City of Saskatoon
Saskatoon Water

CORROSION CONTROL PROGRAM
LEAD SERVICE LINES

2021 Annual Report

March 11, 2022
File: WT 7500-2

CONTENTS

1.0 Introduction

The Water Security Agency (WSA) requested the City of Saskatoon (City) commence a lead (Pb) monitoring program in November 2013. The monitoring program was to follow Health Canada recommendations for a community with a population greater than 100,000, as outlined in *Guidance on Controlling Corrosion in Drinking Water Distribution Systems*.[1]

On May 30, 2020, the City was issued a renewed Permit to Operate a Waterworks by the WSA, pursuant to Section 28(1)(h) of *The Environmental Management and Protection Act*, 2010. The Permit specifically requires the City to "*conduct a corrosion control program that will monitor the effects the potable water has within the [City's] distribution system. This program shall continue to conform to the information provided in the Health Canada document…[1]*"

The purpose of this report is to present the results from the City's 2021 Lead Monitoring Program and Action Plan, as well as outline the proposed Action Plan for 2022. The report's format and results are presented in a manner consistent with previous annual reports.

2.0 Background

The federal government has undertaken substantial measures to address the presence of lead in Canadian drinking water. The federal maximum acceptable concentration (FMAC) of lead in drinking water is 0.005 mg/L based on health effects in children.[2] This was reduced in 2019, down from 0.010 mg/L. The Province of Saskatchewan has adopted a provincial maximum acceptable concentration (PMAC) of 0.010 mg/L.[3]

Health Canada's guidance document[1] outlines monitoring procedures for lead in residences and in non-residences. In both cases, a two-tiered sampling program is recommended. Initial sampling is to occur throughout the distribution system; the sample size would depend on the population of the community. At least 50% of these locations should be serviced with a lead connection.

Secondary (lead profile) sampling would only occur if more than 10% of the results exceeded the Health Canada Action Level (HCAL) for lead. For residential locations, the HCAL is 0.015 mg/L and for non-residential locations, the HCAL is 0.020 mg/L.

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[1] Health Canada, 2009, *Guidance on Controlling Corrosion in Drinking Water Distribution Systems* (ISBN 978-1-100-14193-0). Water, Air, and Climate Change Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, ON.

[2] Health Canada, 2020*, Guidelines for Canadian Drinking Water Quality – Summary Table*. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, ON.

[3] Water Security Agency, 2020, *Saskatchewan's Drinking Water Quality Standards and Objectives (Summarized)*. EPB 507.

The intent of the sampling program is to help communities determine the sources of lead in drinking water. This information can then be used to develop corrective measures to mitigate public health impacts. Corrective measures can include:

1. ***Altering treatment***: system-wide approach to reduce corrosion by changing the chemistry of the drinking water.
2. ***Physical removal***: replacing distribution system components; mains, service connections, etc.
3. ***Point-of-use devices***: installing treatment at individual taps.

Municipal authorities are also encouraged to develop an inventory of monitoring sites where leaded materials are likely to be present.

Once corrective measures are in place, follow-up sampling is recommended to assess effectiveness and to assist with optimization for corrosion control.

3.0 Monitoring Program 2021

The purpose of the 2021 Lead Monitoring Program was to review the baseline established in 2014, review performance over the years leading up to 2021, and develop an ongoing sampling program that accurately represents the effectiveness of the Lead Service Line (LSL) Replacement Program (Replacement Program). Each year, this program is reviewed to increase the knowledge of corrosion control in Saskatoon. And in 2021, more control sites were added to confirm connections without LSL did not have appreciable levels of Lead.

This program is in accordance with the Health Canada guidelines for residential LSL. In alignment with past sampling programs, priority was given to residential sites as they have the majority of LSL, and previous sampling efforts in 2009 and 2010 indicated that lead levels at non-residential sites did not typically exceed the HCAL of 0.020 mg/L.[4] In addition, non-residential sites with known LSL are issued the annual educational information.

3.1 Residential Sampling Program

Letters requesting voluntary participation in the study were sent to 154 residents. This included those who had recently replaced their LSL, those that had previously participated in the program, and new addresses with LSL in the City's database; 29 agreed to participate. Note that two invitees agreed to participate but did not return samples.

Initial control sites were obtained by random recruitment and have been retained yearly in order to assess continuing absence of lead in the distributed water. Twenty-one

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[4] City of Saskatoon, 2015, *Corrosion Control Program – Lead Service Lines – 2014 Annual Report*. File CP-7900-2

additional control sites were added from staff of the Water Treatment Plant (WTP) whose home addresses had no history of LSL volunteered their homes as control sites.

Consequently, the 2021 residential sampling program included 50 residential sampling sites. This falls within the Health Canada Guidelines for a reduced annual monitoring program, which was implemented by the City in 2015.[5] Sample collection sites included 21 control sites with no history of LSL, 26 sites with active LSL, and three sites with LSL replaced within the previous year.

In 2021, all sites were sampled and analyzed in accordance with the program. Data was analyzed to provide information about what materials in the distribution system are contributing to lead in drinking water. Results will continue to help shape the Action Plan so the best corrective measures can be selected and optimized.

3.2 Residential Sampling Protocols

Copies of letters and sampling instructions presented to residents can be found in Appendix A.

Participants were asked to ensure that a minimum stagnation period of six hours had passed before obtaining a sample at their kitchen tap. Aerators and screens were not to be removed, and the sample was to be obtained at a flow rate consistent with typical household use.

All participants were provided with four, one-litre sample bottles and a thermometer. They collected four sequential samples and reported the time and temperature at the beginning and end of sample collection. All four samples were typically collected within one to five minutes of turning on the tap. Laboratory staff analyzed and recorded pH and alkalinity for each sample.

As per the previous programs, the intention was to obtain samples of water from the LSL to determine if the service line is an important source of lead that is detected in the sample from the tap. There is no specific knowledge of the interior plumbing conditions at any of the sampling locations.

3.3 Residential Sampling Results

Sample results are outlined in Table 3, Along with Figures 1 through 4 located in Appendix A. A summary of results is as follows:

1. None of the 21 control samples exceeded the FMAC of 0.005 mg/L.
2. None of the three replaced LSL sites exceeded the FMAC of 0.005 mg/L. Note that the 2019 homeowner literature was updated to include an educational component on flushing internal plumbing following replacement work. An example of this can be

[5] City of Saskatoon, 2016, *Corrosion Control Program – Lead Service Lines – 2015 Annual Report*. File WT-7500-2

found in Appendix B.

3. 25 (96%) LSL sites exceeded the FMAC of 0.005 mg/L in at least one of the samples.
4. 23 (88%) LSL sites exceeded the PMAC of 0.010 mg/L in at least one of the samples.
5. 21 (81%) LSL sites exceeded the HCAL of 0.015 mg/L in at least one of the samples.
6. 12 LSL sites who participated in the 2020 program, also participated in the 2021 program. There was no clear trend year-to-year, as some results revealed lead level decreases, while others revealed increases.
7. The maximum lead value recorded in a single sample was 0.137 mg/L, which was higher than the maximum recorded in 2020 (0.127 mg/L) but lower than 2019 (0.164 mg/L). The highest lead value recorded in a single sample in the 2014 report was 0.120 mg/L.

The Health Canada guidance document indicates that the collection of four sequential samples provides a profile of the lead originating from the tap, the interior household plumbing, and all or a portion of the LSL.

Results were provided to all participants. Regardless of results, those with a LSL were advised to continue flushing their water lines after a period of stagnation.

3.4 Distribution System Conditions

Table 1 summarizes the conditions within the distribution system, through the months of June to September 2021, during which sampling was conducted. Conditions are presented for the water leaving the WTP, for two routine distribution sampling sites on the west and east sides of the City, and for sample sites (where available).

The average temperature of all samples was 22.4°C for the first litre sampled and dropped down to 19.5°C for the fourth litre sampled. This is typical, reflecting the higher temperature of the lines in the home and dropping as more water is pulled from the cooler distribution pipes in the street.

Alkalinity leaving the WTP was determined to be relatively stable between 102 and 118 mg/L as $CaCO_3$, and pH was also stable between 8.1 and 8.4. In general terms, lead corrosion is expected to decrease with increasing pH and alkalinity.

The Langlier Saturation Index is calculated based on several parameters and indicates the tendency of the water to deposit hardness onto pipes in the distribution system. A positive value was calculated for all samples showing a tendency to cause deposition, reducing the corrosive effect of the water on a lead service line.

Table 1: Summary of Distribution System Conditions, June 1 to September 30, 2021

Location		pH	Temperature (°C)	Alkalinity (mg/L as $CaCo_3$)	Saturation Index	Total Chlorine (mg/L)
Leaving WTP	Min.	8.1	18.6	102	0.09	1.39
	Avg.	8.2	19.5	109	0.18	1.87
	Max.	8.4	21.9	118	0.27	2.12
West Distribution Sites	Min.	8.2	15.7	100	0.12	0.54
	Avg.	8.3	18.0	110	0.21	1.70
	Max.	8.4	19.8	120	0.29	2.05
East Distribution Sites	Min.	8.2	12.3	102	0.09	1.24
	Avg.	8.3	15.9	109	0.14	1.63
	Max.	8.4	18.3	122	0.19	1.99
Lead Sites 1st Litre	Min.	8.0	17.0	100	Not available	n/a
	Avg.	8.2	22.9	106		
	Max.	8.3	27.1	112		
Lead Sites 2nd Litre	Min.	8.0	14.5	102	Not available	n/a
	Avg.	8.2	21.8	106		
	Max.	8.3	26.8	114		
Lead Sites 3rd Litre	Min.	7.9	12.9	102	Not available	n/a
	Avg.	8.2	20.6	107		
	Max.	8.2	29.4	114		
Lead Sites 4th Litre	Min.	8.0	12.5	98	Not available	n/a
	Avg.	8.2	19.5	107		
	Max.	8.3	30.4	114		
Lead Sites Replaced 1st Litre	Min.	8.1	21.1	100	Not available	n/a
	Avg.	8.2	22.4	104		
	Max.	8.2	24.4	110		
Lead Sites Replaced 2nd Litre	Min.	8.1	20.3	104	Not available	n/a
	Avg.	8.2	21.6	106		
	Max.	8.2	23.6	110		
Lead Sites Replaced 3rd Litre	Min.	8.1	18.7	102	Not available	n/a
	Avg.	8.2	20.0	105		
	Max.	8.2	21.8	110		
Lead Sites Replaced 4th Litre	Min.	8.1	16.1	102	Not available	n/a
	Avg.	8.2	18.6	106		
	Max.	8.2	21.1	112		
Control Sites 1st Litre	Min.	7.8	19.1	100	Not available	n/a
	Avg.	8.1	21.9	109		
	Max.	8.2	25.5	114		
Control Sites 2nd Litre	Min.	7.9	16.3	104	Not available	n/a
	Avg.	8.1	21.5	110		
	Max.	8.2	27.5	116		
Control Sites 3rd Litre	Min.	8.0	15.4	106	Not available	n/a
	Avg.	8.1	20.9	110		
	Max.	8.3	26.9	116		
Control Sites 4th Litre	Min.	8.0	15.4	106	Not available	n/a
	Avg.	8.1	20.3	110		
	Max.	8.2	26.5	116		

4.0 Action Plan 2021

The 2021 Action Plan was based on the results of sampling programs that were carried out up to 2020, as previously reported.

4.1 Public Education

A formal Communication Plan was developed to address health concerns of lead. Education materials in 2021 were similar to 2020 and focused on informing citizens how they could reduce the potential for exposure to lead. Key messages included:

1. Flushing for a minimum of five minutes after periods of stagnation.
2. Using cold water only for drinking and cooking.
3. Installing and maintaining a point of use filter.
4. The importance of modernizing the plumbing system in older homes.
5. Replacement of lead service connections.

This information was distributed to the public via the City's website and direct mailing to 3,040 affected stakeholders. Informational letters and brochures were sent to stakeholders as identified in Table 2. For reference, communication materials are included in Appendix B.

Table 2: 2021 Lead Education Materials Mailed.

Stakeholder	Quantity
Residential Owner	2,002
Residential Occupant	783
Commercial Owner	76
Commercial Occupant	72
Owner of Multiple LSL Property	107 letters re: 367 sites
Total Mailed:	**3,040**

4.2 Treatment Adjustments

Treatment adjustments for corrosion control purposes were not carried out in 2021, as previous investigations and proved that treatment adjustments did not affect lead levels in the distribution system and reduce disinfection effectiveness.

4.3 Lead Service Line Replacement Program

Replacement of the LSL is still seen to be the best option for managing lead corrosion in the distribution system.

The City subsidizes approximately 60% of the total cost of replacement from the water main to the outside wall of the residence. Partial replacements of LSL are not allowed because of the elevated lead levels that may occur; therefore, the City also performs full replacement of LSL when they are encountered during water main replacement programs, roadway resurfacing programs, or when emergency repairs must be made.

In 2021 a total of 509 LSL were replaced. This includes planned and emergency replacements. It is estimated that 2,180 LSL remain in use in Saskatoon.

4.4 Point of Use Devices
Point of use devices were not distributed in 2021 as part of the corrosion control program.

4.5 Public Feedback
Feedback from the public was limited in 2021; most calls received were from the public inquiring about their LSL's and when they would be replaced. The City does not yet have the capacity to easily track the number of calls, especially because there is no centralized call centre that receives all water quality calls. It is estimated that less than 20 calls were received about lead over the year at the WTP lab.

4.6 High Risk Areas
In 2015, the City assessed connections to all high-risk areas including registered daycares, schools, care homes, and hospitals. The City's records still indicate that there are no LSL in these high-risk areas.

5.0 Proposed Action Plan 2022
The WSA has included requirements for a Corrosion Control Program in the Permit to Operate for the WTP. An annual report is to be submitted to the WSA each year regarding the program. Proposed activities for the 2022 Action Plan are outlined below.

5.1 Monitoring Program
The City will continue to follow the Health Canada guidance document with a sampling program designed to monitor current conditions and the impacts of corrective measures to the distribution system.

5.2 Public Education
The public education program for 2022 will be similar to that developed for 2021 and will continue to include information about the Replacement Program.

5.3 Treatment Adjustments
Treatment adjustments for corrosion control purposes are not proposed for 2022.

5.4 Lead Service Line Replacement Program
In 2017, the City discontinued the homeowner requested Replacement Program and moved to a strategic replacement program that will align LSL replacements with water main upgrades and planned road preservation work. The goal of this new strategy is to replace all remaining LSL by 2027.

In 2022, the City plans to replace approximately 541 LSL as part of planned projects at an estimated cost of $5.78 million. An additional $0.85 million has been budgeted for replacing LSL on an emergency basis. There are typically 60 to 80 emergency LSL failures per year.

5.5 Point of Use Devices

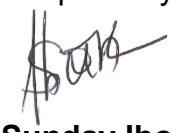
There are no plans to distribute point of use devices in 2022.

6.0 Closure

The 2021 Monitoring Program was intended to continue to gather relevant data and closely follow the guidance document provided by Health Canada, for lead in the distribution system.

Currently, full replacement of LSL is still seen to be the most effective corrective measure that the City can take to mitigate health risks for the long term. Public education is seen to be most effective in the short term only. The City will work towards the goal of full replacement by January 1, 2027.

Respectfully,



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Appendix A: Monitoring Program

Table 3: Monitoring Program Sampling Data

Sample ID	Sample Date	Date Replaced	1st LITRE				2nd LITRE				3rd LITRE				4th LITRE			
			LEAD (mg/L)	ALKALINITY (mg $CaCO_3$/L)	pH	Temp (◦C)	LEAD (mg/L)	ALKALINITY (mg $CaCO_3$/L)	pH	Temp (◦C)	LEAD (mg/L)	ALKALINITY (mg $CaCO_3$/L)	pH	Temp (◦C)	LEAD (mg/L)	ALKALINITY (mg $CaCO_3$/L)	pH	Temp (◦C)
Control 01	25-Aug-21	N/A	0.000271	108	8.2	19.9	0.000989	110	8.2	19.8	0.000257	112	8.1	19.3	0.000164	112	8.2	19.1
Control 02	13-Aug-21	N/A	0.00044	104	8.2	24.0	0.000418	104	8.2	24.3	0.00059	106	8.2	23.8	0.000161	106	8.2	20.3
Control 03	30-Aug-21	N/A	0.00101	112	8.1	22.0	0.00107	110	8.2	21.5	0.000387	110	8.2	21.1	0.000314	110	8.2	19.8
Control 04	24-Aug-21	N/A	0.00191	114	8.1	21.3	0.000955	114	8.1	21.8	0.00151	116	8.1	20.3	0.000507	114	8.1	18.7
Control 05	17-Aug-21	N/A	0.000308	108	8.0	20.9	0.000344	108	8.0	21.1	0.000499	108	8.0	21.3	0.000887	106	8.0	21.2
Control 06	5-Aug-21	N/A	0.00153	106	8.2	21.1	0.00248	108	8.2	20.3	0.00105	108	8.2	19.0	0.000552	106	8.2	17.7
Control 07	11-Aug-21	N/A	0.000474	106	8.0	21.6	0.000216	108	8.1	21.9	0.000198	108	8.1	22.2	0.000228	108	8.1	21.9
Control 08	5-Aug-21	N/A	0.000162	100	7.8	19.1	0.000212	104	7.9	18.1	0.000284	108	8.1	17.5	0.000062	110	8.1	17.2
Control 09	26-Aug-21	N/A	0.00106	110	8.1	24.3	0.000803	110	8.1	23.2	0.000765	112	8.1	22.9	0.000718	112	8.1	23.3
Control 10	11-Aug-21	N/A	0.0009	110	8.1	21.2	0.000327	110	8.1	20.5	0.000321	112	8.1	20.3	0.000293	112	8.1	19.7
Control 11	11-Aug-21	N/A	0.000351	110	8.1	23.9	0.000422	110	8.1	23.8	0.000903	112	8.1	23.1	0.000515	112	8.1	21.8
Control 12	11-Aug-21	N/A	0.000117	108	8.1	22.7	0.00013	108	8.1	22.7	0.000298	108	8.2	22.3	0.00014	108	8.2	21.1
Control 13	18-Aug-21	N/A	0.00176	108	8.2	21.5	0.000937	108	8.2	21.5	0.000811	108	8.1	21.6	0.00122	108	8.1	21.2
Control 14	19-Aug-21	N/A	0.00116	110	8.1	23.1	0.00134	112	8.1	22.7	0.000398	110	8.2	22.0	0.0005	110	8.2	21.3
Control 15	27-Aug-21	N/A	0.000187	114	8.1	21.2	0.00021	116	8.2	22.7	0.000272	116	8.2	21.1	0.000161	114	8.2	19.9
Control 16	19-Aug-21	N/A	0.00087	110	8.1	21.4	0.000926	110	8.1	20.3	0.000673	110	8.1	19.9	0.000582	110	8.1	20.1
Control 17	20-Aug-21	N/A	0.000394	112	8.1	25.5	0.000284	110	8.1	27.5	0.000278	110	8.1	26.9	0.000184	110	8.1	26.5
Control 18	18-Aug-21	N/A	0.000547	110	8.2	21.0	0.000283	108	8.1	16.3	0.000282	108	8.1	15.4	0.000294	108	8.1	15.4
Control 19	24-Aug-21	N/A	0.00347	114	8.1	21.0	0.0014	114	8.1	20.2	0.0014	116	8.1	20.2	0.00132	116	8.1	20.0
Control 20	25-Aug-21	N/A	0.00194	114	8.1	19.7	0.00225	112	8.2	19.4	0.0023	112	8.3	19.5	0.000799	112	8.2	20.3
Control 21	18-Aug-21	N/A	0.00212	108	8.1	22.7	0.000975	106	8.1	21.5	0.000578	106	8.1	20.0	0.000539	106	8.1	19.5
Lead 01	7-Jul-21	N/A	0.018	104	8.3	23.5	0.0172	104	8.3	23.5	0.0175	104	8.2	23.2	0.0198	104	8.3	23.0
Lead 02	13-Jul-21	N/A	0.0226	104	8.2	22.2	0.0293	106	8.2	21.6	0.0395	106	8.2	20.3	0.0371	106	8.2	18.4
Lead 03	9-Jul-21	N/A	0.0193	112	8.2	26.0	0.0208	112	8.2	25.7	0.0233	112	8.2	23.5	0.0528	112	8.2	20.5
Lead 04	13-Jul-21	N/A	0.0182	104	8.2	21.1	0.0266	104	8.2	19.8	0.073	104	8.2	18.3	0.0652	104	8.2	16.6
Lead 05	13-Jul-21	N/A	0.0157	108	8.1	25.5	0.0237	106	8.2	24.4	0.0478	106	8.2	21.8	0.0506	106	8.2	19.2
Lead 06	4-Aug-21	N/A	0.0361	104	8.2	22.1	0.0425	106	8.2	18.3	0.043	108	8.2	17.5	0.0417	108	8.2	17.1
Lead 07	9-Jul-21	N/A	0.0303	106	8.1	25.1	0.0801	108	8.2	23.9	0.0961	108	8.2	18.6	0.0885	110	8.2	14.7
Lead 08	19-Jul-21	N/A	0.0292	106	8.0	21.5	0.028	108	8.2	20.9	0.0269	112	8.2	19.5	0.0269	112	8.2	19.5
Lead 09	27-Jul-21	N/A	0.00524	104	8.2	24.3	0.00254	104	8.2	23.7	0.00266	108	8.2	23.0	0.00165	106	8.2	21.1
Lead 10	19-Jul-21	N/A	0.00596	110	8.2	21.3	0.00665	108	8.3	17.8	0.00576	112	8.2	17.0	0.00416	114	8.2	17.2
Lead 11	15-Jul-21	N/A	0.0117	106	8.2	23.1	0.0146	104	8.2	19.0	0.015	102	8.2	16.7	0.00908	102	8.2	15.3
Lead 12	13-Jul-21	N/A	0.0305	104	8.0	25.1	0.034	104	8.1	24.3	0.039	104	8.2	23.2	0.0412	106	8.2	22.6
Lead 13	15-Jul-21	N/A	0.0359	104	8.2	27.1	0.0329	106	8.2	26.8	0.0462	104	8.2	25.9	0.0536	100	8.2	23.4
Lead 14	11-Aug-21	N/A	0.0339	112	8.2	22.2	0.0527	114	8.2	22.0	0.0897	114	8.2	20.4	0.0836	112	8.2	18.6
Lead 15	12-Jul-21	N/A	0.0164	108	8.2	20.5	0.0191	102	8.2	19.7	0.0217	110	8.2	19.5	0.0475	108	8.2	18.8
Lead 16	11-Jul-21	N/A	0.0248	108	8.1	n/a	0.033	104	8.1	n/a	0.0566	104	8.1	n/a	0.0565	98	8.1	n/a
Lead 17	14-Jul-21	N/A	0.0203	108	8.2	22.5	0.0202	106	8.2	22.2	0.0205	108	8.2	22.2	0.0432	110	8.2	21.1
Lead 18	13-Jul-21	N/A	0.00948	104	8.2	23.1	0.0127	104	8.2	22.8	0.0161	104	8.2	22.1	0.0229	104	8.2	21.9
Lead 19	23-Jul-21	N/A	0.0329	110	8.2	24.7	0.0501	110	8.2	24.3	0.0662	110	8.2	23.6	0.0707	110	8.2	22.7
Lead 20	15-Jul-21	N/A	0.0325	104	8.2	24.7	0.0315	104	8.2	23.5	0.0613	102	8.2	20.2	0.0694	102	8.2	16.5
Lead 21	12-Jul-21	N/A	0.0312	106	8.2	21.3	0.0438	106	8.2	20.9	0.035	106	8.2	20.1	0.0299	106	8.2	19.1
Lead 22	20-Jul-21	N/A	0.000647	108	8.1	23.3	0.000568	110	8.1	23.6	0.000421	112	8.1	23.2	0.000364	112	8.1	23.0
Lead 23	12-Aug-21	N/A	0.0212	110	8.2	21.3	0.0344	112	8.2	21.1	0.0248	110	8.2	20.3	0.0814	110	8.2	19.1
Lead 24	26-Jul-21	N/A	0.137	106	8.2	18.2	0.124	108	8.2	14.5	0.0276	108	8.2	13.7	0.128	108	8.2	14.9
Lead 25	27-Jul-21	N/A	0.0782	106	8.2	17.0	0.0919	104	8.2	15.0	0.0799	106	8.2	12.9	0.0614	104	8.2	12.5
Lead 26	3-Aug-21	N/A	0.0065	100	8.0	25.3	0.00764	104	8.0	25.1	0.0105	102	7.9	29.4	0.0111	102	8.0	30.4
Replaced 01	20-Jul-21	2-Mar-21	0.000412	110	8.1	21.7	0.000403	110	8.1	20.3	0.000256	110	8.1	19.5	0.000265	112	8.1	18.6
Replaced 02	9-Aug-21	20-Jan-20	0.00264	100	8.2	21.1	0.00105	104	8.2	20.9	0.000581	102	8.2	18.7	0.000708	102	8.2	16.1
Replaced 03	25-Jul-21	31-Mar-21	0.00389	102	8.2	24.4	0.0011	104	8.2	23.6	0.000742	104	8.2	21.8	0.00061	104	8.2	21.1

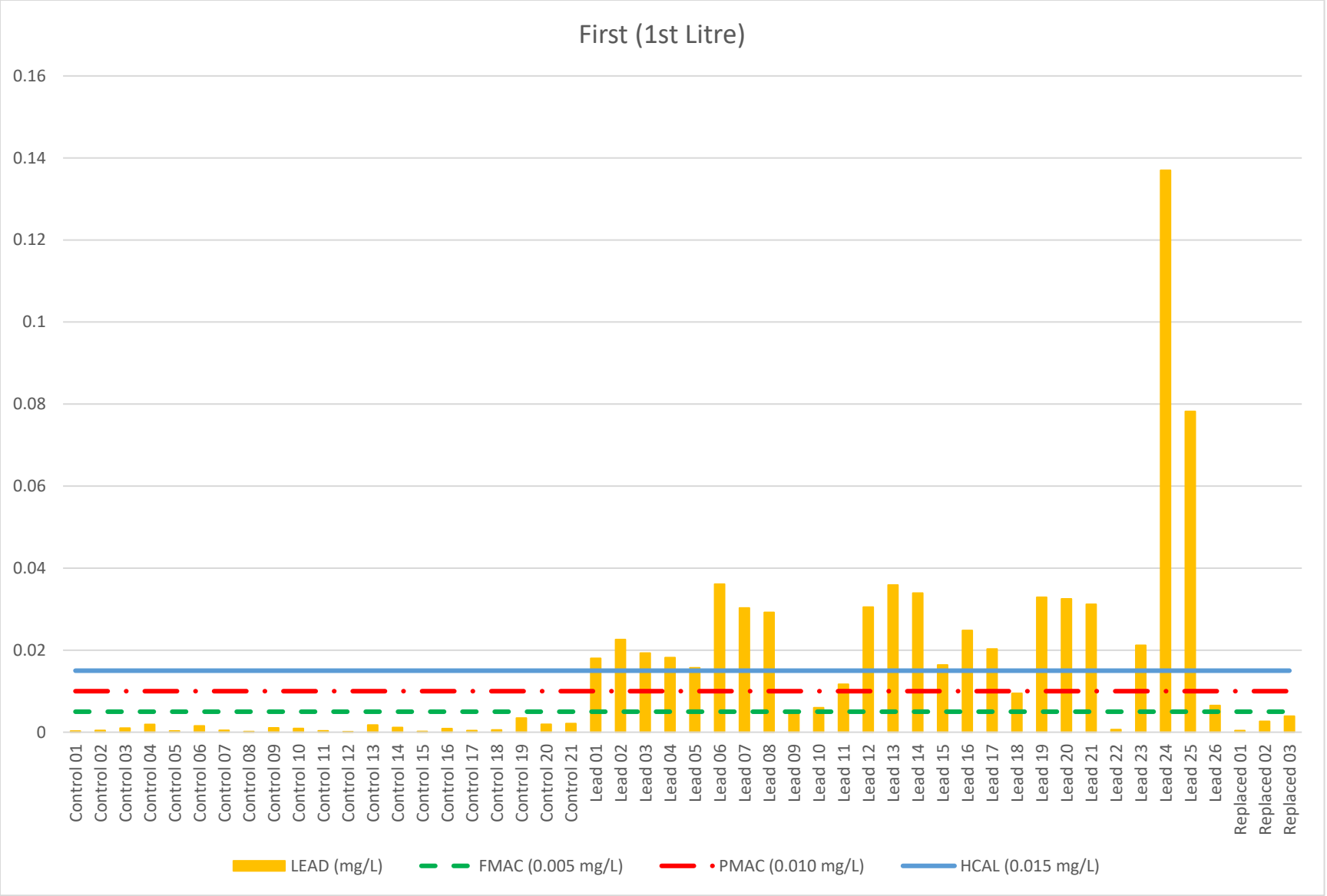


Figure 1: First Litre, Lead (Pb) Concentration

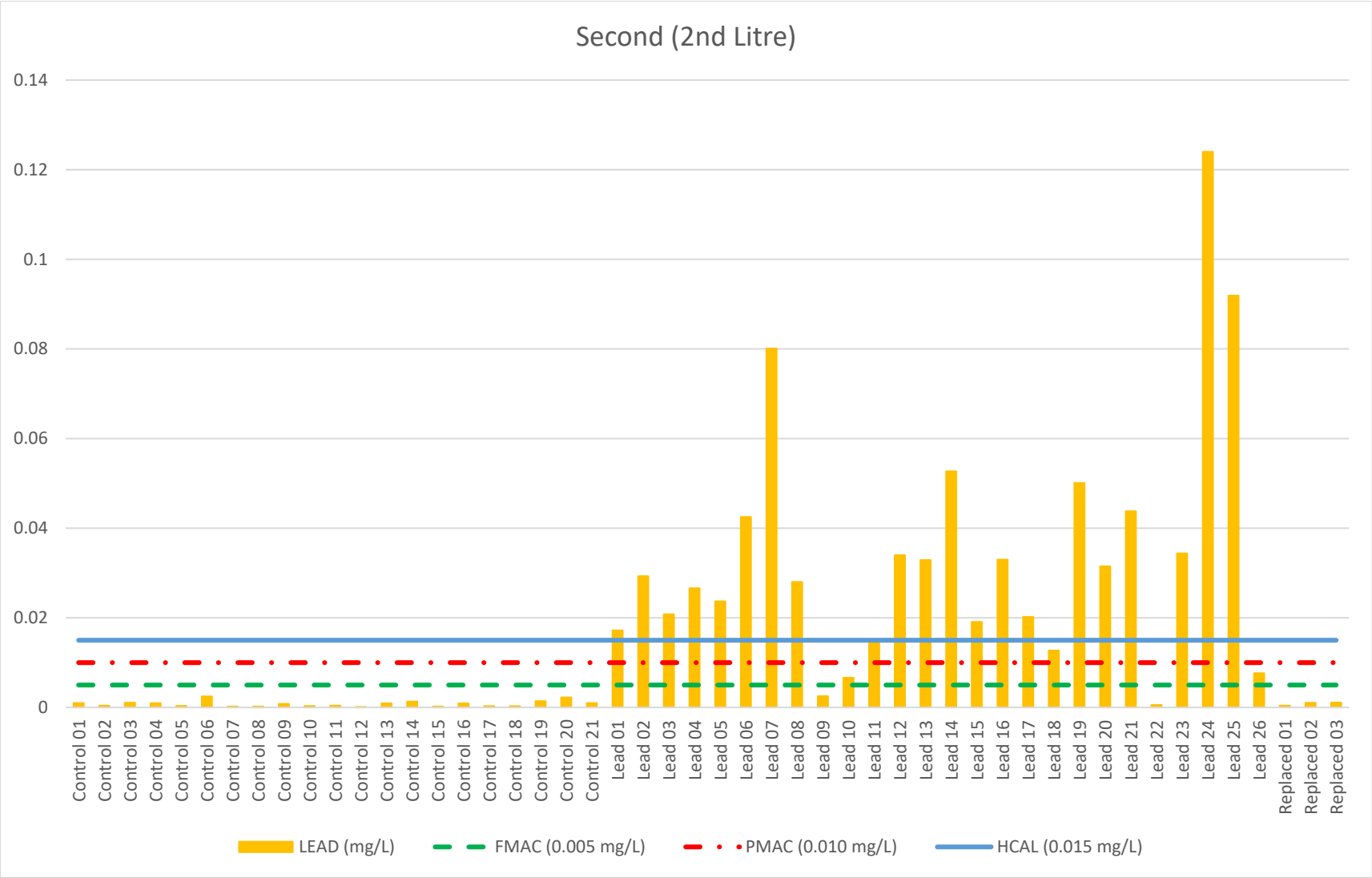


Figure 2: Second Litre, Lead (Pb) Concentration

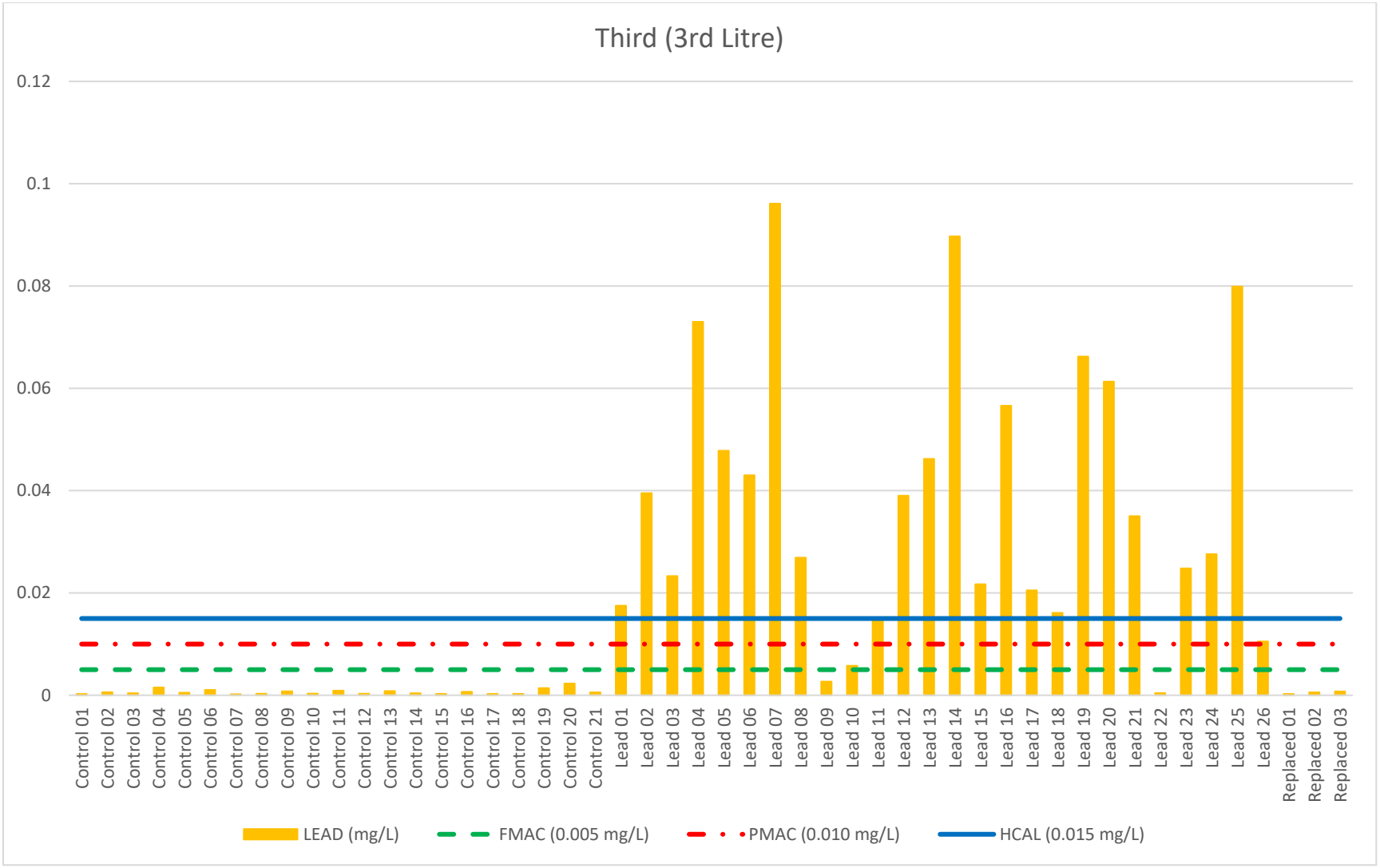


Figure 3: Third Litre, Lead (Pb) Concentration

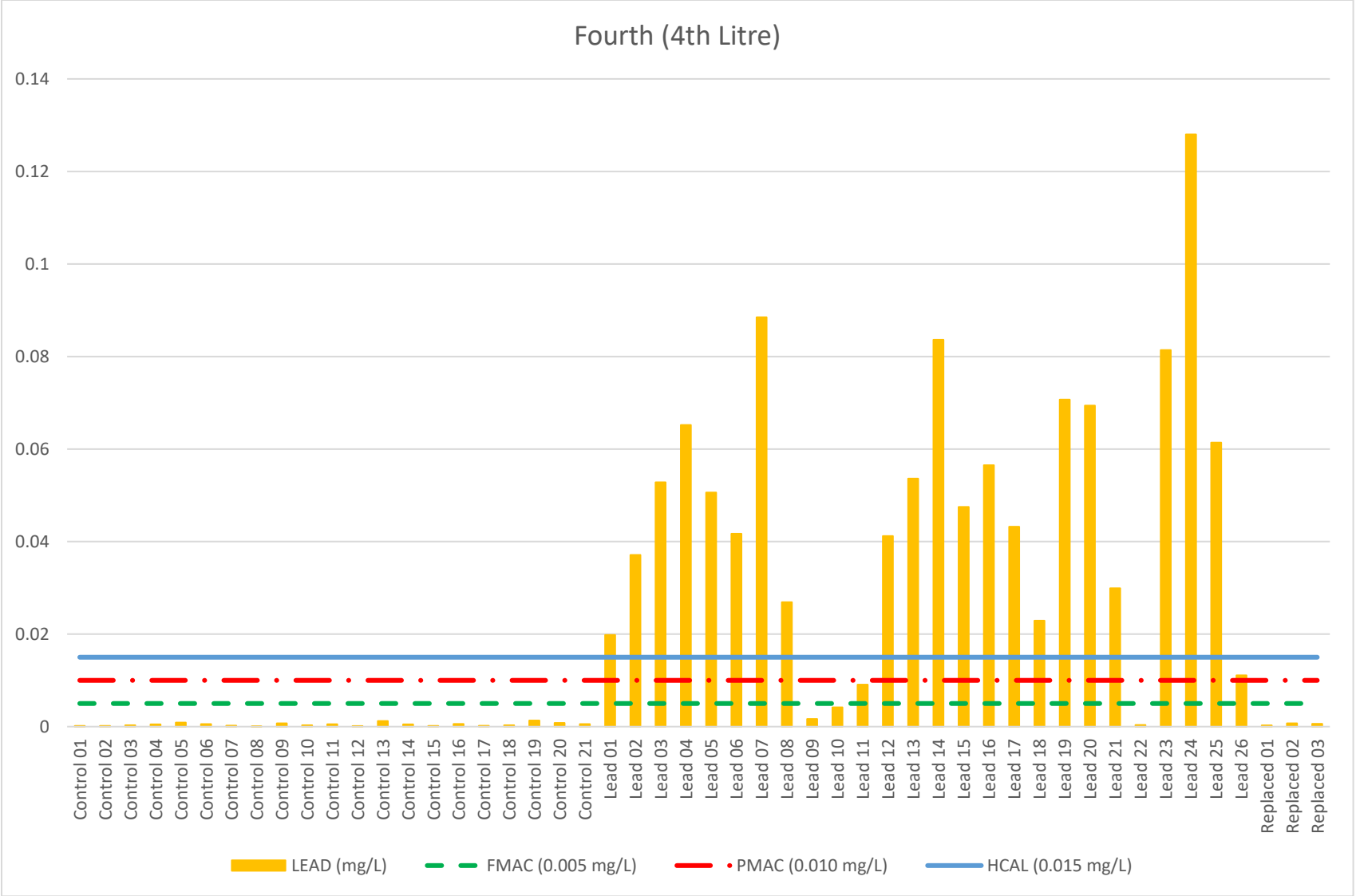


Figure 4: Fourth litre, Lead (Pb) Concentration

Saskatoon Water
1030 Avenue H South
Saskatoon SK S7M 1X5

saskatoon.ca/lead
customercare@saskatoon.ca
tel 306-975-2476

Homeowner Name
Address
Saskatoon, SK Postal Code

Dear Homeowner:

The City of Saskatoon Water Lab conducts a study every July and August to assess lead in drinking water. The drinking water leaving the Water Treatment Plant contains no measurable amount of lead; however, homes serviced by lead service lines may experience lead leaching from the pipes into the drinking water.

As a participant in last year's study, your property is a good candidate for this study. We would like to invite you to participate in the study again this year so we may obtain follow-up data. Participation is entirely voluntary and there is no charge for the testing. The results for your property will be shared with you once the study has been completed in the fall. Sampling must be able to be performed in either July or August at your convenience.

Participation in the study will require you to take one morning to collect four consecutive 1-Litre samples from the cold water line of your primary drinking water tap. Water must pass through the cold water line only – not through the hot water tap or through any filters or water softeners. The samples will need to be collected after the water has sat in the lines for a minimum of six hours (usually first thing in the morning), prior to water being used for any other purpose (e.g. flushing toilets, showers, sprinklers, laundry, etc.). We will provide the sample bottles and instructions for sample collection and will pick up the samples from your home the same day you notify our lab you have completed sampling.

Please note that your tap water sample results will be shared with the Water Security Agency as part of required reporting under this program. Your personal information, such as name and address, will not be shared. By providing your tap water sample(s), you are consenting to this collection, use and disclosure.

If you are interested in participating, please reply before July 9, 2021, to **cleo.jahraus@saskatoon.ca** or call 306-975-2539.

Sincerely,

Cleo Jahraus
Water Lab Coordinator

Saskatoon Water
1030 Avenue H South
Saskatoon SK S7M 1X5

saskatoon.ca/lead
customercare@saskatoon.ca
tel 306-975-2476

Homeowner Name
Address
Saskatoon, SK Postal Code

Dear Homeowner:

The City of Saskatoon Water Lab conducts a study every July and August to assess lead in drinking water. The drinking water leaving the Water Treatment Plant contains no measurable amount of lead; however, homes serviced by lead service lines may experience lead leaching from the pipes into the drinking water.

Our records indicate that your home has recently had lead lines replaced, and as such, is a good candidate for this study. We would like to offer you the opportunity to participate in this study. Participation is entirely voluntary and there is no charge for the testing. The results for your property will be shared with you once the study has been completed in the fall. Sampling must be able to be performed in either July or August at your convenience.

Participation in the study will require you to take one morning to collect four consecutive 1-Litre samples from the cold water line of your primary drinking water tap. Water must pass through the cold water line only – not through the hot water tap or through any filters or water softeners. The samples will need to be collected after the water has sat in the lines for a minimum of six hours (usually first thing in the morning), prior to water being used for any other purpose (e.g. flushing toilets, showers, sprinklers, laundry, etc.). We will provide the sample bottles and instructions for sample collection and will pick up the samples from your home the same day you notify our lab you have completed sampling.

Please note that your tap water sample results will be shared with the Water Security Agency as part of required reporting under this program. Your personal information, such as name and address, will not be shared. By providing your tap water sample(s), you are consenting to this collection, use and disclosure.

If you are interested in participating, please reply before July 9, 2021, to **cleo.jahraus@saskatoon.ca** or call 306-975-2539.

Sincerely,

Cleo Jahraus
Water Lab Coordinator

Saskatoon Water
1030 Avenue H South
Saskatoon SK S7M 1X5

saskatoon.ca/lead
customercare@saskatoon.ca
tel 306-975-2476

Homeowner Name
Address
Saskatoon, SK Postal Code

Dear Homeowner (from above):

The City of Saskatoon Water Lab conducts a study every July and August to assess lead in drinking water. The drinking water leaving the Water Treatment Plant contains no measurable amount of lead; however, homes serviced by lead service lines may experience lead leaching from their pipes into the drinking water.

As our records indicate your home may be serviced by a lead service line, and as such, is a good candidate for this study and would like to offer you the opportunity to participate. Participation is entirely voluntary and there is no charge for the testing. The results for your property will be shared with you once the study has been completed in the fall. Sampling must be able to be performed in either July or August at your convenience. If your lead service line has been replaced, please disregard this notice.

Participation in the study will require you to take one morning to collect four consecutive 1-Litre samples from the cold water line of your primary drinking water tap. Water must pass through the cold water line only – not through the hot water tap or through any filters or water softeners. The samples will need to be collected after the water has sat in the lines for a minimum of six hours (usually first thing in the morning), prior to water being used for any other purpose (e.g. flushing toilets, showers, sprinklers, laundry, etc.). We will provide the sample bottles and instructions for sample collection and will pick up the samples from your home the same day you notify our lab you have completed sampling.

Please note that your tap water sample results will be shared with the Water Security Agency as part of required reporting under this program. Your personal information, such as name and address, will not be shared. By providing your tap water sample(s), you are consenting to this collection, use and disclosure.

If you are interested in participating, please reply before July 9, 2021, to **cleo.jahraus@saskatoon.ca** or call 306-975-2539.

Sincerely,

Cleo Jahraus
Water Lab Coordinator

Saskatoon Water – Water Lab
1030 Avenue H South
Saskatoon SK S7M 1X5

www.saskatoon.ca
tel (306) 975.2567

Homeowner Name
Address
Saskatoon, SK Postal Code

Dear Homeowner:

Thank you for participating in the Lead Line Study recently conducted by the City of Saskatoon Water Lab. The results for your property are shown below.

As a reminder, the drinking water leaving the Water Treatment Plant contains no measurable amount of lead; however, homes serviced by lead service lines may experience lead leaching from the pipes into the drinking water.

Your results should be considered a guideline, as they are specific for the date and time the sample was drawn. The concentration of lead may vary depending on a variety of factors, including season and usage. For this reason, you are encouraged to continue to flush the lines for five minutes before using the water for drinking and cooking. Previous study results have shown that flushing will significantly reduce the lead concentration in the water. Additional information can be found on our webpage: https://www.saskatoon.ca/services-residents/power-water/water-wastewater/drinking-water/lead-pipes-drinking-water

When interpreting your results, Health Canada states that the current drinking water guideline for lead is 0.005 mg/L. When collected as directed, the volume of the four litres sampled is not enough to bring fresh water into your home from the main. It is reflective of the lead contributed from within the home plumbing fixtures and the service connection.

SAMPLE DATE:

Lead Concentration	**mg/L**
First Litre	
Second Litre	
Third Litre	
Fourth Litre	

If you have any further questions, please contact me at cleo.jahraus@saskatoon.ca or (306) 975-2539.

Sincerely,

Cleo Jahraus
Water Lab Coordinator
Saskatoon Water

Saskatoon Water – Water Lab
1030 Avenue H South
Saskatoon SK S7M 1X5

www.saskatoon.ca
tel (306) 975.2567

Homeowner Name
Address
Saskatoon, SK Postal Code

Dear Homeowner

Thank you for participating in the Lead Line Study recently conducted by the City of Saskatoon Water Lab. The results for your property are shown below.

As a reminder, the drinking water leaving the Water Treatment Plant contains no measurable amount of lead; however, homes serviced by lead service lines may experience lead leaching from the pipes into the drinking water.

Your results should be considered a guideline, as they are specific for the date and time the sample was drawn. The data from the samples collected from all sites indicate that replacement of the lead service lines is effective in reducing lead concentration in drinking water to levels below the guideline value specified by Health Canada within about six months of replacement. Additional information can be found on our webpage: https://www.saskatoon.ca/services-residents/power-water/water-wastewater/drinking-water/lead-pipes-drinking-water

When interpreting your results, Health Canada states that the current drinking water guideline for lead is 0.005 mg/L. When collected as directed, volume of the four litres sampled is not enough to bring fresh water into your home from the main. It is reflective of the lead contributed within the home plumbing fixtures and the service connection.

SAMPLE DATE:

Lead Concentration	**mg/L**
First Litre	
Second Litre	
Third Litre	
Fourth Litre	

If you have any further questions, please contact me at cleo.jahraus@saskatoon.ca or (306) 975-2539.

Sincerely,

Cleo Jahraus
Water Lab Coordinator
Saskatoon Water

Saskatoon Water – Water Lab
1030 Avenue H South
Saskatoon SK S7M 1X5

www.saskatoon.ca
tel (306) 975.2567

Homeowner Name
Email

Dear Homeowner:

Thank you for participating in the Lead Line Study recently conducted by the City of Saskatoon Water Lab. The results for your property, located at address, are shown below.

As a reminder, the drinking water leaving the Water Treatment Plant contains no measurable amount of lead; however, homes serviced by lead service lines may experience lead leaching from the pipes into the drinking water. Your home is not serviced by lead lines, and as such, is a good control sample for the purpose of this study.

Your results should be considered a guideline, as they are specific for the date and time the sample was drawn.

When interpreting your results, Health Canada states that the current drinking water guideline for lead is 0.005 mg/L. When collected as directed, volume of the four litres sampled is not enough to bring fresh water into your home from the main, so values are reflective of internal plumbing and the service line.

SAMPLE DATE:

Lead Concentration	**mg/L**
First Litre	
Second Litre	
Third Litre	
Fourth Litre	

If you have any further questions, please contact me at cleo.jahraus@saskatoon.ca or (306) 975-2539.

Sincerely,

Cleo Jahraus
Water Lab Coordinator
Saskatoon Water

Utilities and Environment
Saskatoon Water
Water Lab

Thank you for your participation in the City of Saskatoon Lead in Drinking Water Study. Please find below the directions for sample collection. If you have any questions, please call the lab at (306) 975-2539. Results of testing will be mailed out in October, once the study is complete. Please have samples collected as soon as possible after you have received the package. The study closes August 20, 2021; sample packages received after this date will not be able to be processed.

Sample Collection:

- *Record information requested on reverse side of this form.*
- Fill all four bottles on ***same*** day. Use **cold tap only.**
- Fill all four bottles, in numerical order, one immediately after the other.
- Do not run tap before or between bottles.
- Sample bottles need to be filled after a period of minimum six hours where *no* water has been used on the premises. This includes dishwashers, sprinklers, laundry machines, toilets, showers, etc. First thing in the morning usually works best.
- Water should be collected from the primary tap used for drinking/cooking and should not be connected to a water softener or filter. Use a rate of flow similar to filling a glass of water – not too slow, not too fast.
- Use thermometer provided to determine temperature (remove cap). **Record temperature in table on reverse. Return thermometer with samples.**

Please do not collect on Saturday, Sunday or STAT Holidays, as we are not able to pick up and/or process samples on these days. Sample bottles must be collected by the lab as soon as *possible on the day of collection*.

Call (306)975-2539 between 7:00 am to 3:00 pm to arrange same day pickup, Monday to Friday. Leave a message indicating that your sample bottles are ready for pickup along with your address.

You may also email cleo.jahraus@saskatoon.ca. Leave sample package in a shaded, accessible location out of direct sunlight wherever possible. We will pickup your samples that day.

City of Saskatoon
Utilities and Environment
Saskatoon Water
Water Lab

PROVIDE THE FOLLOWING CRITICAL INFORMATION:

DATE SAMPLES COLLECTED: _____

TIME FIRST SAMPLE *STARTED*:_____am/pm

TIME LAST SAMPLE *COMPLETED*:_____am/pm

NAME OF PERSON COLLECTING SAMPLE: _____

SAMPLE BOTTLE	TEMPERATURE (°C)	LAB USE ONLY	LAB USE ONLY
1			
2			
3			
4			

All four bottles are to be filled in immediately, one after the other, in numerical order on the **same day**.

Return form, thermometer and sample bottles in bag provided.

Appendix B: Public Education

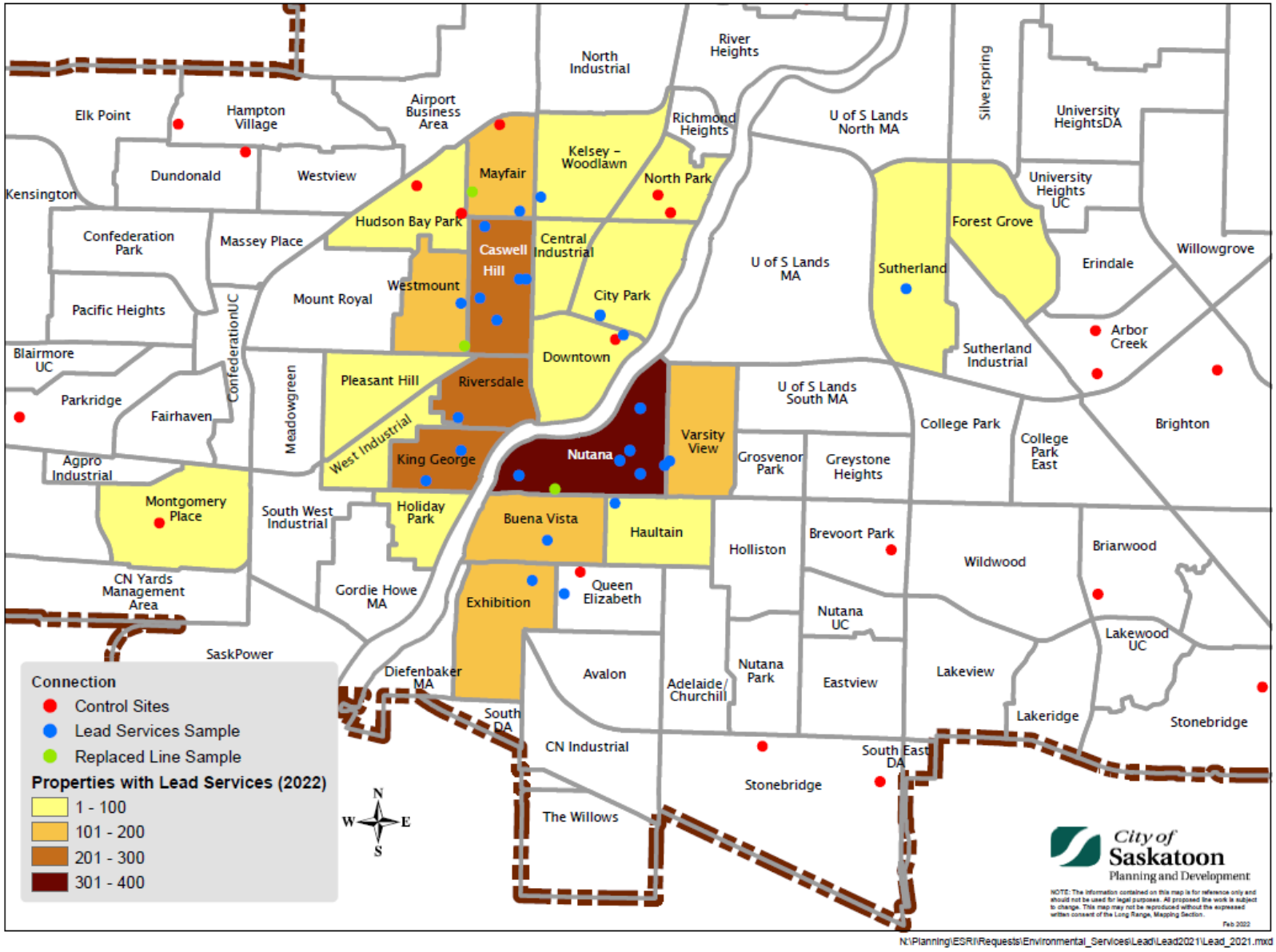


Figure 5: Corrosion Control Monitoring, Residential Lead Services 2021

Saskatoon Water
1030 Avenue H South
Saskatoon SK S7M 1X5

saskatoon.ca/lead
customercare@saskatoon.ca
tel 306-975-2476

<<OWNER>>
<<ADDRESS>>
<<CITY>> <<PROVINCE>> <<POSTAL CODE>>

Dear Homeowner or Current Resident:

Every year we send important health information to homes where lead pipes are still used for water service lines to ensure new occupants are informed, and as a reminder for everyone.

In order to support our continuing commitment to reach those potentially affected, this year we will also start sending letters to tenants of a business.

According to our records for <<ADDRESS>>, Saskatoon, SK, the pipe that connects the plumbing from your home to the water main in the street may contain lead, which can leach into your drinking water. Testing has found that when drinking water sits unused in lead pipes, lead levels are likely to be higher than recommended. As this is a potential health risk, the City encourages you to take some precautions before drinking water at this address.

What you can do:

- **Review the enclosed brochure "Reduce lead in drinking water".**
- Run the cold water faucet for about five minutes before drinking or cooking to draw in clean, fresh water from the water main.
- Refer to the Saskatchewan Health Authority and Health Canada websites for current information about health risks associated with lead exposure.
- If the lead pipes at this address were replaced, contact us at **leadpipes@saskatoon.ca** or 306-975-2476 so we may review our records.

What to expect from us:

- The City is aggressively replacing lead pipes in areas across Saskatoon built prior to 1950, to be completed by 2026.
- A projected replacement schedule for all remaining properties with lead pipes has been made. Homes that will have replacement work completed in 2022 will be contacted early in the year. Homeowners can contact the Customer Care Centre for more information.
- As part of our goal to manage the City in a smart, sustainable way, City Council adjusted funding in 2017 to reduce the thirty-year replacement plan for lead pipes to ten years.

For more information, please visit **saskatoon.ca/lead,** email **customercare@saskatoon.ca**, or call our 24/7 Customer Care Centre at 306-975-2476.

Replacing lead pipes

ACCELERATED REHABILITATION

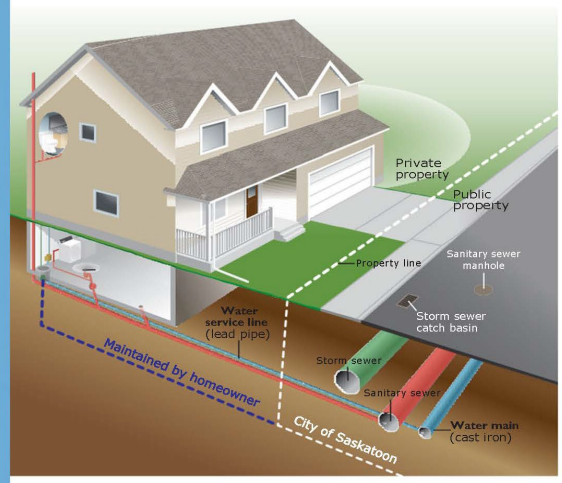
The City is aggressively replacing lead pipes used for water service lines and will be in contact when your area is scheduled.

THE CITY'S ROLE

- Lead pipe replacement will be coordinated with necessary water main and road upgrades.
- You will be notified of scheduled work two to three months in advance.
- Once your area is scheduled, you will receive an information package to guide you through the process with ongoing support by City staff.

THE HOMEOWNER'S ROLE

- When the city is replacing lead pipes, it must include both public (white dotted line in diagram on the back page) and private (blue dotted line) portions of the service line.
- The homeowner is responsible for 40% of the total cost.
- The homeowner is also responsible for any other cost associated with internal plumbing issues. Ask a licensed plumber for a cost estimate.
- You may replace your service line immediately at your own cost. Visit **saskatoon.ca/lead** for reimbursement details, including payment options.
- The City does not allow partial replacement of a service line because of the increased risk to public health.



WATER MAIN AND SERVICE LINE

- The City is responsible for the water main (made of cast iron) and the portion of the service line located on **public property.**
- The Homeowner is responsible for the portion of the water service line located on **private property.**

FOR MORE INFORMATION:

saskatoon.ca/**lead**
customercare@saskatoon.ca
Phone: 306-975-2476

City of Saskatoon

Reduce lead in your drinking water

For homes with lead pipes

City of Saskatoon

Is there lead in my water?

SASKATOON WATER IS SAFE TO DRINK

Strict monitoring procedures are in place to ensure City of Saskatoon water is among the safest drinking water in the world.

While the lead level content in the City's drinking water when it enters the water distribution system is well below the Health Canada allowable limit, testing has found that when drinking water sits unused in lead pipes, lead levels are likely to be higher than recommended.

NEIGHBOURHOODS OLDER THAN 1950

Properties within city neighbourhoods built before 1950 may still have lead pipes. The City is actively working with homeowners to replace these pipes.

TEST YOUR WATER FOR LEAD

If you are concerned about lead in your drinking water, you can have your tap water tested by a private, accredited licensed laboratory.

What can I do to reduce my exposure to lead?

1. **RUN TAP BEFORE YOU DRINK**

   Lead can enter your drinking water when it sits in household lead pipes between uses. Flushing toilets, doing laundry, and running showers all help keep your drinking water fresh. Run the cold water faucet for about five minutes before drinking or cooking.

   This water does not have to be wasted—it is safe to use for cleaning or watering plants.

   Keep a container of drinking water in your refrigerator so you don't have to run water every time you want a drink. Remember that boiling water does not remove lead.

2. **REMOVE AND CLEAN YOUR TAP SCREEN**

   Most household taps have an aerating screen attached to the end. Calcium carbonate can build up on the screen and absorb lead. Make it a habit to remove the screen and clean off any build up every month.

3. **INSTALL A CERTIFIED WATER FILTER**

   Young children and pregnant women should consume drinking water from an alternate source or use a filter certified for lead removal. Look for a National Sanitation Foundation certified filter marked with NSF-053 that attaches to your fridge, ice maker, drinking water tap or comes as a separate water pitcher. It's important to follow the manufacturer's recommendations for replacing filters.

4. **MODERNIZE YOUR PLUMBING**

   The most effective way to remove lead in drinking water is to remove brass fittings and pipes containing older lead solder and replace them with material certified for contact with drinking water. Remember, even after replacement work is complete, lead levels can remain high in drinking water for a short time. Drinking water precautions should continue for a minimum of six months after lead pipes are replaced.

   A licensed plumber can determine if your home has internal lead plumbing, lead solder or lead pipe fittings. The City will advise you if you have a lead service line.

After Lead Water Pipe Replacement – When is Water Lead Free?

Your home has recently had the lead water service connection replaced from the city water main to your water meter. With a little more work, most homes can soon expect to have lead free water. Recent studies have shown small particles of lead can remain in your home's internal plumbing after lead water service connection replacement work is complete. It is suggested the frequent flushing of your home's internal plumbing (as was done before replacement work was complete) can speed up the removal of these particles. This flushing process includes **running cold water taps before you consume water** (remember to only use cold tap water for **drinking** or cooking, since hot water increases the leaching of lead and other metals from your plumbing); **remove and clean tap screens** (after lead water service connection replacements it is recommended this be done more frequently as more lead particles may have broken free during replacement work); there is also some benefit seen from draining hot water heaters to remove accumulated sediment which may contain lead.

For more information on flushing visit our website at Saskatoon.ca/leadpipes.
saskatoon.ca/sites/default/files/documents/lead_in_drinking_water_brochure_december_14.pdf

The length of time it takes to remove residual lead from your home's internal plumbing depends on two main factors, the length of your water service connection, and the frequency of flushing. Longer lead water service connections have more opportunity to leach lead than shorter lead water service connections. Running cold water taps to flush your home's internal plumbing will help remove lead particle built up. Thus, the more flushing that is done and the shorter the water service connection, the sooner flushing will be complete.

The average time frame has been estimated to be 2 to 3 months (source HealthCanada.ca).
ww.hc-sc.gc.ca/ewh-semt/pubs/water-eau/lead-plomb-eng.php

If you are concerned about lead in your drinking water or to determine when your drinking water is lead free, you can have your tap water tested by a private, accredited licensed laboratory. Although your lead water service connection has been replaced, and water provided by the City is virtually lead free, some homes may still have lead in their internal plumbing:

*"The most significant source of lead in drinking water is usually from lead service lines (water pipes that link the house to the main water supply), **although leaching can also occur from lead solder in plumbing, or from fittings such as faucets made of brass**." Health Canada tips to reducing exposure to lead from drinking water (October 11/16) http://www.hc- sc.gc.ca/ewh-semt/pubs/water-eau/lead-plomb-eng.php*