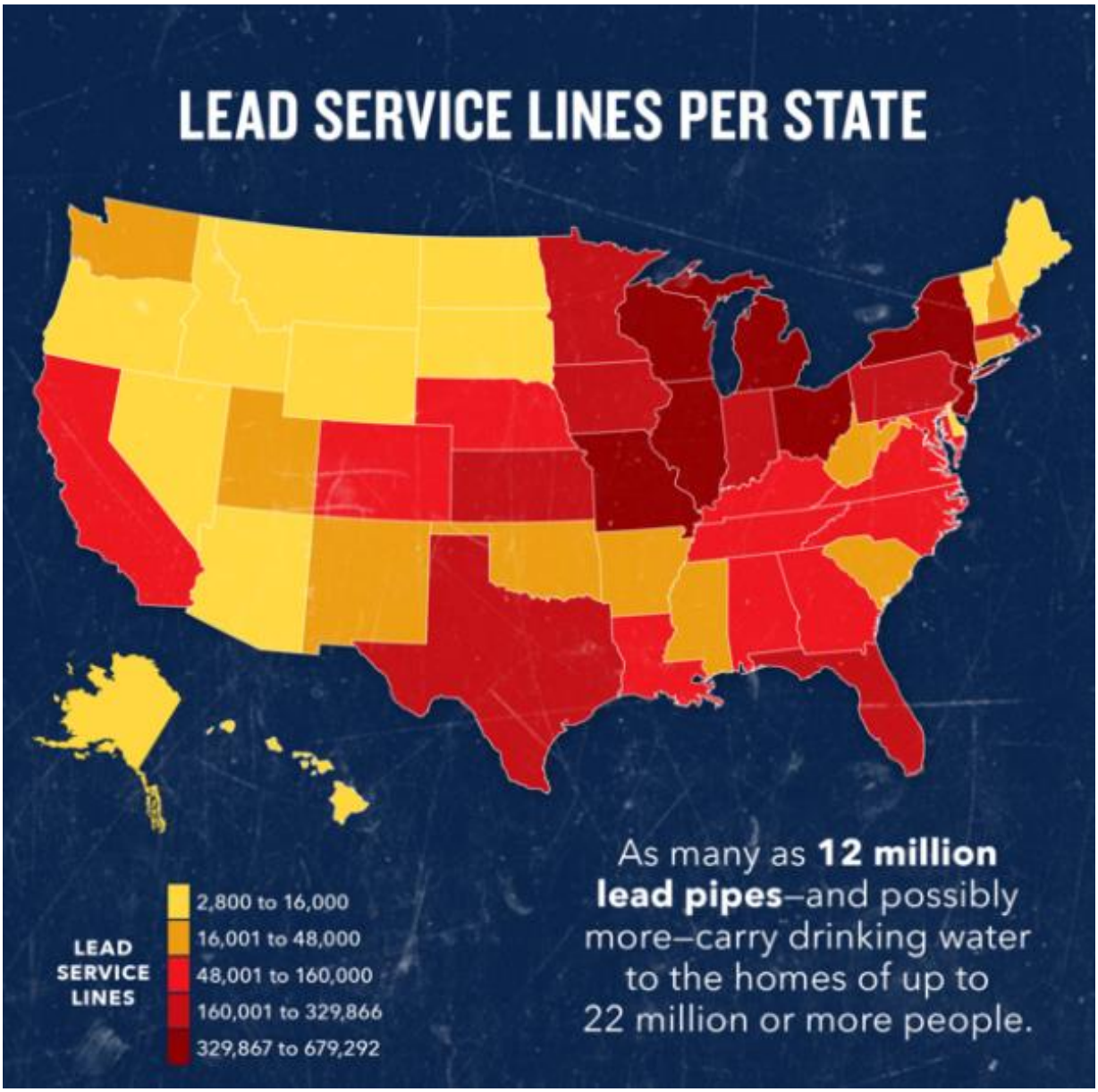
Introduction

On December 16th, 2021 the final rule of the National Primary Drinking Water Regulations: Lead and Copper Rule Revisions (LCRR) was officially released. The Environmental Protection Agency (EPA) began developing these revisions in 2004 and added the LCRR to the Federal Register in January of 2021. The compliance date for the revisions is October 16th, 2024.



The goal of the LCRR – Remove all lead service lines in the United States. Source: Mulvihill 2021.

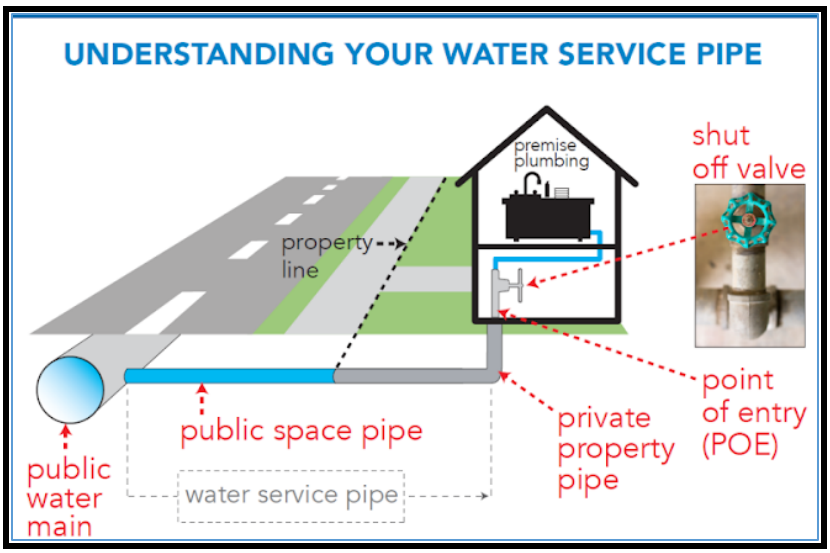
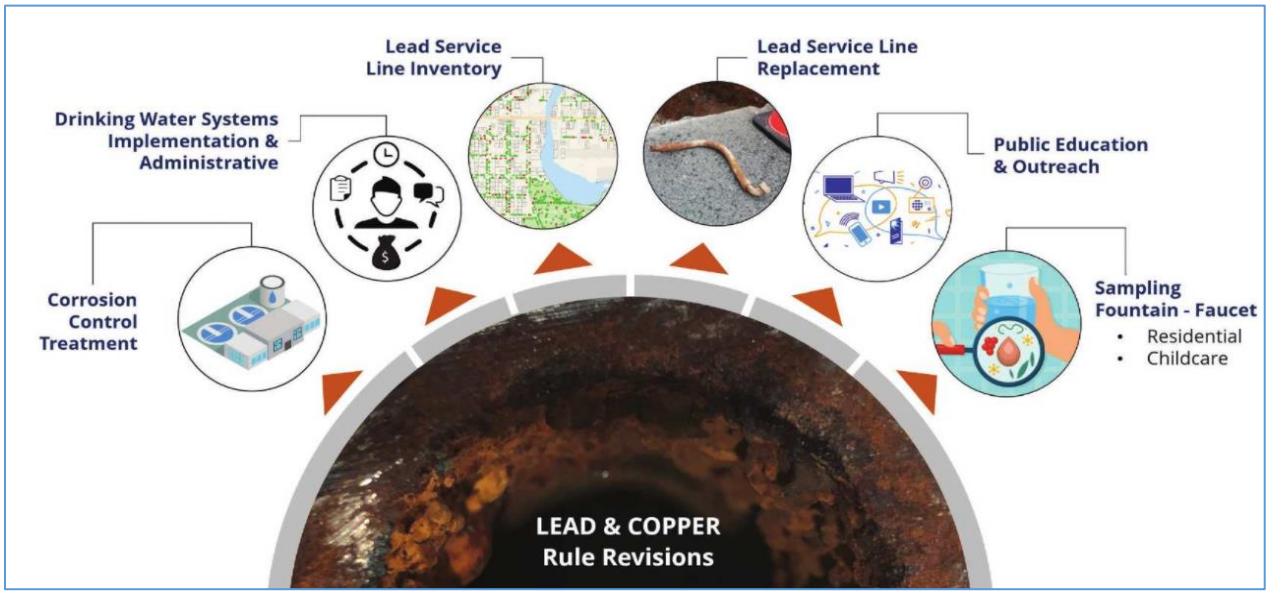


Diagram of a water service line. Source: DC Water 2017.

This report will begin with a brief history of lead in water and the eventual regulation of lead levels in drinking water by the U.S. government. It will then provide a short explanation of the Lead and Copper Rule (LCR) before discussing the LCRR and the ways in which the revisions will affect the City of Bloomington Utilities (CBU) specifically. Each major aspect of the LCRR will be discussed along with details about the plan that CBU is putting in place to ensure all LCR regulations are followed during the LCRR implementation and into the future.



Some major aspects of the LCRR. Source: Murray 2021.

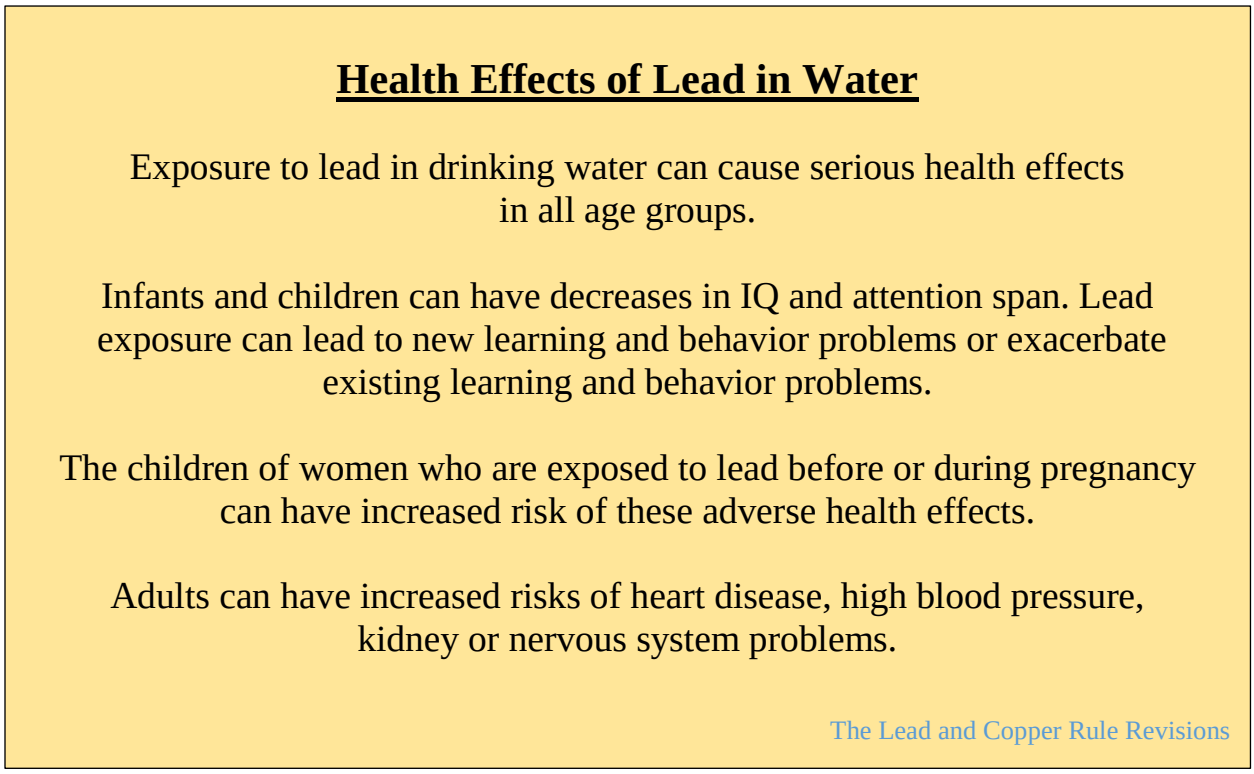
History of Lead in Water

Lead has been used in plumbing for thousands of years. In fact, the word plumbing is derived from the Latin word for lead, *plumbum*. Ancient Rome established a large water distribution system as early as 100 B.C., and was the first civilization to deliver drinking water through pipes directly to individual households (Mays et al. 2007). Much of their distribution network consisted of lead pipes.

Roman lead water pipe circa 81-96 A.D. Source: Science Museum Group 2022.

After the downfall of the Roman Empire, large scale centralized water infrastructure did not appear again until the Industrial Revolution, when cities in the United States and Europe began using pipes to carry drinking water and wastewater. Although iron was often used because it was cheaper than lead, the durability and malleability of lead resulted in its widespread use in plumbing. By 1900, over 70% of cities with more than 30,000 people used lead water lines (Rabin 2008).

By the twentieth century it was evident that incidences of lead poisoning were increasing, and many medical articles and scientific publications made a compelling case for a relationship between lead water pipes and lead poisoning. By the 1920's many communities had decided that the public health risks outweighed the engineering advantages of using lead pipes, and prohibited their use in local and state plumbing codes. In 1925 the U.S. Public Health Service released a non-enforceable tolerance limit for lead of 0.1 mg/l (Rabin 2008).



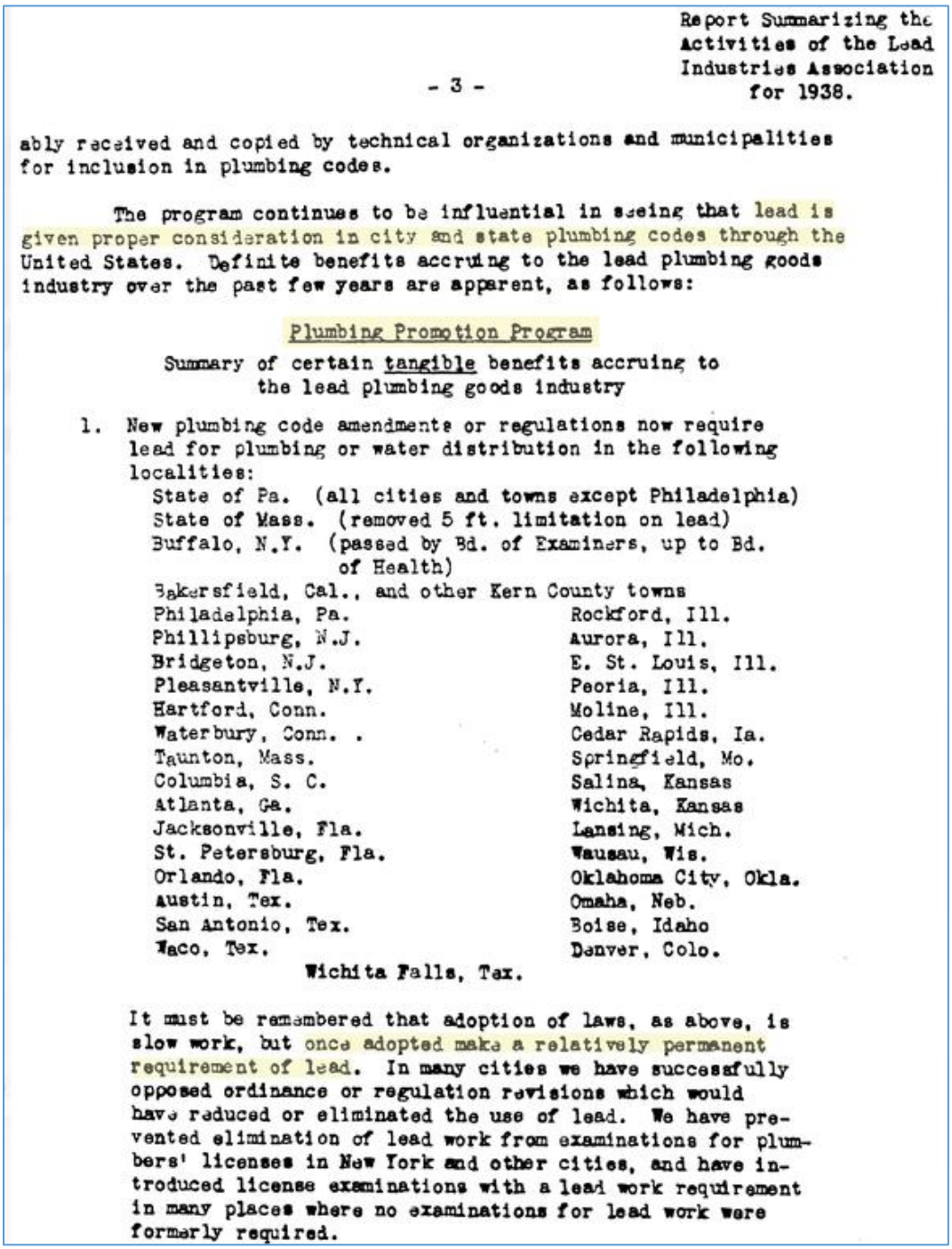
Health effects of lead in water. Source: EPA 2022.

In the 1930's, the Lead Industries Association (LIA), made up of all the major lead companies of the time, created a plan to revive the industry's sale of lead pipe. The association hired staff to visit hundreds of city water departments and pushed the idea of making lead pipes mandatory in city codes. They sent illustrated promotional materials to over 4,000 water departments around the U.S. to encourage the use of lead pipes (McCormick et al. 2022).

The LIA published numerous articles and books highlighting the advantages of lead pipes. They also worked to convince plumbers to become lead advocates, urging them to keep cities dependent on complex lead infrastructure to ensure their own job security.

Lead promotional materials. Source: McCormick et al. 2022.

The LIA plan resulted in two states and 33 major cities requiring lead piping, and plumbers associations in 14 states asserting their allegiance to lead pipes (McCormick et al. 2022). The LIA continued advocating for lead water lines throughout the 1940's and 1950's, and the lead industry benefited from the absence of federal regulations of environmental health hazards (Rabin 2008).



Report Summarizing the Activities of the Lead Industries Association for 1938.

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ably received and copied by technical organizations and municipalities for inclusion in plumbing codes.

The program continues to be influential in seeing that lead is given proper consideration in city and state plumbing codes through the United States. Definite benefits accruing to the lead plumbing goods industry over the past few years are apparent, as follows:

Plumbing Promotion Program

Summary of certain tangible benefits accruing to the lead plumbing goods industry

1. New plumbing code amendments or regulations now require lead for plumbing or water distribution in the following localities:

State of Pa. (all cities and towns except Philadelphia)
State of Mass. (removed 5 ft. limitation on lead)
Buffalo, N.Y. (passed by Bd. of Examiners, up to Bd. of Health)
Bakersfield, Cal., and other Kern County towns

Philadelphia, Pa.	Rockford, Ill.
Phillipsburg, N.J.	Aurora, Ill.
Bridgeton, N.J.	E. St. Louis, Ill.
Pleasantville, N.Y.	Peoria, Ill.
Hartford, Conn.	Moline, Ill.
Waterbury, Conn. .	Cedar Rapids, Ia.
Taunton, Mass.	Springfield, Mo.
Columbia, S. C.	Salina, Kansas
Atlanta, Ga.	Wichita, Kansas
Jacksonville, Fla.	Lansing, Mich.
St. Petersburg, Fla.	Wausau, Wis.
Orlando, Fla.	Oklahoma City, Okla.
Austin, Tex.	Omaha, Neb.
San Antonio, Tex.	Boise, Idaho
Waco, Tex.	Denver, Colo.
Wichita Falls, Tex.	

It must be remembered that adoption of laws, as above, is slow work, but once adopted make a relatively permanent requirement of lead. In many cities we have successfully opposed ordinance or regulation revisions which would have reduced or eliminated the use of lead. We have prevented elimination of lead work from examinations for plumbers' licenses in New York and other cities, and have introduced license examinations with a lead work requirement in many places where no examinations for lead work were formerly required.

Report from the offices of LIA. Source: McCormick et al. 2022.

Public awareness of environmental hazards began to grow and many acts of Congress reflected this change, which would eventually result in the regulation of lead in water. The Federal Water Pollution Control Act was passed in 1948, and amended in 1956 to strengthen the government's ability to enforce regulations and give the federal government control over individual state's consent where health is endangered. This power was enhanced again in 1965 when the Water Quality Act was passed, which established a baseline for state water quality levels (PBS 2022).

In 1970, the Environmental Protection Agency (EPA) was established, in order to consolidate many environmental responsibilities of the federal government under one agency.

President Nixon signing the National Environmental Policy Act in 1970. Source: Hao 2017.

In 1974 Congress passed the Safe Drinking Water Act (SDWA), which allowed the EPA to set enforceable standards for drinking water quality.

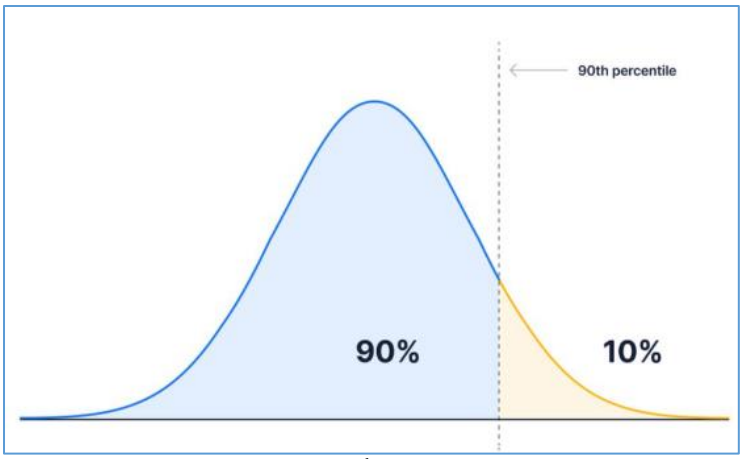
Celebrating the SWDA. Source: EPA 2022.

Amendments to the SDWA were released in 1986, and these defined lead-free plumbing, prohibited its use in conveying public drinking water, and set standards limiting the concentration of lead in public water systems. Further amendments in 1988 established a program to remove all lead-lined drinking water coolers from schools. Finally, in 1991 the EPA released the Lead and Copper Rule.

A Brief Explanation of the Lead and Copper Rule

The Lead and Copper Rule (LCR) is a federal regulation that was originally published by the EPA in 1991 as an addition to the SDWA, with the purpose of controlling lead and copper in drinking water.

Unlike most drinking water regulations, the LCR does not include a health-based standard such as a maximum contaminant level (MCL). Instead the rule establishes a treatment technique and action levels. The LCR specifies an action level (AL) of 15 ppb for lead and 1.3 ppm for copper. The AL is based on the 90th percentile of a water system's tap water samples, which means that 90% of samples collected must have lead levels below 15 ppb for lead and 1.3 ppm for copper.



A bell curve demonstration of 90th percentile. Source: Kohn 2021.

The LCR's treatment technique includes corrosion control, source water treatment, lead service line replacement (LSLR), and public education. If the AL is ever exceeded, the treatment techniques must be applied by the water system.

Because most lead found in drinking water leaches from lead service lines (SLs), compliance sampling takes place at the customer's taps. A "first draw" sample is collected by the customer after allowing the water to sit undisturbed in the pipes for at least six hours.

First draw sampling.

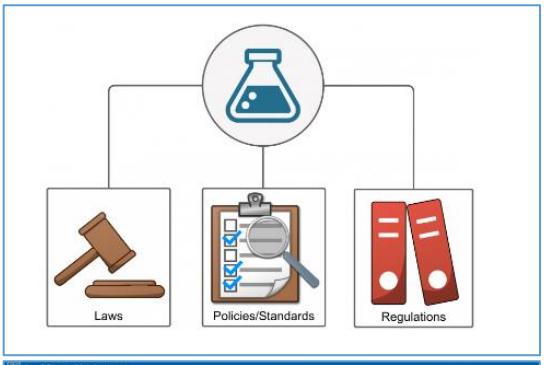
The amount of samples required each monitoring period is determined by the population served by the water system. Compliance sampling frequency is 2 consecutive 6 month monitoring periods, but may be reduced to once per year or once every three years depending on lead results.

Since the LCR was introduced, lead exposures from drinking water has declined in the United States. However, since there is no acceptable level of lead in water, with the EPA Maximum Contaminant Level Goal (MCGL) set at zero, the LCRR has been introduced with the goal of removing all lead service lines in the U.S.

Key Aspects of the LCRR

While there are many minor changes to the LCR that will need to be addressed, this report will focus on the four major aspects of the LCRR affecting CBU:

- Compliance testing changes and implications
- School lead testing
- The creation of a service line inventory (SLI)
- Implementation of a lead service line replacement plan (LSLRP)



Compliance Testing Changes and Implications

With the LCRR, some compliance sampling changes will be implemented and the sampling results will have new implications. Important additions include:

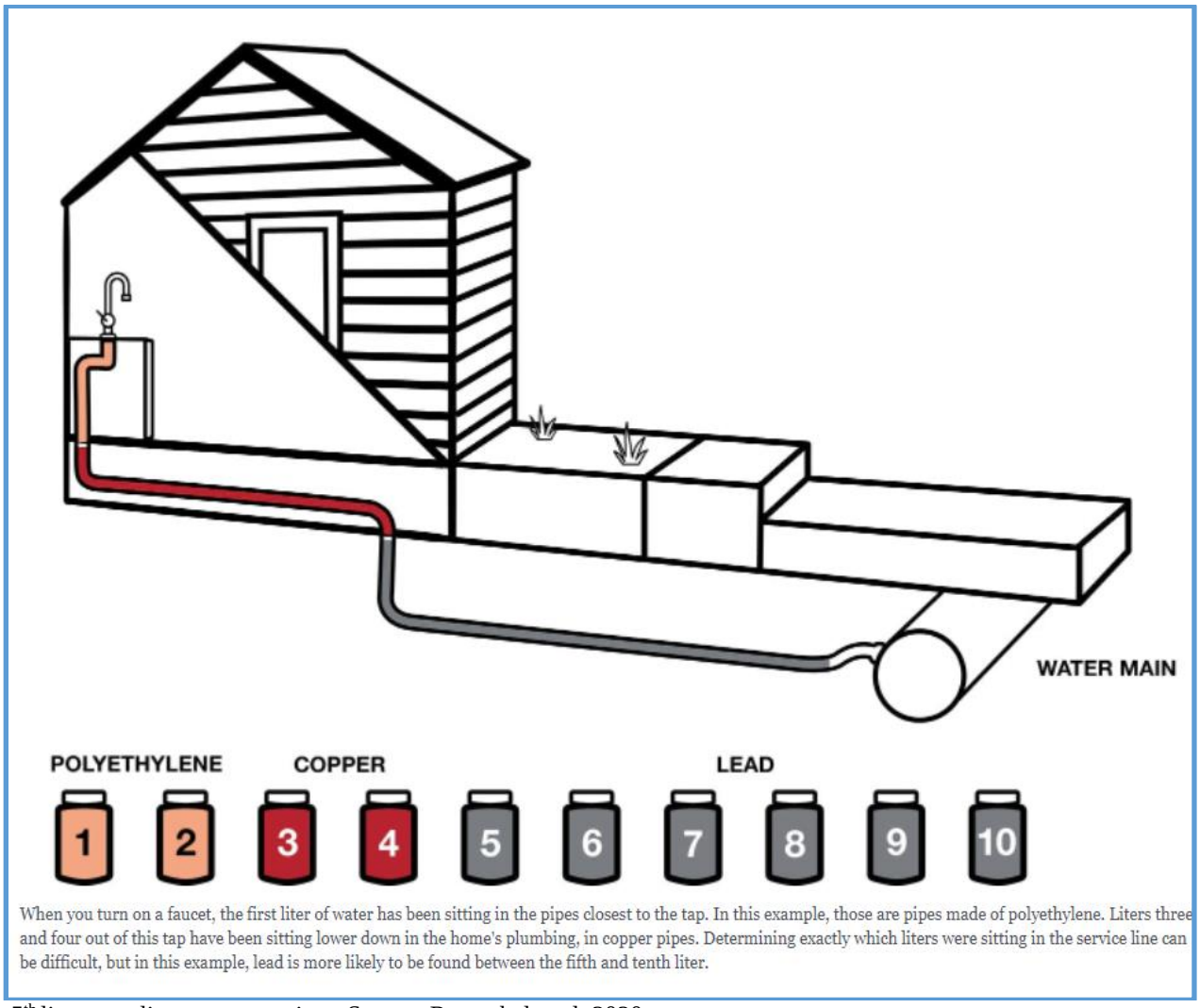
- 5th liter sampling from homes with lead service lines
- Trigger level
- Monitoring frequency updates

Laboratory LCR analysis.

5th Liter Sampling from homes with lead service lines

All samples must be collected from homes with lead service lines. In the past, samples could also be collected from homes using copper pipes with lead solder.

All lead samples collected will now be 5th liter samples, meaning once the water is turned on for sampling, 4 liters must be filled before the compliance sample bottle is filled. This 5th liter sample is more representative of the water sitting in the service line.

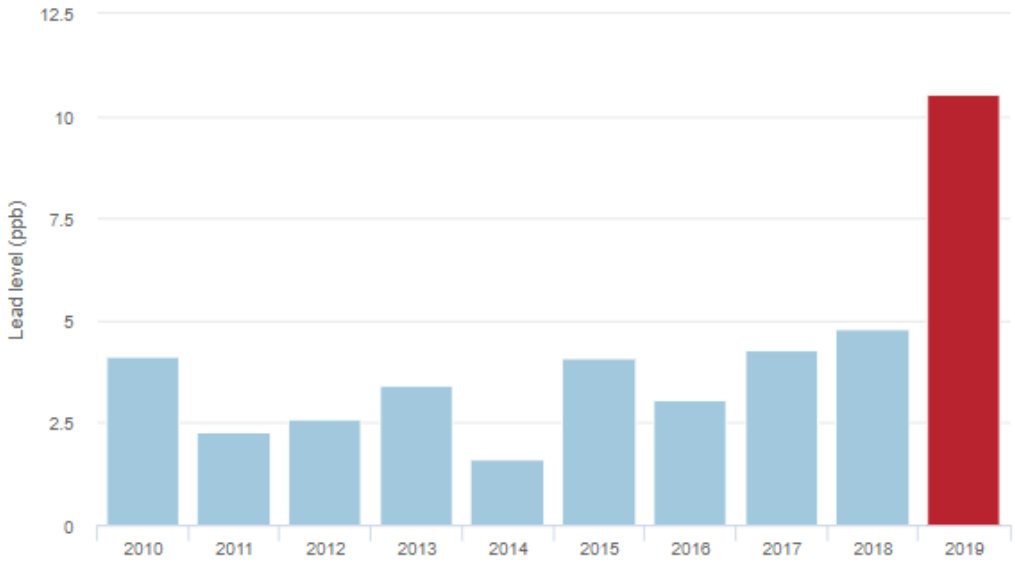


5th liter sampling representation. Source: Rosenthal et al. 2020.

Both of these changes are important because they are likely to cause higher lead results during compliance sampling. After Michigan began requiring 5th liter sampling in 2019, average lead levels more than doubled (Rosenthal et al. 2020).

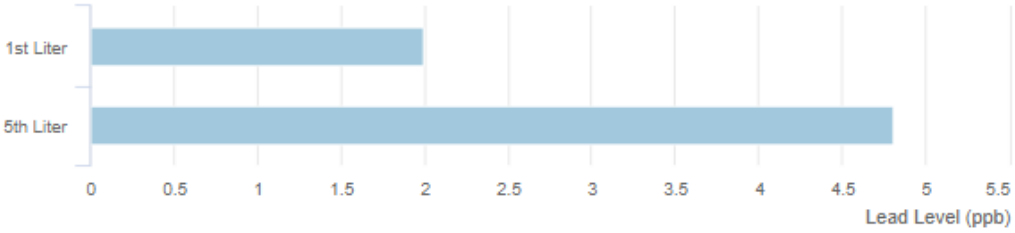
What happened when Michigan changed its testing

In 2019, Michigan began using more rigorous lead testing. That year, 134 water systems in the state began using first- and fifth-liter samples, to capture water more likely exposed to a lead service line. And the average lead level more than doubled, from less than 5 parts per billion to more than 10 ppb.



The fifth-liter samples had more lead

An APM Reports analysis of more than 30,000 individual lead tests in Michigan over the last four years found that, on average, fifth-liter samples had two and a half times as much lead as first-liter samples.



Michigan 5th liter sampling results. Source: Rosenthal et al. 2020.

CBU Plan: Initiate 5th liter sampling methods during 2022 to 2024 LCR compliance sampling.

CBU received permission from IDEM to collect 5th liter samples for our own records, while still using the 1st liter sample for compliance purposes, until the compliance date of the rule begins in 2024.

This will provide valuable data before 5th liter samples are used for compliance, and allow us to plan ahead if the results are dramatically higher for the 5th liter samples than for the 1st liter samples.

Trigger Level

The LCRR introduces a new lead threshold called the trigger level (TL). The AL remains unchanged with the LCRR, at 1.3 ppm for copper and 15 ppb for lead. This is the exceedance level for the 90th percentile of each parameter, meaning that 90% of all samples collected must be under this amount. The TL is lower, with a 90th percentile lead level of 10 ppb.

If either the TL or the AL are exceeded during compliance sampling, steps such as additional planning, monitoring, customer outreach, and treatment requirements will be necessary.

If the TL is exceeded during compliance sampling, a plan for re-optimizing Corrosion Control Treatment (CCT) must be submitted to the state for approval. CCT includes pH adjustment, alkalinity adjustment, orthophosphate addition, or silica addition. If approved by the state, the CCT re-optimization may be a modification to existing CCT without conducting Corrosion Control Studies (CCS).

If the AL is reached, the Community Water System (CWS) must complete an evaluation of CCT re-optimization using CCS, by conducting pipe loop testing utilizing LSLs harvested from the distribution system.

CBU Plan: Create a contingency plan for both instances.

In the case of exceeding the TL, one option of re-optimization without CCS is to increase sodium hydroxide levels at the treatment plant to increase water pH in the distribution system. Currently the target pH is 9.1, so CBU could potentially submit a plan to the state with a higher target pH of 9.3.

In the case of exceeding the AL, CBU will likely hire a consultant, such as Arcadis, to assist in setting up and conducting pipe loop studies. CBU is retaining any lead service line piping as it is removed during LSLRs, in case these pipe loop studies are ever necessary.

Example of a pipe loop study set-up.

There are new public education and customer notification requirements for TL/AL exceedances.

If either the TL or AL are exceeded, the CWS must notify all customers within 24 hours.

If the AL is exceeded, printed materials must be delivered first to the state for approval and then to all customers, and must include mandatory language specified word for word in the LCRR. This information includes the health effects of lead, information on lead service lines and replacement, how to access the SLI, and financing programs for customer LSLRs.

If any individual samples are above 15 ppb, the CWS must notify the consumer within 3 days.

CBU Plan: Prepare all notification materials ahead of time.

The CBU Office of Water Quality team is creating templates for each possible scenario. By the 2024 compliance date, a document will exist for each scenario, and we will have quotes from our local printing company for immediate printing and shipping costs.

Our mass email list will be prepared and ready to send the document immediately in the event of a TL or AL exceedance. The 90th percentile amount will be updated before printing and emailing the notices.

For individual samples above 15ppb, a document will be prepared ahead of time, and the lead amount, address, name and date will be updated before being printed and mailed by the Office of Water Quality. We may also choose to submit these forms to IDEM in advance and ask for pre-approval in case these scenarios were to ever take place.

Monitoring Frequency

If the AL is exceeded, changes in monitoring frequency will be instituted. The Lead and Copper Rule monitoring takes place semi-annually unless certain criteria are met to allow for reduced monitoring. The state may grant reduced monitoring for a CWS, allowing them to sample annually if the 90th percentile is under the AL for two consecutive monitoring periods, or triennially if the 90th percentile is under 5 ppb for two consecutive monitoring periods.

Lead and Copper Sample Summary Results

Water System No. :	IN5253002	Federal Type :	C
Water System Name :	CITY OF BLOOMINGTON UTILITIES	State Type :	C
Principal County Served :	MONROE	Primary Source :	SW
Status :	A	Activity Date :	01-01-1976

Data Quality Code	Monitoring Period Begin Date	Monitoring Period End Date	Number of Samples	Measure (mg/l)	Water System Facility State Asgn ID No.	Date Summary Received	Analyte
A	01-01-2022	12-31-2022	30	0.035	DS001		Copper
A	01-01-2022	12-31-2022	30	0.0033	DS001		Lead
A	01-01-2021	12-31-2021	36	0.042	DS001		Copper
A	01-01-2021	12-31-2021	36	0.0046	DS001		Lead

CBU lead and copper 90th percentile results for 2021 and 2022.

Both of these reduced monitoring schedules require optimal water quality parameters (OWQP) to be within a state-specified range for pH, alkalinity, calcium, and orthophosphate if a phosphate-based corrosion inhibitor is used. If the AL is exceeded, the CWS is no longer eligible for reduced monitoring.

CBU Plan: Prepare for the possibility of increased monitoring frequency.

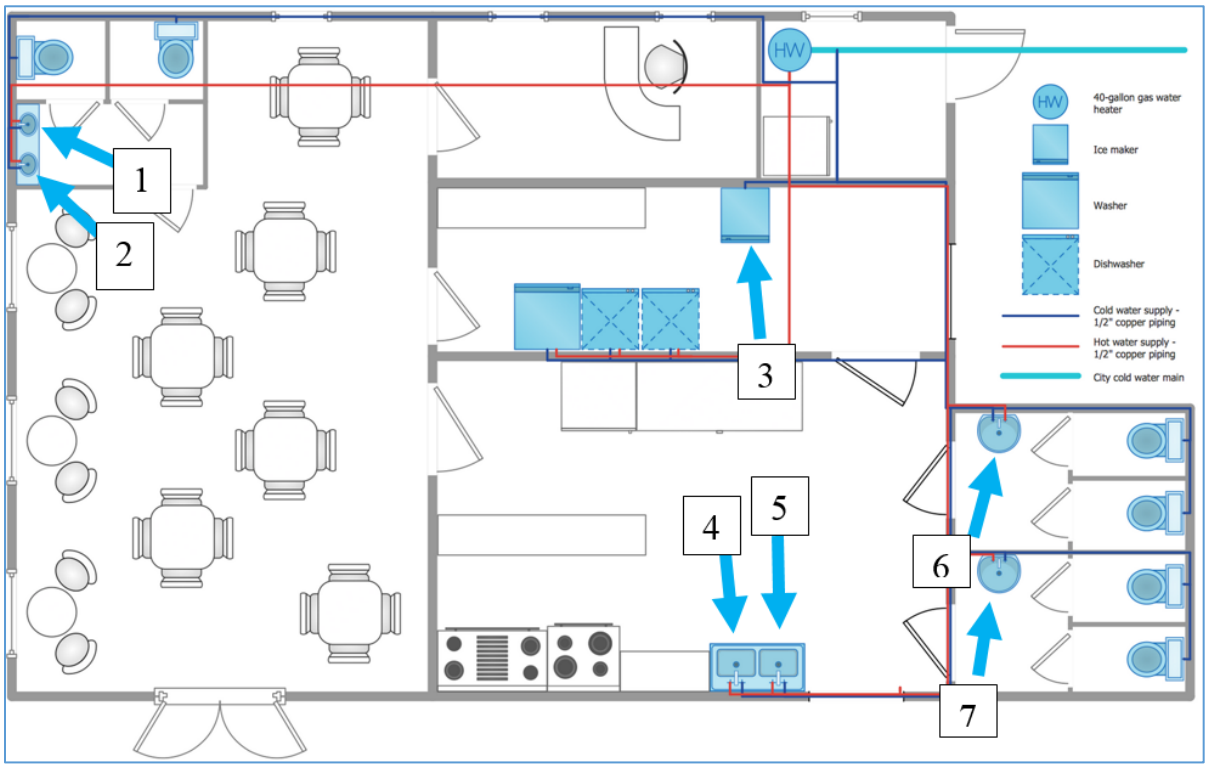
CBU has been granted reduced monitoring, and is currently completing compliance sampling triennially at 30 sites. The next monitoring phase is June to September of 2025.

If CBU ever exceeds the AL, a monitoring frequency increase will cost more money and man-hours. Additional Office of Water Quality positions may be necessary with the increase in sample preparation and delivery time. In 2023 the Office of Water Quality is hiring a full time Water Specialist, who will assist with the extra sampling if necessary.

Lead Testing Program for Schools and Daycares

Beginning in October of 2024, lead testing must be conducted for all Primary schools and daycare facilities in each CWS service area, and offered upon request for all secondary schools. Each year for five years, 20% of all primary schools and 20% of all licensed daycare facilities must be tested at the CWS's expense.

A full school inventory must be created, with details including where each sample site is located within each school. Schools must have at least five sampling sites, and daycare facilities must have at least two sampling sites. After the initial five year cycle, sampling must be offered and completed upon request from each school or daycare.



Example of a map of each faucet location.

Sample results must be provided to all schools and daycares sampled, and must also be shared with the state primacy agency and local health department. Public education materials providing information about the health effects of lead in water and how to request a lead test must be distributed annually.

CBU Plan: Collect school data and purchase necessary laboratory equipment.

Office of Water Quality staff has created a spreadsheet with all schools and daycares in our service area, with addresses and contacts. We plan to sample at all schools including secondary schools. We also plan to sample at every faucet in each school, instead of the minimum 5 sites at schools and 2 at daycares.

The Office of Water Quality has been coordinating the mapping of each faucet, by utilizing the assistance of an Indiana University (IU) professor and students.

To accomplish this amount of testing economically and efficiently, CBU purchased an Inductively Coupled Plasma Mass Spectrometry (ICP-MS) unit for our Water Quality Laboratory.

Public education materials for the schools will be prepared early and distributed annually by Office of Water Quality staff.

ICPMS analysis.

Creation of a Service Line Inventory

The most intensive initial aspect of the LCRR is the requirement of all CWS's to create and maintain a Service Line Inventory (SLI). This inventory must identify and label both the customer side and the municipal side of every service line in the service area. SL's must be labeled "Lead", "Non-Lead", "Lead Status Unknown", or "Galvanized Requiring Replacement", which is designated if a galvanized section of the service line is or ever was downstream of lead.

The inventory must be publicly accessible (online if the CWS serves over 50,000 people), and has to be updated annually. If any lead service lines are present, the CWS must create a Lead Service Line Replacement Plan (LSLRP).

CBU Plan: Utilize multiple resources to complete the SLI.

Unfortunately, CBU has no written records of service line composition. The Office of Water Quality is using a multifaceted approach to ascertain the composition of each line and create the SLI. Important aspects of the project include utilizing:

- Institutional Knowledge
- Year of water main installation
- Year of building construction
- Customer reports
- Physical inspections during routine water line work
- Pot-holing and X-Ray Fluorescence (XRF) metals analysis
- Machine learning algorithm
- Meter pit copper service line identification
- Multiple consultant firms
- Construction of the Public Facing SLI by the CBU GIS Department

Institutional Knowledge

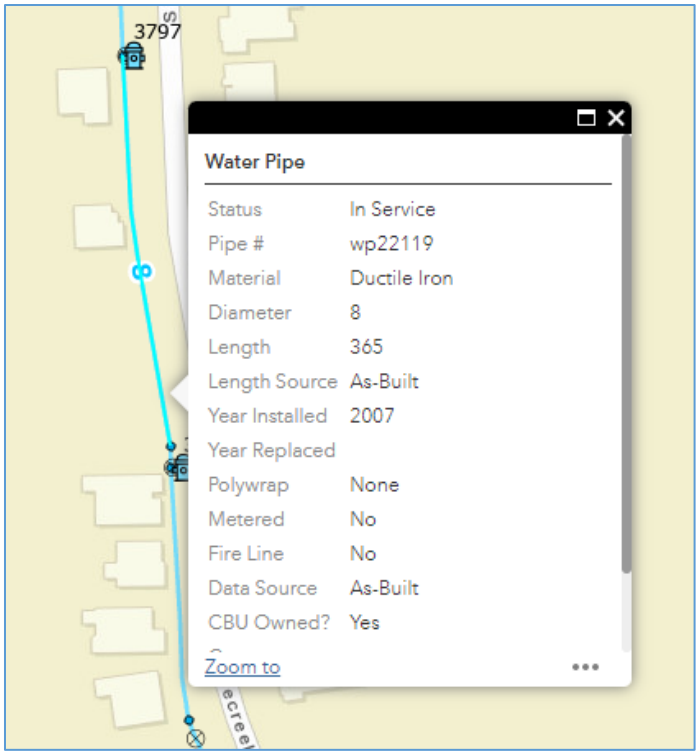
The Office of Water Quality has been interviewing long time CBU employees and retirees. One retiree began working for CBU in 1970 and is certain that lead was never used during that time, or since. It is likely lead use was discontinued well before this date, but 1970 is the earliest confirmed year of the use of all non-lead materials for service line installations.

A few of the approximately 175 CBU employees.

Year of Water Main Installation

CBU does keep records of when a water main was installed or replaced. When a main is installed, the CBU side of the service line is installed simultaneously. So, any CBU service line connected to a main that was installed from 1970 to the present will be labeled as “Non-Lead”. Using this method we’ve identified approximately 10,000 city service lines.

CBU water main installation.



Water main installation year available on CBU GIS.

Year of Building Construction

The County Assessor's Office provided a list of all buildings in the CBU service area, along with the year of construction.

The United States outlawed lead piping in 1986, and Indiana issued an additional state ban in 1988. So, the customer owned service line of any home with a construction date of 1988 to the present will be labeled as "Non-Lead". Using this method we've identified approximately 10,000 customer lines.

AssessmentYear	StateParcelNbr	LocalParcelNbr	Description	Effective Construction Year	LocationAddress
2021	53-05-32-113-026.000-005	013-12270-00	Single-Family R 01	1990	901 W 11th ST
2021	53-05-32-200-056.001-005	013-19740-02	C/I Building C 01	1990	1305 1/2 W 11th ST
2021	53-05-32-201-124.056-005	013-19520-56	Single-Family	1990	814 N Oolitic DR
2021	53-05-32-207-007.000-005	013-15360-00	Single-Family	1990	600 N Alexander ST
2021	53-05-32-307-007.000-005	013-46780-00	C/I Building C 01	1990	141 N ADAMS ST
2021	53-05-32-307-078.000-005	013-36530-00	Single-Family R 01	1990	1402 W Kirkwood AVE
2021	53-05-32-307-122.000-005	013-46790-00	Single-Family R 01	1990	309 N Hay ST
2021	53-05-32-313-012.000-005	013-13220-00	Single-Family R 01	1990	1223 W 7th St
2021	53-05-32-402-002.000-005	013-34910-00	Single-Family R 01	1990	720 W 7th ST
2021	53-05-32-403-048.000-005	013-41570-00	Single-Family R 01	1990	1120 W 8th ST
2021	53-05-32-410-016.000-005	013-42220-00	Single-Family R 01	1990	837 W 6th ST

Monroe County Assessor's Office spreadsheet of building construction year.

Customer Reports

Customers are encouraged to contact the Office of Water Quality to report the composition of their side of the line if they know the information from prior plumbing work. So far we've received approximately 50 customer reports.

Customer reference card.

Physical Inspections During Routine Water Line Work

Transmission & Distribution (T&D) Department employees have been documenting any service lines they come across during normal fieldwork or special projects. So far they have documented over 800 service lines.

Service Line Composition

Address	Customer Side of Meter ☑					CBU side of Meter ☑				
	Copper	Poly	Galv.	Lead	Other(Write in)	Copper	Poly	Galv.	Lead	Other(Write in)

Service line checklist.

Pot-holing, XRF Detection, and Machine Learning Algorithm

The City of Bloomington received $2,000,000 from the American Rescue Plan Act (ARPA). Of that, Utilities Office of Water Quality received $700,000 for the SLI.

This money has been used to purchase:

- Hydro-excavation truck
- Crew cab dump truck
- Line locating equipment
- Hand and power tools
- Trimble GPS transceiver
- XRF metals detection device
- Advising from the consultant firm Arcadis
- Model run from the machine learning algorithm company Blue Conduit
- Services of the media relations firm Holsapple
- Salaries for employees working on the project in the field

Pot-holing on both sides of the water meter pit.

Blue Conduit Machine Learning

Blue Conduit uses machine learning and predictive modeling to extrapolate data and assign each service line in Bloomington with a percent likelihood of lead.

The first step in the process is for CBU to physically inspect 150 service lines, randomly chosen by Blue Conduit but evenly distributed around the city. With this data, Blue Conduit will use their machine learning to provide the likelihood of lead for each customer and CBU service line.

It is unclear at this time whether the EPA or IDEM will allow machine learning data to serve as the final line verification. If they do, then ideally we would list any service line that is 70% or higher likelihood of lead as "Lead", any service line that is 30% or lower likelihood of lead as "Non-lead", and any service line in between those parameters would remain "Lead Status Unknown" until physically verified.

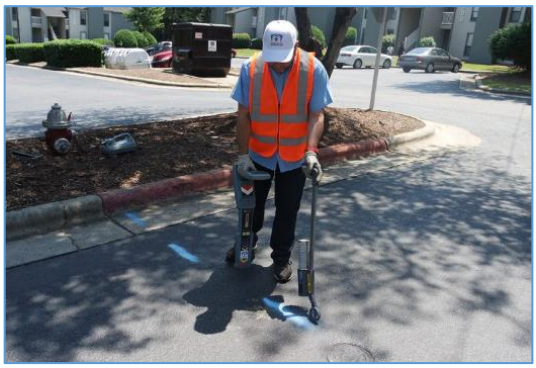
If this data is not allowed to be used as final verification, it will still provide CBU with valuable data and help us decide where to spend our time performing physical verification as we move forward with the project.

Blue Conduit accomplishments.

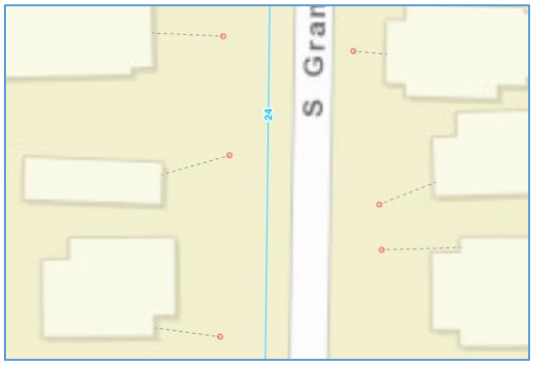
Hydro-Excavation and XRF Analysis

To physically inspect the first 150 lines we are utilizing the hydro-excavation truck, along with a crew of 3-4 Laborers and one Master Equipment Operator who drives and operates the truck.

The laborers first locate the service line using line locating equipment and paint the line location. Next they walk the line with the Trimble GPS transceiver and an iPad with GIS, in order to accurately map where the line is located. Currently in CBU's GIS system the service lines are not accurately depicted and this project provides a chance to update GIS with this information.



Line locating and painting.



Mapping service lines with Trimble GPS and ArcGIS.

Hydro Excavation and XRF Analysis

Once the line is located and mapped, the hydro-excavator is used to pot-hole from 2-5 feet out on both sides of the meter pit in customer's yards in order to efficiently access the customer side and the city side of each service line.

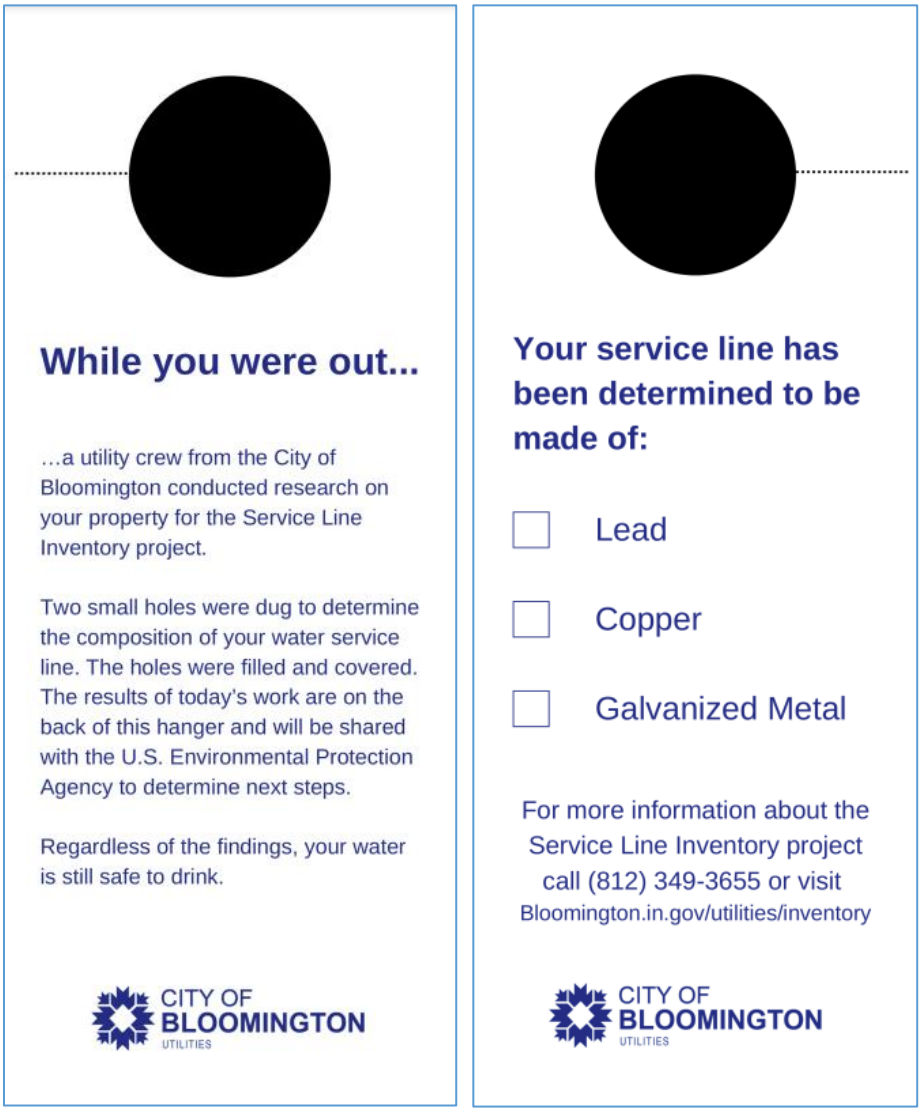
When the line is exposed, the XRF metals analyzer is used to ascertain the exact composition. The XRF stores the data, and GIS is updated in the field to list the service line composition. Finally, the holes are backfilled and grass seed is planted.

Pot-holing, metals analysis with XRF, and backfilling excavations.

Hydro-Excavation and XRF Analysis

The Office of Water Quality has identified approximately 100 service lines so far, and plan to have the first 150 lines identified by spring of 2023 to initiate the Blue Conduit model run.

Once Blue Conduit completes the model run for the initial 150 service lines, then CBU will begin the next phase of pot-holing, using the data provided to excavate in appropriate areas. Depending on the data provided, if it is necessary Blue Conduit will complete a second model run to provide additional data.



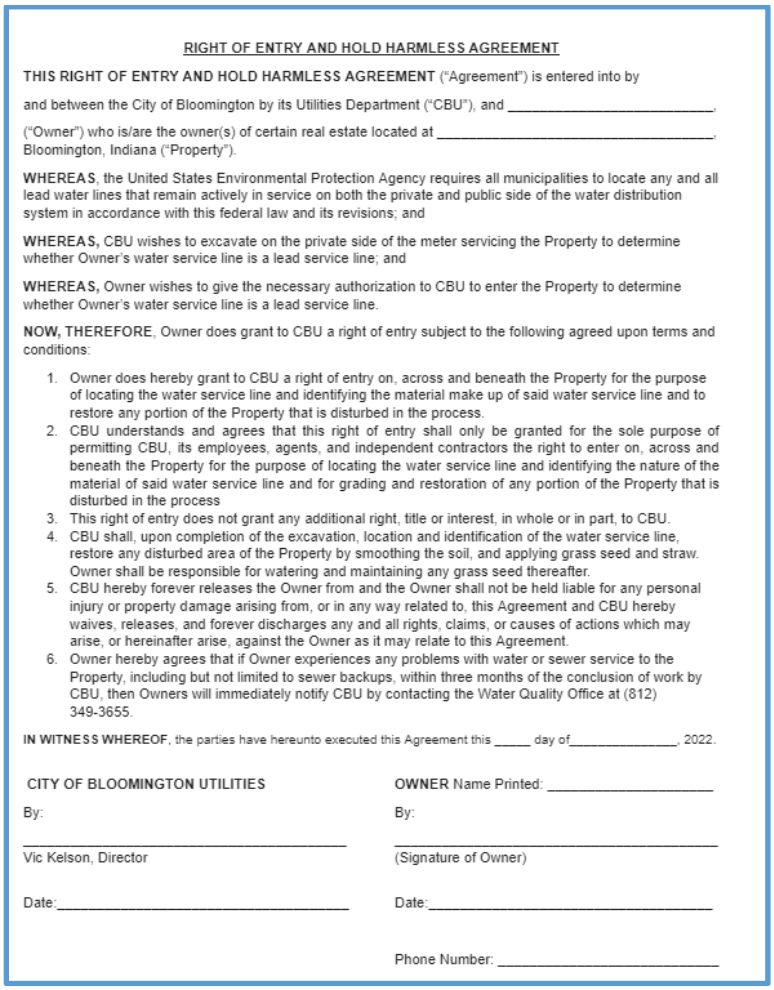
Post excavation door tag front and back.

Customer Outreach

Each customer must sign a Right of Entry (ROE) agreement before CBU pot-holes on their property. An agreement is mailed to renters and homeowners, along with an introductory letter, a brochure about the project, a list of Frequently Asked Questions and Answers, and a stamped return envelope.

The media relations firm Holsapple assisted in the creation of these packets, and developed media events, as well as newspaper and social media articles meant to teach the public about the project and convince those who receive an ROE to sign and return it to CBU.

Holsapple also assisted in the development of our Service Line Inventory webpage https://bloomington.in.gov/utilities/inventory.



RIGHT OF ENTRY AND HOLD HARMLESS AGREEMENT

THIS RIGHT OF ENTRY AND HOLD HARMLESS AGREEMENT ("Agreement") is entered into by

and between the City of Bloomington by its Utilities Department ("CBU"), and _____,

("Owner") who is/are the owner(s) of certain real estate located at _____, Bloomington, Indiana ("Property").

WHEREAS, the United States Environmental Protection Agency requires all municipalities to locate any and all lead water lines that remain actively in service on both the private and public side of the water distribution system in accordance with this federal law and its revisions; and

WHEREAS, CBU wishes to excavate on the private side of the meter servicing the Property to determine whether Owner's water service line is a lead service line; and

WHEREAS, Owner wishes to give the necessary authorization to CBU to enter the Property to determine whether Owner's water service line is a lead service line.

NOW, THEREFORE, Owner does grant to CBU a right of entry subject to the following agreed upon terms and conditions:

1. Owner does hereby grant to CBU a right of entry on, across and beneath the Property for the purpose of locating the water service line and identifying the material make up of said water service line and to restore any portion of the Property that is disturbed in the process.
2. CBU understands and agrees that this right of entry shall only be granted for the sole purpose of permitting CBU, its employees, agents, and independent contractors the right to enter on, across and beneath the Property for the purpose of locating the water service line and identifying the nature of the material of said water service line and for grading and restoration of any portion of the Property that is disturbed in the process
3. This right of entry does not grant any additional right, title or interest, in whole or in part, to CBU.
4. CBU shall, upon completion of the excavation, location and identification of the water service line, restore any disturbed area of the Property by smoothing the soil, and applying grass seed and straw. Owner shall be responsible for watering and maintaining any grass seed thereafter.
5. CBU hereby forever releases the Owner from and the Owner shall not be held liable for any personal injury or property damage arising from, or in any way related to, this Agreement and CBU hereby waives, releases, and forever discharges any and all rights, claims, or causes of actions which may arise, or hereinafter arise, against the Owner as it may relate to this Agreement.
6. Owner hereby agrees that if Owner experiences any problems with water or sewer service to the Property, including but not limited to sewer backups, within three months of the conclusion of work by CBU, then Owners will immediately notify CBU by contacting the Water Quality Office at (812) 349-3655.

IN WITNESS WHEREOF, the parties have hereunto executed this Agreement this _____ day of_____, 2022.

CITY OF BLOOMINGTON UTILITIES

By:

_____
Vic Kelson, Director

Date:_____

OWNER Name Printed: _____

By:

_____
(Signature of Owner)

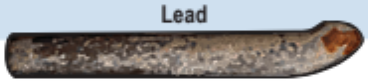
Date:_____

Phone Number: _____

Right of Entry form.

Types of Water Pipes

Lead



A dull, silver-gray color that is easily scratched with a coin. Use a magnet...strong magnets will ***not*** cling to lead pipes.

Galvanized

A dull, silver-gray color. Use a magnet...strong magnets ***will*** typically cling to galvanized pipes.

Copper

The color of a copper penny.

Plastic

White, rigid pipe that is joined to water supply piping with a clamp

Lead in Home Plumbing

Prior to 1986, it was common for plumbers to use fixtures containing lead or lead solder. CBU adjusts the water's chemistry at the treatment plant to reduce the possibility of lead dissolving into the water from these sources. If your home has pre-1986 plumbing, you may want to have it inspected by a licensed plumber to identify lead and galvanized pipes.
If you believe your home may have lead plumbing, there are steps you can take to reduce exposure:

- Run the tap for several minutes before use
- Use only cold water for cooking or drinking
- Clean faucet aerators
- Purchase a home filter certified for lead removal

For more information about the Service Line Inventory visit:

bloomington.in.gov/inventory

Contact us at:

wq@bloomington.in.gov
(812) 349-3655

CITY OF BLOOMINGTON
UTILITIES

Let's Get the Lead Out!

Service Line Inventory

SLI trifold brochure front page.

Water Quality is Our Top Priority

Providing safe, reliable water is our top priority. To ensure your water meets all local, state, and federal safety standards, City of Bloomington Utilities (CBU) analyzes thousands of samples every year for a wide range of contaminants, including lead.

Elevated levels of lead in the human body can pose serious health risks, particularly for pregnant women, infants, and young children.

CBU's drinking water does not contain lead when it leaves the treatment plant. However, water can dissolve lead particles in private service lines and fixtures containing lead.

CBU provides free in-home water testing kits for customers who want to check for the presence of lead. You can request a water test by emailing wq@bloomington.in.gov.

More detailed information about the overall water quality of CBU's drinking water may be found in the annual water quality report at

bloomington.in.gov/utilities/water-quality.

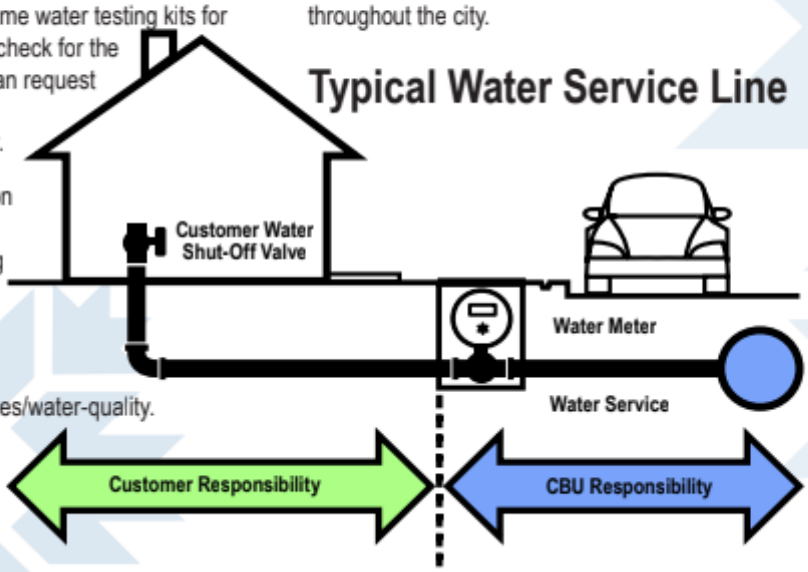
What is the Service Line Inventory?

CBU is inventorying all private and public water service lines in our distribution system. The Service Line Inventory (SLI) is a requirement of the United States Environmental Protection Agency (EPA) for municipal utilities to locate lead water lines that remain actively in service on both the private and public side of the water distribution system.

How it Works

CBU is using several methods to create an inventory of the entire distribution system that we will submit to the EPA for approval. We are using data from GIS and building plans, historical data such as materials available when the building was constructed, and physically looking at pipes throughout the city.

Typical Water Service Line



How You Can Help

For properties selected for the physical inventory, CBU will send a letter and request a Right of Entry Agreement with the property owner, which grants permission so CBU can access the property to excavate, locate, and identify the material of your water service line. If you already know the composition of your water service line from prior plumbing work, please contact CBU to report your findings. This will save CBU time as we will not need to dig on your property.

What to Expect

The day of the project, CBU will excavate two holes-- one on the private side of the water meter and one on the public side of the meter. From these two excavations, CBU will determine the composition of both sides of the line. The holes will be filled, smoothed, and covered in grass seed and straw that same day. This process should take approximately one hour to complete. Neither owners nor tenants are required to be present.

What Happens After

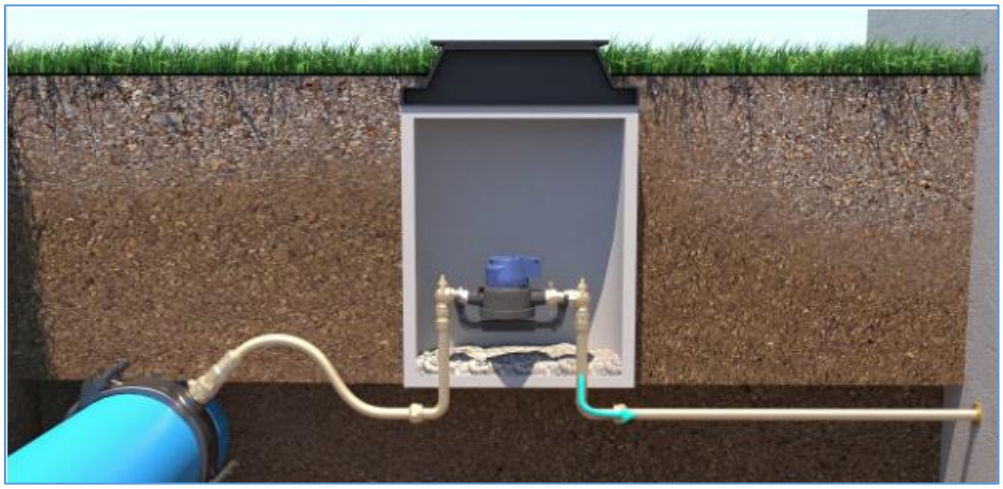
All lead water service lines that CBU identifies will be recorded into an inventory list and incorporated into the comprehensive city-wide lead service line replacement schedule. Details on line replacement will be available in the coming months.

SLI trifold brochure back page.

Meter Pit Copper Service Line Identification

Many long-time CBU employees have asserted that although in some cases the composition of the service line in the meter pit may change between the meter pit and the water main or home, if the line in the pit is composed of copper, it always will continue to be copper all of the way to the main on the CBU side and copper all the way to the home on the homeowner side.

In order to confirm this during pot-holing, if the line is identified as copper then we check and document the line composition inside the meter pit.



Example of a meter pit and service line set-up. Source: Mueller 2022.

Meter Pit Copper Service Line Identification

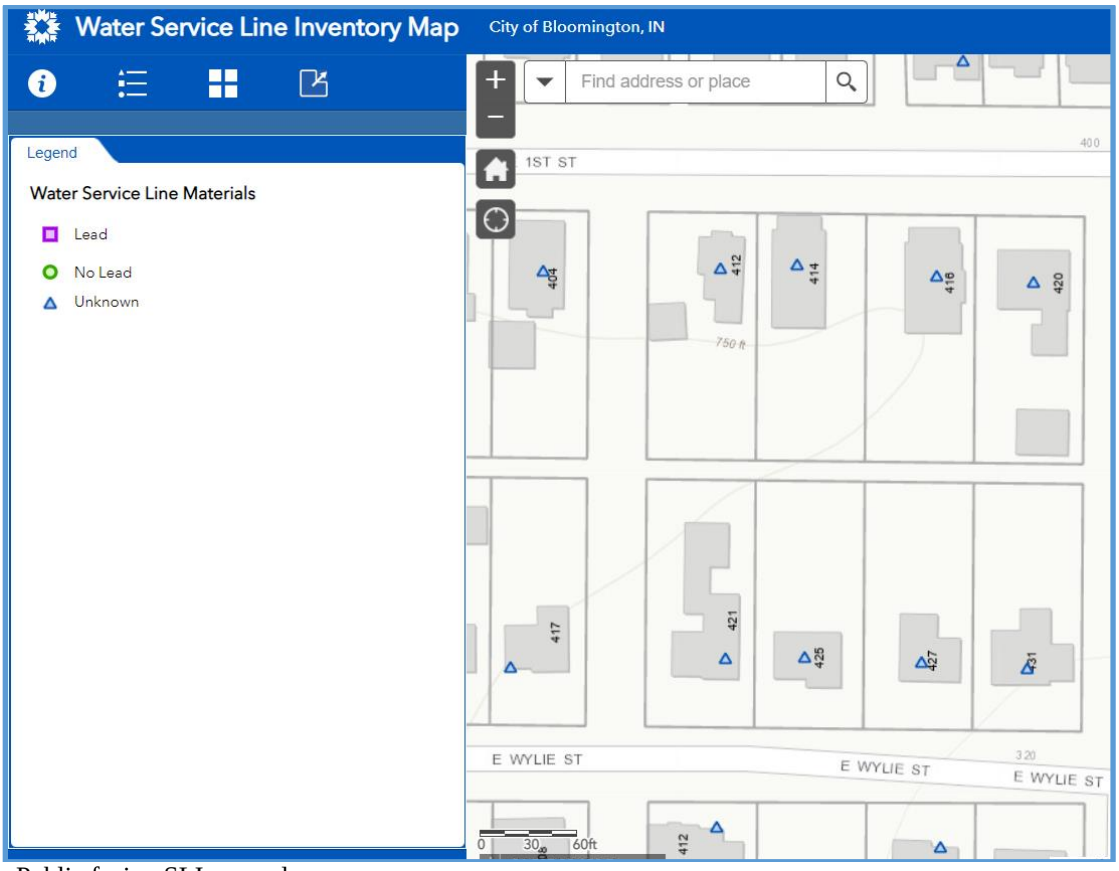
By November 2022 the service line crew had identified over 100 copper lines. Every single copper line identified by pot-holing was also identified as copper in the meter pit. This data was submitted to IDEM, and because of this they authorized meter pit identification, as long as the line is copper. This is a major breakthrough with the SLI and will likely allow CBU to identify tens of thousands of service lines without excavation.

In spring of 2023, CBU plans to hire a team of interns or temporary part time employees to check all of the meter pits in our area and label any CBU copper lines as “Copper”. Any lines in the meter pit that are not copper will result in the line retaining the “Lead Status Unknown” label. This method of service line identification will save a great deal of time and resources. It is likely that once all copper lines are identified there will only be a few thousand “Lead”, “Non-Lead”, or “Lead Status Unknown” service lines remaining.

The Public Facing Service Line Inventory

CBU's GIS team is working to create our Public Facing Service Line Inventory, with assistance from Arcadis. There will be a link on the CBU Service Line Inventory website leading to a GIS map. It will be possible to search for individual homes as well as zoom in from the city-wide map.

Each home will have a color coded symbol showing if lead is present on either side, not present on either side, or if the composition is unknown.



Public facing SLI example.

The Public Facing Service Line Inventory

Once the symbol is selected, a dialogue box will pop up showing the customer side and city side composition separately. If the exact composition is known it will be provided here. The dialogue box will also show how the verification was made. Options may include:

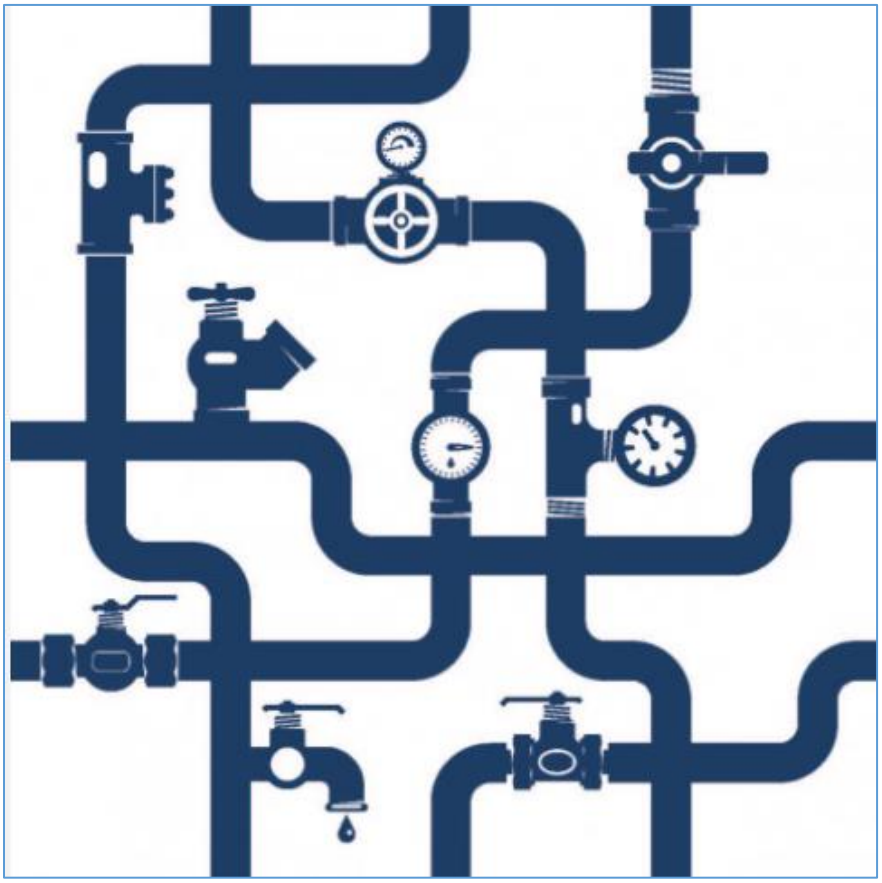
- "Visual confirmation – meter pit"
- "XRF confirmation – meter pit"
- "Visual confirmation – excavation"
- "XRF confirmation – excavation"
- "Historical data – home built after 1988"
- "Historical data – water main installed after 1970"
- "Customer reported"

The Public Facing SLI will also include a dashboard where the public can monitor the project.

SLI dashboard example. Source: ESRI 2022.

The Service Line Inventory is a major project that will require immense resources, as well as time, hard work and dedication from many CBU employees. Ideally the SLI will be completed with zero “Lead Status Unknown” service lines, but realistically when it is first released to the public it may contain some that we’ll continue to identify over time.

CBU is further along with the SLI than most water systems around the country. Because of this, the CBU Water Quality Coordinator has completed presentations about the project at the Indiana Section American Water Works Association (AWWA) Annual Conference and the Association of State Drinking Water Administrators (ASDWA) National Lead Service Line Symposium. Interviews have also taken place with other municipalities interested in following our example, including some large water systems such as Baton Rouge, Louisiana. CBU has so far done an outstanding job in working to create the SLI, but a great deal of work is still ahead.



Lead Service Line Replacement Plan

The LSLRP has many requirements. First, it must include a strategy for determining SL composition of all "Lead Status Unknown" SL's. It must contain a Standard Operating Procedure (SOP) for full LSLR's. It must include the strategy for informing customers before a full or partial LSLR, and an SOP which will be provided to customers on how to flush service lines and premise plumbing of lead.

The LSLRP must include a LSLR goal rate to occur if the trigger level were ever exceeded. It must also include a prioritization strategy based on factors such as LSLR for disadvantaged consumers and populations most sensitive to the effects of lead. Finally, it must include a funding strategy for conducting LSLR's for customers who are unable to pay for the cost of replacing the portion of the LSL they own.

A goal-based LSLRP rate of replacement will be determined by the state primacy agency if the TL is ever exceeded. If the AL is ever exceeded, the rate of replacement must be at least 3% of all LSL's and "Lead Status Unknown" SL's each year. In the LSLRP, only full LSLRs will count toward the replacement rate requirement.

After a full or partial LSLR, a pitcher filter must be provided by the CWS within 24 hours and filters provided for six months. If a homeowner replaces their portion of the LSL, the CWS has 45 days to replace theirs.

CBU Plan: Prepare a written LSLRP, create LSLR SOPs, establish a funding policy, purchase wholesale pitcher filters, and communicate with the public.

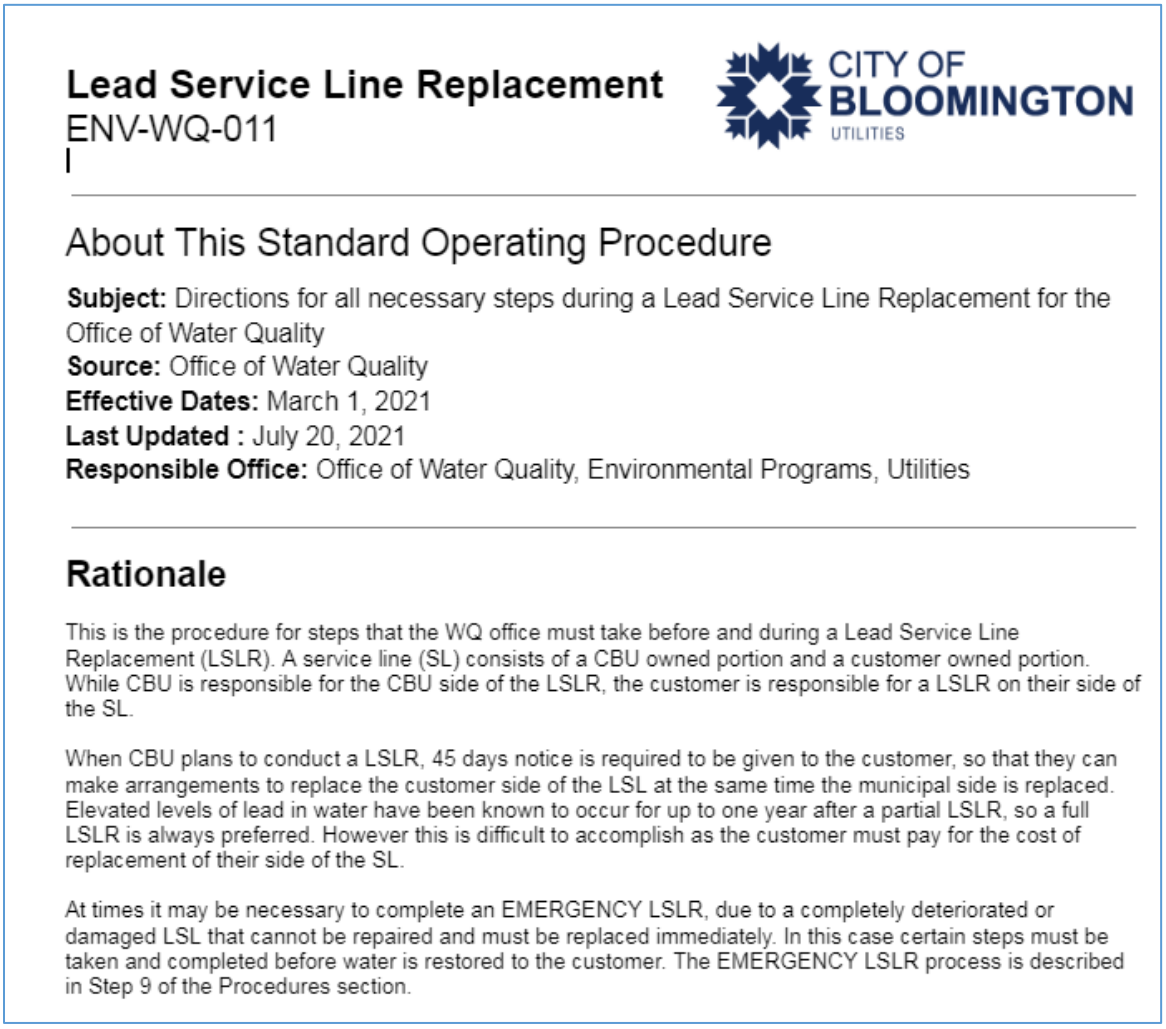
CBU will have a Lead Service Line Replacement Plan by the compliance date of October 16th, 2024.

The actual rate of replacement will be determined once we know how many lead service lines are present.

Because the rate of replacement will be goal based if the TL is ever exceeded and 3% of lead and unknown lines per year if the AL is ever exceeded, the LSLRP that CBU sets initially should be at least 3% per year. However if the resources are available it would be preferable to complete all LSLRs within either 10 years (10% per year) or 5 years (20% per year).

LSLR SOPs

Employees in the Office of Water Quality have already created preliminary SOPs for LSLR's and for customer flushing after the replacement. These drafts will continue to be updated over time and will be ready for use during the LSLRP.



Lead Service Line Replacement
ENV-WQ-011

CITY OF BLOOMINGTON UTILITIES

About This Standard Operating Procedure

Subject: Directions for all necessary steps during a Lead Service Line Replacement for the Office of Water Quality
Source: Office of Water Quality
Effective Dates: March 1, 2021
Last Updated : July 20, 2021
Responsible Office: Office of Water Quality, Environmental Programs, Utilities

Rationale

This is the procedure for steps that the WQ office must take before and during a Lead Service Line Replacement (LSLR). A service line (SL) consists of a CBU owned portion and a customer owned portion. While CBU is responsible for the CBU side of the LSLR, the customer is responsible for a LSLR on their side of the SL.

When CBU plans to conduct a LSLR, 45 days notice is required to be given to the customer, so that they can make arrangements to replace the customer side of the LSL at the same time the municipal side is replaced. Elevated levels of lead in water have been known to occur for up to one year after a partial LSLR, so a full LSLR is always preferred. However this is difficult to accomplish as the customer must pay for the cost of replacement of their side of the SL.

At times it may be necessary to complete an EMERGENCY LSLR, due to a completely deteriorated or damaged LSL that cannot be repaired and must be replaced immediately. In this case certain steps must be taken and completed before water is restored to the customer. The EMERGENCY LSLR process is described in Step 9 of the Procedures section.

LSLR SOP.

Funding Customer LSLR

CBU will create a prioritization strategy for disadvantaged consumers and populations most sensitive to the effects of lead.

CBU hopes to provide some funding for all customers to entice them to replace their side of the service line at the same time CBU replaces the municipal side. Possibilities include:

- Covering the entire cost and hiring contractors to complete the work
- Covering a certain amount such as $1,000 or $2,000 of the cost
- Offering interest free loans for replacement costs

Having the LSLRP in place will help CBU in procuring grants and other funding resources as they become available.

One possible resource is the Drinking Water State Revolving Fund (DWSRF) which provides grants and low interest loans for municipalities. The Office of Water Quality has had multiple meetings with the Indiana Finance Authority concerning the LSLRP and potential funding for customer replacement costs.

Eligible Projects

- **Infrastructure Replacement:** Complete service line replacement is an eligible DWSRF expense, regardless of pipe material and ownership of the property on which the service line is located. The entire service line from the public water main to the point at which it connects with premise plumbing is DWSRF-eligible. As of November 15, 2021, The Bipartisan Infrastructure Law invests $15 billion towards Lead Service Line Replacement through the DWSRF.

Bipartisan Infrastructure Law LSLR funding.

Point of Use Filters

Currently CBU purchases home filters for customers from Amazon.com. We purchase the Brita Longlast pitcher system and provide an extra filter after any LSLR. Each filter removes 99% of lead and lasts 6 months.

The Office of Water Quality has had meetings with Brita representatives and will buy directly from that company in bulk once we're ready to begin our LSLRP.

Brita Longlast pitcher filter.

Customer Communication

Effective communication with the public will be very important during and before the LSLRP. CBU plans to work with Holsapple public relations firm to ensure that the public is well aware of the project and excited about participating.

Lead and Copper Rule Improvements

The LCRR compliance date is October 16th, 2024 and the EPA recently stated they'll be releasing the Lead and Copper Rule Improvements (LCRI) at that time. The contents of the LCRI are unknown, but the EPA said it will focus on four key areas:

1. Replacing all LSLs
2. Improving lead sampling
3. Demystifying the AL and TL for water systems and reconsidering the necessity of the TL.
4. Ensuring equitable LSLR

Because the LCRI will be released on the compliance date of the LCRR, it is imperative that CBU has completed the SLI and LSLRP, and is ready to begin school sampling and 5th liter compliance sampling. If CBU is behind in any aspects of the LCRR, it will be difficult to complete the requirements of the LCRI efficiently.

LCRR compliance date: October 16th, 2024.

Conclusion

The LCRR has presented major challenges for water systems around the country. CBU began to address the requirements of the LCRR as soon as they were released by the EPA. The Office of Water Quality is in constant communication with IDEM regarding the necessary steps of each aspect of the LCRR. Coordination between all divisions of CBU is incredibly important in completing the requirements of the LCRR in a timely manner.

Since the LCR was established in 1991, lead exposures from drinking water have declined in the U.S. However, as long as lead service lines still exist there will always be a chance of lead exposure. The LCRR goal is to remove all lead service lines from our country, to protect our citizens and especially children. The City of Bloomington Utilities Department is committed to complying with all aspects of the LCRR, in order to protect the health of our current citizens and future generations.

CITY OF BLOOMINGTON UTILITIES

City of Bloomington Utilities Monroe Water Treatment Plant.

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