

# DENVER WATER LEAD REDUCTION PROGRAM

## SEMI-ANNUAL REPORT – S1 2022

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**Presented by:** Denver Water



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## LIST OF ACRONYMS

µg/L	micrograms per liter
mg/L	milligrams per liter
ALSLR	Accelerated Lead Service Line Replacement
CASS	Coding Accuracy Support System
CCT	Corrosion control treatment
CDPHE	Colorado Department of Public Health and Environment
COE	Communications, Outreach and Education
EPA	Environmental Protection Agency
HE&EJ	Health equity and environmental justice
LCR	Lead and Copper Rule
LCRR	Lead and Copper Rule Revisions
LIMS	Laboratory Information Management System
LRP	Lead Reduction Program
LRPP	Lead Reduction Program Plan
LSL	Lead service line
LSLR	Lead service line replacement
NSF	National Sanitation Foundation
OCCT	Optimal corrosion control treatment
Order	Variance Order
QA/QC	Quality Assurance / Quality Control
T&D	Transmission and Distribution



# PART 1: INTRODUCTION

Denver Water is committed to significantly reducing the lead exposure levels to customers from lead service lines and plumbing. The Lead Reduction Program provides a holistic and permanent lead reduction approach that will significantly reduce lead exposure to our customers and be less harmful to the environment. In December 2019, Denver Water began the process of implementing the Lead Reduction Program Plan in accordance with the Environmental Protection Agency's Dec. 16, 2019, Variance and the Nov. 15, 2019, letter from the Colorado Department of Public Health and Environment regarding conditional approval of Denver Water's request for modification of optimal corrosion control treatment.

This semi-annual report was prepared in compliance with paragraph 7.B of the Variance and commitments made by Denver Water in the 2019 LRPP. The report addresses the first six months of 2022 for the period of Jan. 1 through June 3, 2022. During this time period, Denver Water has provided six monthly reports for January 2022, February 2022, March 2022, April 2022, May 2022, and June 2022 to CDPHE. This report includes data and information from these monthly reports, as well as additional reporting as required by the Variance for the semi-annual reports.

## What to Expect: Reporting on Program Activities

The purpose of the semi-annual (and subsequent annual) reports is to document the implementation of the LRP, describe the actions taken by Denver Water to reduce lead levels and support the subsequent evaluation of the LRP in anticipation of an extension to the Variance request beyond three years.

The performance data included for the different elements of the LRP described in this semi-annual report vary depending on the launch date of the different program elements (see Table 1). The reporting dates for the different program elements are shown in Table 2. In general, data shown for the first six months of 2022 include the period of Jan. 1 through June 3, with a few exceptions to either provide additional information not included in previous reports or to align with other reporting timelines (for example, with Lead and Copper Rule six-month reporting periods).

**TABLE 1. WHAT TO EXPECT IN THIS SEMI-ANNUAL REPORT**

Paragraph (and LRP Task)	What to Expect in this Semi-Annual Report and Status
<b>7.B.i CCT</b>	This section includes a summary of results previously submitted in the six monthly reports <sup>1</sup> for January, February, March, April, May and June 2022.
<b>7.B.ii LSL Inventory</b>	Denver Water first published the LSL Inventory on its website on March 5, 2020. The map was updated on the Denver Water website on June 30, 2022, using data current up to June 27, 2022.
<b>7.B.iii LSL Replacements (aka ALSLR Program)</b>	This section summarizes the number and type of replacements completed. Denver Water crews have been replacing lead service lines since Jan. 1, 2020. Contractors started lead service line replacement on March 5, 2020.
<b>7.B.iv Filters (aka Filter Program)</b>	This section summarizes filter distribution. Initial filter distribution was completed by Sept. 21, 2020. Replacement filter distribution was initiated on July 1, 2020, and continues through 2022.
<b>7.B.v Compliance Metrics</b>	The Equivalency Model is updated using data collected for the program year and is presented in the annual report.
<b>7.B.vi Communications, Outreach and Education</b>	This section describes implementation of the 2022 COE Plan, <sup>2</sup> virtual community meetings, engagement with the Stakeholder Advisory Committee, and development of new customer resources and materials.
<b>7.B.vii Health Equity and Environmental Justice</b>	This section summarizes implementation of the 2022 COE Plan, updates on community partnerships, and outreach.
<b>Additional Requirements and Miscellaneous Deliverables</b>	This section summarizes submissions to EPA and CDPHE identified in the LRPP. <sup>3</sup>
<b>Appendices</b>	Appendices include CCT, LSL inventory, water quality results, LSL replacements, customer refusal lists, COE and HE&EJ.

<sup>1</sup> See Appendix REG-1 Copies of Letters for Compliance-Related Submissions (First Six-Month Period of 2022).

<sup>2</sup> See Appendix COE-15 2022 COE Plan in the Second Semi-Annual Report of 2021 (submitted Jan. 7, 2022).

<sup>3</sup> See Appendix REG-1 Copies of Letters for Compliance-Related Submissions (First Six-Month Period of 2022).

**TABLE 2. DATES FOR DATA INCLUDED IN THE FIRST SEMI-ANNUAL REPORT FOR 2022**

Description	Second Semi-Annual Report (2021)	First Semi-Annual Report (2022)
<b>CCT pH/alkalinity Adjustment Start-up</b>	All three WTPs have the capability to adjust pH	All three WTPs have the capability to adjust pH
<b>LCR 90<sup>th</sup> Percentile Lead Concentration based on Compliance and Customer Requested Samples</b>	All LCR compliance samples collected from July 1 to Dec. 31 All customer requested samples reported in LIMS <sup>1</sup> between July 1 and Dec. 31	All LCR compliance samples collected from Jan. 1 to June 30 All customer requested samples reported in LIMS between Jan. 1 and June 30
<b>Elevated Lead Response Reporting</b>	June 5 to Dec. 3	Jan. 1 to June 3 <sup>2</sup>
<b>Water Quality Sampling from Select Households (1983 to 1987 Homes)</b>	June 5 to Dec. 3	Jan. 1 to June 3
<b>Inventory – Posting of Map to Denver Water’s Website</b>	Data through Sept. 24, 2021 Posted Sept. 29, 2021	Data through June 27, 2022 Posted June 30, 2022
<b>Inventory – Update</b>	June 5 to Dec. 3	Jan. 1 to June 3
<b>Investigations – Verification Potholing as Part of ALSLR Program</b>	June 5 to Dec. 3	Jan. 1 to June 3
<b>Investigations – Investigative Potholing Independent of ALSLR Program</b>	June 5 to Dec. 3	Jan. 1 to June 3
<b>Investigations – Water Quality Sampling as part of ALSLR Program (not included in 90<sup>th</sup> Percentile Calculation)</b>	All results reported in LIMS by Dec. 3	All results reported in LIMS by June 3
<b>Investigations – Water Quality Sampling Independent of ALSLR Program (not included in 90<sup>th</sup> Percentile Calculation)</b>	All results reported in LIMS by Dec. 3	All results reported in LIMS by June 3
<b>Water Quality Sampling Post-LSL Replacement</b>	All results reported in LIMS by Dec. 3	All results reported in LIMS by June 3 <sup>3</sup>
<b>ALSLR Program Replacements</b>	June 5 to Dec. 3	Jan. 1 to June 3
<b>ALSLR Program Consent Forms</b>	June 5 to Dec. 3	Jan. 1 to June 3
<b>Initial Filter Distribution</b>	June 5 to Dec. 3	Jan. 1 to June 3
<b>Replacement Filter Distribution</b>	June 5 to Dec. 3	Jan. 1 to June 3
<b>Filter Program Occupancy Changes<sup>4</sup></b>	June 5 to Dec. 3	Jan. 1 to June 3
<b>Informal Filter Adoption Survey as Part of ALSLR Program</b>	June 5 to Dec. 3	Jan. 1 to June 3
<b>Filter Testing in the Field</b>	July 1 to Dec. 31	Jan. 1 to June 30
<b>COE Activities</b>	June 5 to Dec. 3	Jan. 1 to June 3

<sup>1</sup> LIMS is the Laboratory Information Management System used by Denver Water.

<sup>2</sup> For samples collected and reported in LIMS by June 3 and follow-up response by June 30, 2022.

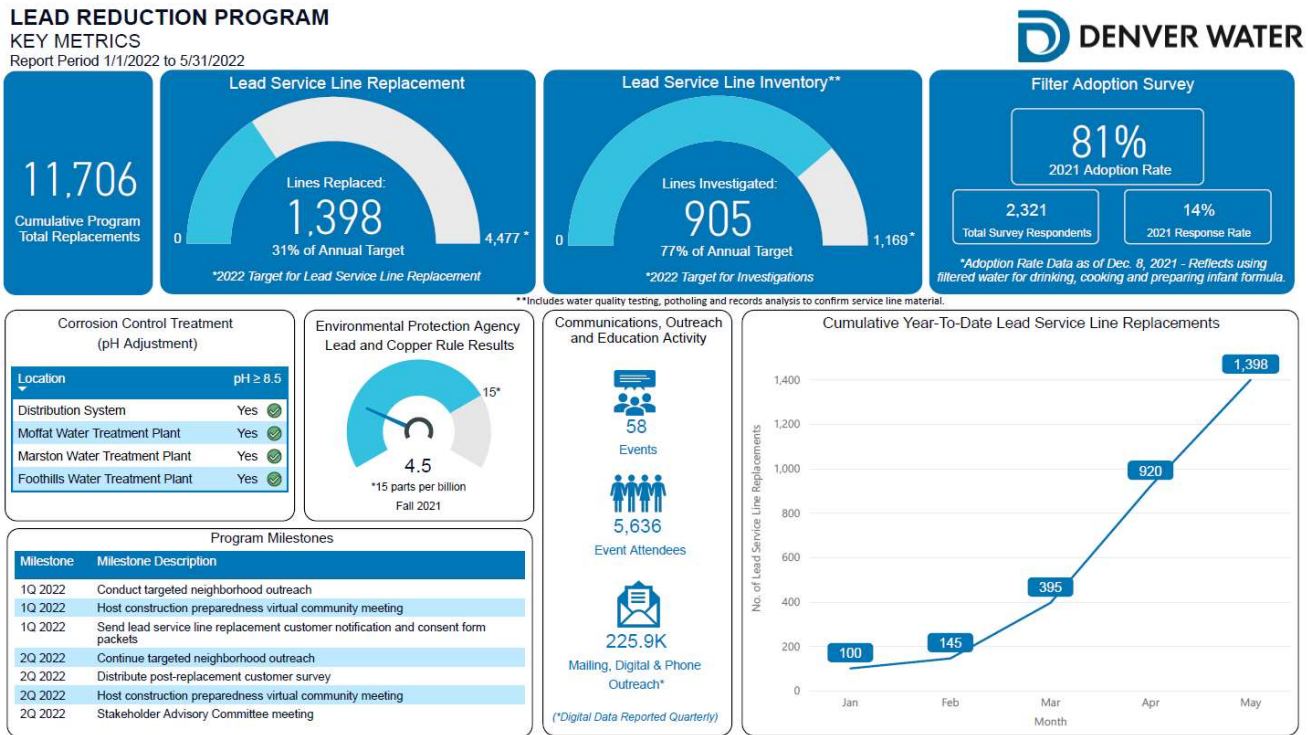
<sup>3</sup> See December 2021 monthly report for sample results reported in LIMS between Dec. 4 and 31, 2021.

<sup>4</sup> Includes occupancy changes at ALSLR properties by definition.

## Summary of Key Performance Indicators Year-to-Date

Denver Water uses a dashboard to communicate key metrics to share the progress of the LRP with the public. The dashboard was posted on Denver Water’s website on June 21, 2022, in both English and Spanish, and currently shows data through May 31, 2022.<sup>4</sup> The dashboard can be accessed from the Denver Water website at: <https://www.denverwater.org/your-water/water-quality/lead/dashboard>

**FIGURE 1. DASHBOARD AS POSTED TO THE DENVER WATER WEBSITE (DATA TO MAY 31, 2022)**



<sup>4</sup> See the 2020 Second Quarterly Report for an explanation of the metrics used in the dashboard.

## PART 2: REQUIRED REPORTING

### 7.B.i CCT

Section 7.B.i of the Variance addresses Denver Water's Corrosion Control Treatment (CCT) recordkeeping and reporting requirements for the first half of 2022 for the following parameters:

*i. CCT*

- a. within 90 days of the Effective Date, an elevated lead response plan for approval by CDPHE and EPA in accordance with requirements of paragraph 2.B.iv.*
- b. notification to CDPHE and EPA of elevated lead levels and the actions that Denver Water is taking to reduce drinking water exposure to lead at those locations;*
- c. all lead and copper compliance tap sampling results, as required in Subpart I of 40 C.F.R. Part 141 and Section 11.26 of 5 CCR 1002-11, as well as the results of any customer requested samples;*
- d. CCT water quality parameters for pH and alkalinity, reported monthly no later than the tenth day of the following month; and*
- e. all lead and water quality results collected as part of Denver Water's investigation of LSLs and post LSL replacement and service line material of those sites, reported monthly no later than the tenth day of the following month.*

*Text is taken verbatim from the Order, dated Dec. 16, 2019.*

Denver Water uses a combination of water quality parameters and lead sampling results to report the performance of CCT. Information that was previously reported as part of the monthly reports for January through June 2022 is not included in this report with the exception of a summary of some of the data.

During this reporting period, Denver Water continued to operate at or near a pH of 8.8 at all three plants. Denver Water also submitted several miscellaneous reports to CDPHE and EPA as required in the LRPP as described in Table 3.

**TABLE 3. OVERVIEW OF 7.B.I REQUIREMENTS**

<b>Paragraph Reference</b>	<b>Description</b>	<b>Refer to</b>
<b>7.B.i.a</b>	Submit Elevated Lead Response Plan by March 30, 2020, per paragraph 2.B.iv.	Submitted as part of Implementation Plan. Approved July 17, 2020.
<b>7.B.i.b</b>	Notify CDPHE of elevated lead levels and actions taken by Denver Water to reduce lead exposure.	See Table 4 and Appendix. <sup>5</sup>
<b>7.B.i.c</b>	Lead sampling results per the Lead and Copper Rule and from customer requested sampling.	See Table 5 (90 <sup>th</sup> percentile to date). See monthly reports for January through June 2022 submitted previously. <sup>6</sup>
<b>LRPP III.E (p 70)</b>	Monthly trending of LCR compliance samples and customer requested samples.	See monthly reports for January through June 2022. <sup>6</sup>
<b>7.B.i.d</b>	CCT parameters for pH and alkalinity, reported monthly.	See Table 6. See monthly reports for January through June 2022. <sup>6</sup> CDPHE confirmed setpoints on June 9, 2021. <sup>7</sup>
<b>LRPP III.E (p 70)</b>	Install automated pH control loops at all three treatment plants by March 2020.	All three plants have feedback loops in place and are functioning.
<b>7.B.i.e</b>	All lead and water quality sampling results from investigations for LSLs. All lead and water quality sampling results from post-LSL replacement sampling. Note that lead results from investigations and post-LSL replacement sampling are not included in the calculation of the 90 <sup>th</sup> percentile lead concentration.	See Table 7 and monthly reports for January through June 2022. <sup>6</sup> See Table 8.
<b>LRPP Executive Summary LRPP III.E (p 65)</b>	Targeted communications for select households built between 1983 to 1987 that self-identify as expecting or existing families with formula-fed infants and children up to 2 years of age. Offer water quality sampling; provide filter if lead measured > 3 µg/L (as described in paragraph 5.D).	Described with section 7.B.vi. Outreach materials launched Aug. 21, 2020. See Table 9.
<b>LRPP III.E (p 71)</b>	Complete distribution system modeling, evaluating pH, disinfection by-products and water age by Jan. 31, 2020. Submit nitrification control plan by June 30, 2020, to address sampling, monitoring and flushing.	Submitted July 6, 2020.  Re-submitted July 15, 2021.
<b>Voluntary</b>	Results from continued operation of the pipe racks.	Submitted Feb. 16, 2022.

<sup>5</sup> See Appendix CCT-1 Summary of Response to Elevated Lead Levels (First Six-Month Period of 2022).

<sup>6</sup> See Appendix REG-1 Copies of Letters for Compliance-Related Submissions (First Six-Month Period of 2022).

<sup>7</sup> See Letter from CDPHE to Denver Water. See also Optimal Corrosion Control Treatment Parameters for Denver Water, submitted to CDPHE on May 5, 2021.

Denver Water manages lead and water quality samples via its Laboratory Information Management System, with analysis performed by either the Denver Water Quality Lab or a contract lab. The sub-program under which the sample was collected is reported in LIMS, including LCR compliance samples, customer requested samples, customer requested samples from select households built between 1983 to 1987 (self-identifying as a home with a formula-fed infant), pre-LSL replacement investigative water quality samples and post-LSL replacement water quality samples.

### Summary of Actions Taken to Reduce Drinking Water Exposure to Lead at Locations with Elevated Lead Levels [7.B.i.a and b]

In 2020, Denver Water set the elevated lead investigative response level at 15 and 25 µg/L in LCR compliance and customer requested samples, respectively, under its Elevated Lead Response Plan approved by CDPHE and EPA. Denver Water provides a description in the monthly report of actions taken when this occurs.

All customer requested samples above 25 µg/L analyzed by month during the first half of 2022 are listed in Table 4; a detailed summary of responses is provided in the monthly reports for all properties reviewed as part of the Elevated Lead Response Plan.<sup>8</sup> A lead result over 25 µg/L in the first sample bottle for a customer’s home will trigger follow up and investigative sampling, as outlined in the Corrosion Control Treatment Implementation Plan.<sup>9</sup> Lead was measured above 25 µg/L in eight samples during the reporting period for the first six months of 2022.

**TABLE 4. COUNT OF PROPERTIES WITH ELEVATED LEAD CONCENTRATIONS IN LCR AND CUSTOMER REQUESTED SAMPLES<sup>1</sup>**

Description (Based on Sampling Date)	January 2022	February 2022	March 2022	April 2022	May 2022	June 2022	Response
<b>Properties with Lead &gt;25 µg/L in first 1 L sample bottle</b>	1	1	0	1	0	1	Reported to CDPHE within 10 days and again in monthly report. See Appendix. <sup>10</sup>

<sup>1</sup> Although the Elevated Lead Response Plan applies only to LCR and eligible customer requested samples, the features of the plan are applied to results generated from pre-LSL replacement water quality samples obtained from properties included in the LRP for a consistent customer experience. The actions taken at these properties to investigate elevated lead are described in Appendix CCT-1 per the definition used in the Order. Data reflect samples analyzed by June 3, 2022, with actions updated through July 1, 2022.

<sup>8</sup> See Appendix CCT-1 Summary of Response to Elevated Lead Levels (First Six-Month Period of 2022) for elevated lead measured in the first bottle of the 3-bottle test.

<sup>9</sup> See Corrosion Control Treatment Implementation Plan re-submitted to CDPHE on June 4, 2020.

<sup>10</sup> See Appendix CCT-1 Summary of Response to Elevated Lead Levels (First Six-Month Period of 2022).

## Lead Sampling Results from LCR Compliance and Customer Requested Sampling [7.B.i.c]

Data for LCR compliance and customer requested sampling are provided in the individual monthly reports for January through June 2022.<sup>11</sup> Data used to calculate the 90<sup>th</sup> percentile lead concentration in the first semi-annual report align with reporting requirements of the LCR. This value may be updated by CDPHE pending their review of data used to calculate the 90<sup>th</sup> percentile lead concentration for LCR reporting needs.

The cumulative 90<sup>th</sup> percentile lead concentration for LCR compliance samples for the Spring 2022 compliance period (Jan. 1 through June 30, 2022) is presented in Table 5. Denver Water staff continues to collect LCR compliance samples inside customer homes.

**TABLE 5. SUMMARY OF LCR 90<sup>TH</sup> PERCENTILE LEAD CONCENTRATIONS (JAN. 1 TO JUNE 30, 2022)**

LCR Compliance Results for Lead – Spring 2022 Compliance Period	Result	Number of Homes
<b>LCR Compliance 90<sup>th</sup> Percentile Lead<sup>1</sup></b>	3.5 µg/L	109
<b>Overall 90<sup>th</sup> Percentile Lead Concentration using LCR Compliance + Customer Requested Samples<sup>2</sup></b>	3.7 µg/L	413 (62 + 351)

<sup>1</sup> Includes results for all LCR compliance samples (from 1951 and older homes plus 1983 to 1987 homes with copper piping and lead solder) and reported in LIMS for the Jan. 1 to June 30, 2022, compliance period. This number matches the June monthly report.

<sup>2</sup> Includes results from customer requested samples reported in LIMS between Jan. 1 and June 30, 2022, and submitted via the monthly reports. Sampling to support the ALSLR Program is excluded from the compliance calculation by definition. This number matches the June monthly report.

Results from customer requested sampling are included in the overall 90<sup>th</sup> percentile lead concentration reported in Table 5 and detailed calculations are available in the monthly reports.

## Corrosion Control Treatment Water Quality Parameters for pH and Alkalinity [7.B.i.d]

Chemical feed systems were brought into service for enhanced pH CCT on March 3, 2020, at the Marston and Foothills Water Treatment Plants and on May 1, 2020, at the Moffat Water Treatment Plant. Trends for pH and alkalinity are included in monthly reports since Jan. 1, 2020; operating data with adjusted pH are included in the monthly reports since March 2020. Data for pH in treated water from the active water treatment plants and the distribution system are summarized in Table 6 based on the lowest daily average pH measured each month from each sampling point. On Aug. 13, 2020, Denver Water wrote to CDPHE that steady state performance of CCT was achieved in the distribution system. One year of data to describe CCT performance was provided to CDPHE on May 6, 2021, including pH and alkalinity data. The treatment targets for pH and alkalinity in the effluent of the three treatment plants and across the distribution system was announced by CDPHE on June 9, 2021. CDPHE established a target of

<sup>11</sup> See Appendix REG-1 Copies of Letters for Compliance-Related Submissions (First Six-Month Period of 2022).



8.8 ± 0.2 for pH in treated water, 8.8 ± 0.3 for pH in the distribution system, and alkalinity greater than or equal to 20 mg/L as CaCO<sub>3</sub>, all effective July 1, 2021.<sup>12</sup>

**TABLE 6. MINIMUM DAILY AVERAGE PH REPORTED EACH MONTH<sup>1</sup>**

Description	January 2022	February 2022	March 2022	April 2022	May 2022	June 2022
<b>Effluent Variance Requirement</b>	pH 8.8 +/- 0.2 in WTP effluent					
<b>Marston Water Treatment Plant Effluent</b>	8.85	8.87	8.85	8.84	8.79	8.82
<b>Foothills Water Treatment Plant Effluent</b>	8.86	8.86	8.82	8.77	8.79	8.84
<b>Moffat Water Treatment Plant Effluent<sup>2</sup></b>	--	--	--	--	8.82	8.85
<b>Distribution System Variance Requirement</b>	pH 8.8 +/- 0.3 in distribution system					
<b>Distribution System</b>	pH levels in the distribution have been within 8.8 +/- 0.3 since March 12, 2020. <sup>3</sup>					

<sup>1</sup> See monthly reports submitted previously for detailed pH data.

<sup>2</sup> The Moffat Water Treatment Plant went offline from September 8, 2021, to May 2, 2022, for the winter season. As of May 3, 2022, the plant was back online but experienced a power outage which resulted in data invalidation. The May 2022 value of 8.61 is the daily average value recorded the day the treatment plant returned online. All pH values following that date average 8.82.

<sup>3</sup> See monthly reports from March 2020 through June 2022.

### Water Quality Sampling Results from Pre-LSLR Sampling [7.B.i.e]

Results from water quality sampling can provide an indication of lead at single-family residential properties and, when reviewed with additional results from field methods, the status of a service line can be changed in the inventory (i.e., from possible lead to known lead<sup>13</sup>). The 3-bottle test is performed<sup>14</sup> at properties in the City and County of Denver and the distributors:

- To confirm the service line material before LSL replacement at properties included in the 2022 Accelerated Lead Service Line Replacement Program Task Orders where lead has not been confirmed (i.e., p-value < 1<sup>15</sup>).
- To inform the inventory and predictive model at properties in the City and County of Denver with a suspected (i.e., p-value ≥ 0.8 and < 1) or possible LSL (i.e., p-value ≥ 0.5 and < 0.8).

<sup>12</sup> See Appendix REG-1 Copies of Letters for Compliance-Related Submissions (First Six-Month Period of 2022).

<sup>13</sup> See discussion in Section 7.B.ii LSL Inventory.

<sup>14</sup> See individual monthly reports for details and results for pre-LSL replacement sampling efforts.

<sup>15</sup> Since July 22, 2020, kits are sent to all properties with a p-value of 0.5 to 0.9. Any property with a p-value < 1 is verified in the field before replacement, using visual inspection of materials at the interior connection and/or potholing on the exterior.

- To support the designation of the service line material at all single-family residential properties within a distributor boundary identified with a suspected or possible lead service (i.e., p-value  $\geq 0.5$  and  $< 1$ ).<sup>16</sup>
- To validate customer comments on the presence (or absence) of a LSL and requests to opt into (or out of) the LRP.

Lead results over 3  $\mu\text{g/L}$  in the second or third sample bottle will trigger a review of inclusion in the LRP, and the property will be added to the list for LSL replacement and added to the Filter Program if not already enrolled.<sup>17</sup> A summary of the water quality results prior to LSL replacements is presented in Table 7. One property measured 779.5  $\mu\text{g/L}$  in the first bottle in February 2022 and had its service line replaced in May 2022.

**TABLE 7. SUMMARY OF WATER QUALITY RESULTS<sup>1</sup> PRE-LSL REPLACEMENT AT SINGLE-FAMILY RESIDENCES USING THE 3-BOTTLE TEST**

Water Quality Sampling for Investigation (pre-LSL Replacement)	Result for 2022 Year-to-Date	Unit
<b>Total Number of Kits Mailed Out<sup>2</sup></b>	4,995	Kits
<b>Total Number of Kits Received and Analyzed to Investigate the Service Line Material<sup>3</sup></b>	1,631	Kits
<b>Maximum Lead Concentration Measured Year-to-Date<sup>4</sup></b>	779.5	$\mu\text{g/L}$
<b>Average Lead Concentration (in second and third bottles only)<sup>5</sup></b>	2.49	$\mu\text{g/L}$

<sup>1</sup> Results from pre-LSL replacement sampling from investigation, verification, and customer requested sampling are included in monthly reports. Data reported in LIMS between June 4 and 30, 2022, can be found in the June 2022 monthly report.

<sup>2</sup> If a sampling kit is re-sent to a property, it is counted twice.

<sup>3</sup> As reported in LIMS by June 3, 2022, sample kits collected in 2022 are included in the metric.

<sup>4</sup> The highest value measured in the first six months of 2022 was 779.5  $\mu\text{g/L}$  (measured in Bottle 1 on Feb. 12, 2022). Pre-LSLR samples, although managed in accordance with the Elevated Lead Response Plan, are documented in the monthly reports and therefore are not documented in Appendix CCT-1.

<sup>5</sup> If a value was reported as less than the detection limit (i.e.,  $< 1$  ppb) the measured value was taken as 0.5  $\mu\text{g/L}$  for calculation of the average concentration.

### Water Quality Sampling Results for Post-LSL Replacement [7.B.i.e]

Water quality sampling is offered to all customers approximately four months after LSL replacement. For LSL replacements completed prior to Dec. 31, 2019, letters were mailed to customers to offer post-replacement sampling four months after LSL replacement to single-family, multi-family and commercial properties. Customers could then call Denver Water to request a sampling kit. This process was discontinued on April 2, 2020.

<sup>16</sup> This approach applied to all distributors with one exception. Sampling kits were delivered to 500 residential properties in Consolidated Mutual, although any customer can request a sample kit.

<sup>17</sup> The threshold used as an indicator for a lead service line was reduced to reflect the impact of corrosion control treatment with pH adjustment on lead release measured in water quality samples. Samples collected on May 1, 2020, and after with lead measured about 3  $\mu\text{g/L}$  are considered lead. Samples collected prior to May 1, 2020, are assessed using the original threshold of 5  $\mu\text{g/L}$ .

For LSL replacements completed between Jan. 1 and Dec. 31, 2020, single-family residential property customers were automatically mailed a 3-bottle sampling kit approximately four months after replacement and multi-family and commercial properties were mailed a letter offering post-LSL replacement sampling inviting the customer to request a sampling kit. The letter was sent to every unit in a multi-family building.

For LSL replacements completed after Jan. 1, 2021, all single-family, multi-family, and commercial properties receive an offer letter for post-LSL replacement sampling. If the customer elects to participate, single-family properties receive a 3-bottle sampling kit and multi-family and commercial properties receive a 1-bottle sampling kit. A summary of post-LSL replacement sampling offers is provided in Table 8. As of July 2021, only those single-family properties with replacements completed by Denver Water Transmission and Distribution (T&D) crews automatically receive a 3-bottle sampling kit, with offer letters continuing to be mailed to all other residential, multi-family and commercial properties.

**TABLE 8. SUMMARY OF POST-REPLACEMENT SAMPLING OFFERS AND WATER QUALITY (THROUGH JUNE 3, 2022)**

Water Quality Sampling after LSL Replacement	Count <sup>1</sup>						TOTAL
	January 2022	February 2022	March 2022	April 2022	May 2022	June 2022	
<b>Total Number of Letters Mailed to Offer Post-LSL Replacement Sampling<sup>2,3</sup></b>	842	289	228	0	65	0	1,424
<b>Total Number of Kits Mailed Out<sup>2,3</sup></b>	337	216	167	28	196	2	946
<b>Total Number of Kits Received and Analyzed to Confirm post-LSL Replacement Water Quality<sup>2,4</sup></b>	26	68	53	58	18	0	223
<b>Total Number of Kits Received and Analyzed to Confirm post-LSL Replacement Water Quality Not Previously Reported</b>	89	0	0	0	0	0	89
<b>Number of Properties with Lead &gt; 15 µg/L in First Bottle<sup>2</sup> (triggers additional investigation effort)</b>	0	0	1	1	0	0	2
<b>Number of Properties with Lead ≥ 5 and &lt; 15 µg/L in the Second and/or Third Bottle<sup>5, 6</sup> (triggers additional investigation effort)</b>	1	1	1	1	0	0	4
<b>Number of Properties with Lead ≥ 5 and &lt; 15 µg/L in First Bottle<sup>2</sup> (triggers customer education)</b>	5 <sup>7</sup>	4	5	3	0	0	17

<sup>1</sup> Counts are based on the month of sample collection, per the Order. Not applicable to “Total Number of Letters Mailed to Offer Post-LSLR Replacement Sampling” or “Total Number of Kits Mailed Out”, which are based on the date of mailing.

<sup>2</sup> Applies to single-family and multi-family residences.

<sup>3</sup> If a duplicate letter or sampling kit was sent to a property/customer, it is counted twice.

<sup>4</sup> Total number of kits analyzed refers to results available in LIMS by June 3, 2022, with samples collected since Jan. 1, 2022.

<sup>5</sup> Applies to single-family residences only.

<sup>6</sup> Number in January is from a November 2021 sample which was not previously reported.

<sup>7</sup> This count includes two properties that were sampled in December 2021 and not previously reported due to the results not being available in LIMS by the data cut-off date used for 2021 reporting.

During this reporting period, 80 properties with a completed LSL replacement did not receive an offer letter or sampling kit and required additional review due to the replacement being performed by a third party, data discrepancies, tap status changes, mailing address errors, etc. In many circumstances, a homeowner or contractor elects to replace a service line as part of redevelopment or renovation, a process that can take several months to complete. Once the data are reconciled, a water quality sampling kit or offer letter is sent to these properties. A detailed list of properties that did not receive the offer and explanation is provided in Appendix CCT-3, including follow-up activities.<sup>18</sup>

Post-replacement sampling offer letter mailing lists are created every month by compiling a list of properties from the inventory where the p-value status changed to 0 due to replacement of the LSL four months prior to the month the mailing list is created. The Quality Assurance/Quality Control process to determine valid addresses includes evaluating who completed the replacement (i.e., Denver Water T&D crews or ALSLR contractors), if the property is CASS<sup>19</sup> certified, and the initial status of the property in the inventory.

### Water Quality Results from Select Households (1983 to 1987 Homes) [5.D]

Section 5.D of the Variance provides that:

*...If a formula-fed infant/child up to 24 months of age resides in a Select Household, upon customer request Denver Water must offer free drinking water lead testing. If the water quality results in the first draw sample show lead concentrations above 3 ppb, Denver Water must offer a filter and enough replacement filters and cartridges to last the customer until the child at the Select Household exceeds the age of 24 months. Denver Water will develop and implement a communications, outreach and education program focused on Select Households to make them aware of the opportunity for testing and filters.*

*Text is taken verbatim from the Order, dated Dec. 16, 2019.*

Outreach to customers residing in all households built between 1983 and 1987 was launched in August 2020 with a second round of outreach performed in November 2021. “Select households” are defined as homes built between 1983 to 1987 with copper piping and lead solder and that self-identify as having a formula-fed infant under the age of 24 months. If a customer from a 1983 to 1987 home requests a water quality sampling kit, Denver Water will mail a kit whether or not a formula-fed infant resides at the property. If lead is measured above 3 µg/L, and the customer self-identifies as having a formula-fed infant, the customer is invited to enroll into the Filter Program.

<sup>18</sup> See Appendix CCT-3 Post LSL Replacement Sampling – Summary of Incomplete Offer to Test (Cumulative since LRP Inception).

<sup>19</sup> CASS (Coding Accuracy Support System) is used by the United States Postal Service to verify and improve the accuracy of an address and its associated zip code.

Outreach for water quality sampling in 1983 to 1987 homes was initiated in fall 2020 and resulted in sample requests through early 2021 that were reported in the first 2021 semi-annual report. Follow-up outreach to those properties was conducted in November 2021 to remind customers of the opportunity to request a free water quality sampling kit if they have a formula fed infant in the home. In 2022, 21 sample kit requests were received, and 17 sample kits were subsequently returned and analyzed. Lead was measured greater than 3 µg/L in the first bottle for zero properties and therefore no new properties defined as a select household were enrolled in the Filter Program.<sup>20</sup> Results recorded in LIMS by June 3, 2022, are presented in Table 9. The annual reminder mailing to customers in 1983 to 1987 homes on the opportunity for water quality sampling will be distributed in the second six months of 2022 and will be presented in the second semi-annual report.

**TABLE 9: SUMMARY OF WATER QUALITY RESULTS FROM SELECT HOUSEHOLDS**

Year	Number of Customers Contacted by Mail	Number of Customer Requested Samples <sup>1</sup>	Number of Kits Received and Analyzed for Lead	Number of Properties with Lead > 3 µg/L	Number of Properties Self-Identified with Formula-fed Infant and Enrolled in Filter Program <sup>2</sup>
2020	38,477	319	150	7	2
2021	36,723	178	62	3	0
2021 Not Previously Reported	N/A	19	38	5	1
2022 <sup>3</sup>	N/A <sup>4</sup>	21	17	0	0

<sup>1</sup> Number of Customer Requested Samples is based on the Test Kit Sent Date.

<sup>2</sup> Select Households receive enough replacement filter cartridges to meet the formula preparation needs for infants up to 24 months and distribution of additional replacement filter cartridges are not provided as part of the Filter Program.

<sup>3</sup> Total number of kits analyzed refers to results available in LIMS between Jan. 1 and June 3, 2022.

<sup>4</sup> The annual outreach mailer for 2022 will be sent in the second six-month period of 2022. Results from the 2022 outreach effort will be presented in the Second Semi-Annual Report of 2022.

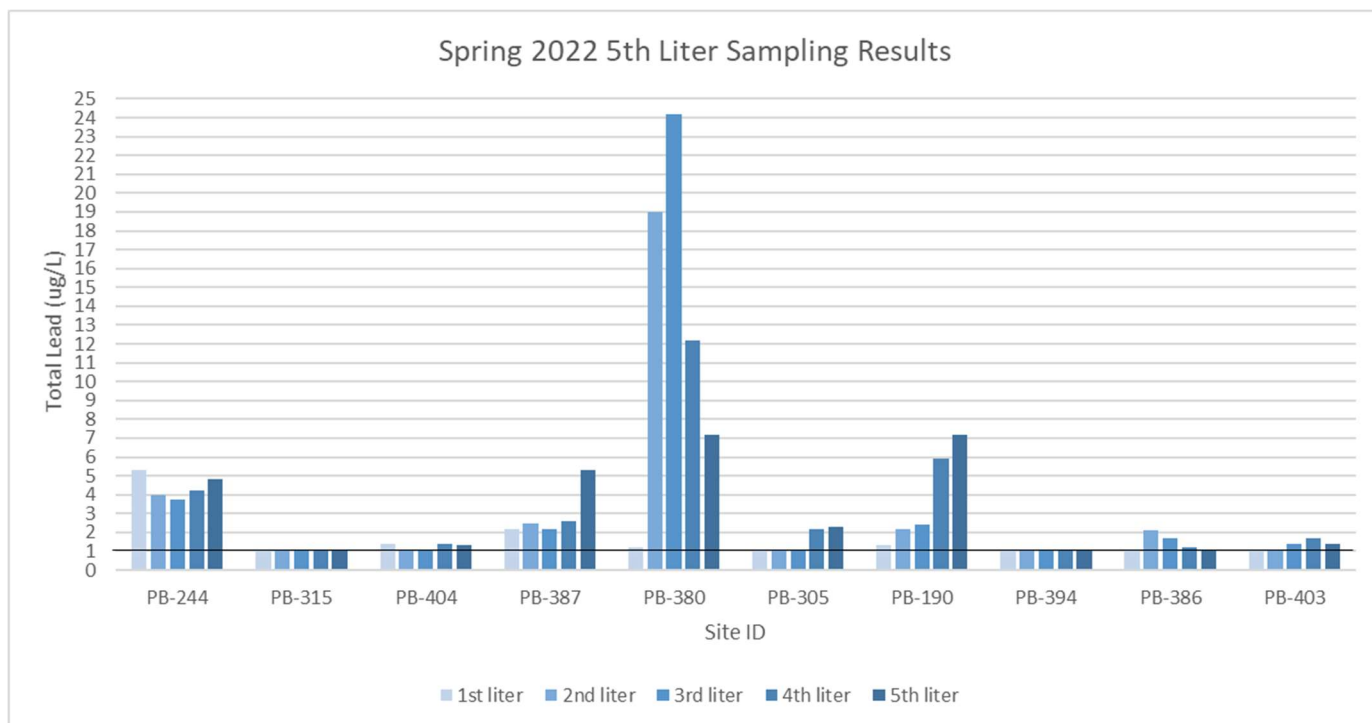
### Voluntary 5th L Sample Collection

During the Spring 2022 LCR compliance sampling round, technicians collected five 1 L sequential samples at 10 randomly selected properties with a LSL included in the LCR study pool in preparation for new sampling protocols described in the EPA Lead and Copper Rule Revisions published in January 2021. Results are shown in Figure 2 and Table 10. Lead was measured less than 1 µg/L in the 5<sup>th</sup> L at three properties with mixed results observed at the remaining properties (with either more or less lead measured in the 5<sup>th</sup> L). The results of Figure 2 were compared to results described in the LRPP which included sampling using ten sequential samples. In general, the 5<sup>th</sup> L profile sampling suggests the first draw (i.e., the compliance sample under the existing LCR does not capture the highest lead concentrations within a service line. One home had concentrations as high as 24 µg/L in the third draw but all other homes had

<sup>20</sup> See Appendix CCT-4 Summary of Water Quality Sampling Results from Select Households (1983 to 1987 Homes, Cumulative since LRP Inception).

results less than 10 µg/L. Customers at this home use a local water source as an alternative to their drinking water and the stagnation period was within an acceptable range. All results are an early indication that the CCT component of the LRP is effective and CCT practices are expected to meet the needs of the LCRR.

**FIGURE 2. RESULTS FROM LEAD RELEASE PROFILES USING FIVE 1 L SAMPLES (NON-COMPLIANCE SAMPLES COLLECTED DURING SPRING 2022 LCR SAMPLING PERIOD)**



**TABLE 10. OVERVIEW OF 5<sup>TH</sup> LITER SAMPLING DATA IN SPRING 2022**

Voluntary 5 <sup>th</sup> L Sampling in 2022		Count
<b>Total Number of Properties Sampled for 5<sup>th</sup> L</b>		10
<b>Number of Properties with inconclusive data (all results &lt;1.0)</b>		2
<b>Number of Properties where the 5<sup>th</sup> L &lt; 1<sup>st</sup> L concentration</b>		2
<b>Number of Properties where the 5<sup>th</sup> L &gt; 1<sup>st</sup> L concentration</b>		5
<b>Number of Properties where the 5<sup>th</sup> L = 1<sup>st</sup> L concentration</b>		1

## 7.B.ii LSL Inventory

Section 7.B.ii of the Variance requires that Denver Water maintain records and report the following information with respect to its LSL Inventory:

*ii. LSL Inventory.*

- a. total number of service lines;*
- b. the total number of replaced LSLs during the variance;*
- c. the total number of known, suspected, and possible LSLs;*
- d. the total number of unlikely LSLs;*
- e. the total number of non-LSLs, indicating the number designated as non-LSLs solely based on statistical factors;*
- f. the number of Investigations conducted each year, demonstrating that the minimum 1.4% verification rate has been met;*
- g. an updated service line inventory map; and*
- h. the rationale for a change in the status of a service line in the inventory (e.g. Investigation, replacement, water quality data).*

*Text is taken verbatim from the Order, dated Dec. 16, 2019.*

An overview of the LSL Inventory reporting requirements is shown in Table 11.

**TABLE 11. OVERVIEW OF 7.B.II REQUIREMENTS**

<b>Paragraph Reference</b>	<b>Description</b>	<b>Refer to</b>
<b>3.A</b>	Complete initial LSL Inventory no later than 35 days after the effective date.	Submitted Feb. 5, 2020. <sup>21</sup>
<b>3.C</b>	Publication of LSL Inventory no later than 70 days after the effective date.	Re-posted on June 30, 2022, using data through June 27, 2022.
<b>7.B.ii.a</b>	Total number of LSLs.	Refer to Table 12. See Appendix. <sup>22</sup>
<b>7.B.ii.b</b>	Total number of replaced LSLs during the Variance.	Refer to Table 13.
<b>7.B.ii.c</b>	Total number of known, suspected and possible LSLs.	Refer to Table 12.
<b>7.B.ii.d</b>	Total number of unlikely lead.	Refer to Table 12.
<b>7.B.ii.e</b>	Total number of non-lead service lines. Total number of non-lead determined solely by statistical methods.	Refer to Table 12. Described after Table 12.
<b>7.B.ii.f</b> <b>3B, 3.D</b>	Number of investigations that supports a determination of the material of the service line and that are performed independently of a LSL replacement or not at the request of the customer.	Refer to Table 18.
<b>LRPP III.B</b> <b>(p 51)</b>	Use results from investigations to update the predictive model which is used to plan and prioritize efforts of the COE Plan, ALSLR Program and Filter Program.	See Section 7.B.vii.
<b>7.B.ii.g</b>	Updated LSL Inventory Map.	<a href="https://www.denverwater.org/your-water/water-quality/lead">https://www.denverwater.org/your-water/water-quality/lead</a>
<b>7.B.ii.h</b>	Rationale for change to status of the service line in the LSL Inventory.	See Appendix. <sup>23</sup>

### Current LSL Inventory [7.B.ii.a, c, d and e]

The initial LSL Inventory designating known, suspected, and possible LSLs was submitted on Feb. 5, 2020. The base LSL Inventory was updated using additional information and further analysis of the data presented in the September 2019 LRPP (see Table 12). Adjustments to the status of a service line (i.e., lead or non-lead) are made based on a desktop assessment completed with Denver Water records, customer records, and individual distributor records (i.e., total service, read and bill, and master meter); potholing results; and water quality sampling results. The information presented in Table 12 is used to compare the current understanding of the inventory with the original base inventory submitted in September 2019. The inventory is used to establish the total number of estimated lead services and the mandated annual number of replacements. Therefore, the total number of “known lead” service lines includes the number

<sup>21</sup> See Appendix REG-1 Copies of Letters for Compliance-Related Submissions (First Six-Month Period of 2022).

<sup>22</sup> See Appendix INV-1 Summary of Service Line Status and p-Value (First Six-Month Period of 2022).

<sup>23</sup> See Appendices INV-2A Line by Line p-Value Changes: Status Descriptions and Notes (First Six-Month Period of 2022) and INV-2B Line by Line p-Value Changes by Status (First Six-Month Period of 2022).



of properties with a known lead service that remain in the ground and those that have been replaced by the LRP.

**TABLE 12. LEAD SERVICE LINE INVENTORY AS OF JUNE 3, 2022**

Status of Service Line	Sept. 6, 2019 Submittal (Aug. 8 2019 Data)	Feb. 5, 2020 Submittal (Jan. 28 2020 Data)	Jan. 29, 2021 Submittal (Dec. 30 2020 Data)	Jan. 28, 2022 Submittal (Dec. 30 Data)	July 8, 2022 Submittal (June 3, 2022 Data)
	BASE INVENTORY <sup>1</sup>	INITIAL INVENTORY	2020 ANNUAL REPORT <sup>2</sup>	2021 ANNUAL REPORT <sup>2</sup>	CURRENT INVENTORY <sup>3</sup>
<b>Known Lead</b>	1,066	1,149	7,507 <sup>5</sup>	13,275 <sup>5</sup>	15,300 <sup>5</sup>
<b>Suspected Lead</b>	61,374 <sup>4</sup>	60,549 <sup>4</sup>	54,178	48,224	45,766
<b>Possible Lead</b>	22,106 <sup>4</sup>	21,788 <sup>4</sup>	19,894	18,508	17,938
<b>Unlikely Lead</b>	89,388	90,745	88,475	88,049	87,911
<b>Non-lead</b>	145,766	146,528	150,642 <sup>6</sup>	152,623 <sup>6</sup>	153,767 <sup>6</sup>
<b>Total Number of Services</b>	319,700	320,759	320,696	320,679	320,862
<b>TOTAL ESTIMATED Number of Lead Service Lines</b>	<b>63,955</b>	<b>63,195</b>	<b>63,211</b>	<b>63,276</b>	<b>62,937<sup>7</sup></b>

<sup>1</sup> The “base inventory” is the basis for the 7% LSL replacements per year.

<sup>2</sup> The “annual inventory” is used in the application of the equivalency model to evaluate the performance of the LRP.

<sup>3</sup> The “current inventory” is the basis of enrollment in the Filter Program (calculated as the sum of the properties with a known, suspected and possible lead service line, plus distribution of additional filters to multiple units at the same property and less the number of vacant properties).

<sup>4</sup> “Possible lead” as defined in the Variance includes service lines where  $0.5 \leq p\text{-value} < 0.8$ . In the base and initial inventories, service lines with  $p\text{-value} = 0.7$  were included as “suspected lead.” This was corrected in subsequent reports submitted to CDPHE, including the current inventory. For the base inventory numbers shown in Figure 3, this affected 431 service lines with a  $p\text{-value} = 0.7$  included as “possible lead”. This does not affect the calculation used for the total estimated number of lead services.

<sup>5</sup> The 2020 Annual Report, the July 9, 2021 submittal, and the current inventory counts for “known lead” include properties that are either known to be lead or that have had a lead service line replaced. 11,869 properties categorized as “known lead” in the current inventory were replaced since program inception (see Table 13 and Table 20). Due to ongoing data integration and QC processes, 111 of the 11,869 properties identified as confirmed replacements remain to be integrated into the LRP database to drive a  $p\text{-value}$  change to 0. Of these 111, two remain as “unlikely lead”, 10 as “possible lead”, 54 as “suspected lead”, 27 as “known lead”, and 18 are described as non-active or non-potable (coded as NULL). The counts for these categories in the current inventory (most right column) have been reduced accordingly.

<sup>6</sup> The 2020 Annual Report, the 2021 Annual Report, and the current inventory counts for “non-lead” do not include the properties at which the LSL was replaced as part of the LRP (see Table 13 and Table 20), as these are already included in the count for “known lead”.

<sup>7</sup> See Appendix INV-1 Summary of Service Line Status and  $p\text{-Value}$  (First Six-Month Period of 2022) for details on how this was calculated.

Of the 153,767 service lines identified as non-lead in the current inventory (see Table 12), 105,795 are included in this category based solely on statistical assumptions such as the age of the house, history of development in the Denver Water service area, operating rules requiring

copper at post-1971 properties, water main tap date, etc.<sup>24</sup> Properties built or connected between 1951 and 1971 are considered “unlikely lead” based on historical records and evidence of non-lead materials.<sup>25</sup>

### Number of LSL Replacements Completed and Incorporated into the Inventory [7.B.ii.b]

The total number of LSLs replaced between Jan. 1 and June 3, 2022, is shown in Table 13. Denver Water does not count the replacement of copper service lines (i.e., non-lead) toward the total number of LSL replacements for compliance purposes.<sup>26</sup>

**TABLE 13. NUMBER OF LSL REPLACEMENTS BETWEEN JAN. 1 AND JUNE 3, 2022**

Description	Count <sup>1</sup>
Number of LSLs Replaced in January 2022	97
Number of LSLs Replaced in February 2022	45
Number of LSLs Replaced in March 2022	278
Number of LSLs Replaced in April 2022	527
Number of LSLs Replaced in May 2022	523
Number of LSLs Replaced in June 2022 (June 1 to June 3, 2022)	72
<b>Total Number of LSLs Replaced in the First Six Months of 2022</b>	<b>1,542</b>
<b>Total Number of LSLs Replaced in 2022</b>	<b>1,542</b>
<b>Number of LSLs Replaced not Previously Reported in 2021<sup>2</sup></b>	<b>18</b>
<b>Total Number of LSLs Replaced since inception of LRP on Jan. 1, 2020</b>	<b>11,869</b>

<sup>1</sup> The number of replacements identified in the “Lead Replacement” column of Appendix INV-2B (Line by Line p-Value Changes by Status, First Six-Month Period of 2022) does not match the number of lead service line replacements shown in Table 13 due to a lag in the quality assurance review during data integration from field replacements to LRP database.

<sup>2</sup> This includes the net change to the number of LSL replacements completed in 2021 not previously reported (18 added) and previously reported LSL replacements that upon review were removed (0 deductions); see Appendix LSL-5 Addresses and Types of Replacements for Properties Not Previously Counted and Duplicates (from 2021) for details.

### Investigations of Service Line Material [7.B.ii.f]

Investigations are performed at properties to improve the assumptions that are used to develop the LSL Inventory. Investigations are counted by investigation type and may include desktop evaluation of available data from Denver Water, assessors, permits, distributors, and customers; water quality sampling; potholing and/or visual investigation. After 15 years of the LRP, there should be no remaining properties in the LSL Inventory categorized as suspected or possible lead and all known LSLs should be replaced.

<sup>24</sup> This is the number which retains the original number of non-lead properties (p-value = 0) from the inventory in the Lead Reduction Program Plan (see Appendix III.B.2, Preliminary Identification of Lead Service Lines).

<sup>25</sup> See Appendix II.B.2 of the Lead Reduction Program Plan for details and assumptions.

<sup>26</sup> See paragraph 4.B of the Variance Order and the notes for the column “Actual Previous Materials” in Appendix LSL-1 Addresses and Types of Replacements (First Six-Month Period of 2022).

The number of investigations to support a determination of the service line material are counted toward the required 1.4% of the LSL Inventory investigated each year.

An investigation is counted if all the following conditions apply:

- 1) The property is originally classified as a suspected or possible lead service (see paragraphs 3.B and 3.D in the Variance).
- 2) The investigation was performed independently of LSL replacement and not as part of the 2022 ALSLR Plan<sup>27</sup> (see paragraph 3.D in the Variance).
- 3) The investigation was not the result of a customer requested water quality sample (see paragraph 1.J in the Variance).

A three-point investigative process is used to determine the status of a service line:

- 1) Pothole between the main to water meter and again between the water meter to the building.
- 2) Visual inspection inside the building where the service line enters.
- 3) Sample for water quality.

Potholing can be used in combination with other investigative methods to determine that a property is designated “lead” or “non-lead” (i.e., p-value of 1 or 0, respectively). To confirm “non-lead”, there can be no lead or galvanized visually observed from potholing and interior inspections and there can be no contradictions with the desktop records review and/or water quality sampling results.

In some cases, additional investigative steps are necessary to confirm non-lead. A four-point or five-point investigative process is used when either the interior inspection is not possible and/or water quality testing is inconclusive (between 1 and 3 µg/L) or not available.

In the absence of an interior inspection where the service line enters, a four-point investigative process is used to determine the material of a service line and includes four visual confirmations of the material:

- 1) Two potholes from the main to water meter.
- 2) Two potholes from the water meter to the building.
- 3) Water quality sample result less than 1 µg/L.

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<sup>27</sup> The 2022 ALSLR Plan accounts for replacements completed by the ALSLR contractors and Denver Water’s T&D on planned watermain projects. Material verification efforts undertaken at properties included in the 2022 ALSLR Plan do not count toward the mandatory number of investigations of clause 3.D.

In the absence of a water quality result, or when a water quality result is inconclusive, a five-point investigative process is used to determine the material of a service line and includes five visual confirmations of the material:

- 1) Two potholes from the main to water meter.
- 2) Two potholes from the water meter to the building.
- 3) Inspection at the interior connection.

Investigative potholing is used at properties to improve the knowledge of the inventory at properties that are not included in the 2022 ALSLR Plan. Verification potholing is used at properties included in the 2022 ALSLR Plan to confirm the material of the service line before replacement. As of Aug. 10, 2020, all properties with a p-value  $\geq 0.5 < 1$  are verified prior to replacement, with potholing and/or water quality sampling, to reduce the likelihood of replacing a non-LSL.

Results from verification potholing are presented in Table 14 along with the next steps to either replace a service line that is confirmed to be lead or to pursue additional investigative methods. If copper is observed at three or more points used for verification (e.g., copper is observed at two exterior potholes and at the interior connection), the service line is not categorized and the p-value is not adjusted; rather, the property is subjected to additional investigation efforts (i.e., water quality sampling, data review, additional potholing) to identify the service line material.

**TABLE 14. OUTCOMES FROM VERIFICATION POTHOLING<sup>1</sup> AS PART OF THE 2022 ALSLR PLAN  
(JAN. 1 TO JUNE 3, 2022)**

Service Line Status before Potholing	Potholing Outcome	Update Inventory and Follow-up Action
<b>Initial Status <math>p \geq 0.8</math> (total 1,918)</b>	1,362 confirmed lead (lead observed in at least one point).	Property is confirmed for 2022 ALSLR Plan.
	211 inconclusive (copper observed at three or more points).	Review historical and water quality data to confirm status. <sup>2</sup>
	345 incomplete (could not pothole the minimum three points).	Return to property or find a way to obtain third point. Or proceed with other investigation to confirm status.
<b>Initial Status <math>0.5 \leq p &lt; 0.8</math> (total 304)</b>	110 confirmed lead (lead observed in at least one point).	Property is confirmed for 2022 ALSLR Plan.
	123 inconclusive (copper observed at three or more points).	Review historical and water quality data to confirm status. <sup>2</sup>
	71 incomplete (could not pothole the minimum three points).	Return to property or find a way to obtain third point. Or proceed with other investigation.
<b>Total Number of Properties Potholed and Included in the 2022 ALSLR Program (Verification Potholing)</b>		2,248 <sup>3</sup>

<sup>1</sup> Potholing to verify the material of the service line at properties included in the 2022 ALSLR Plan does not contribute to the required 1.4% investigations. See Appendix INV-3 Results from Potholing for Verification as part of the 2022 ALSLR Program (First Six-Month Period of 2022).

<sup>2</sup> In some cases, the standard for the five-point investigative process was met, meaning water quality may not have been needed to confirm non-lead status.

<sup>3</sup> Includes 26 premises with initial p-values less than 0.5 in the Feb. 20, 2020 Inventory (from Table 12) that were subsequently increased to greater than or equal to 0.5 and therefore eligible for potholing as part of the ALSLR Plan. Ten of the 26 properties have p-values that remain above 0.5, ten had their p-values changed to 0 due to potholing, and six had their p-values changed to 0 due to replacement as part of the ALSLR Plan (1,918 + 304 + 10 + 10 + 6 = 2,248).

During the first six months of 2022, investigative potholing was performed at 216 properties not included in the 2022 ALSLR Plan.<sup>28</sup> Results are included in Table 15, 201 of which confirmed copper, and two of which confirmed lead. Denver Water investigated critical customer properties in advance of replacement: if lead is found, the property is scheduled for replacement in 2022 and therefore the investigation is considered a verification pothole and does not contribute to the required number of annual investigations.

<sup>28</sup> See Appendix INV-4 Results from Potholing for Investigations not part of the 2022 ALSLR Program (First Six-Month Period of 2022).

**TABLE 15. OUTCOMES FROM INVESTIGATIVE<sup>1</sup> POTHOLING INDEPENDENT OF THE 2022 ALSLR PLAN FROM JAN. 1 TO JUNE 3, 2022**

<b>Service Line Status before Potholing</b>	<b>Potholing Outcome<sup>2</sup></b>	<b>Update Inventory and Follow-up Action</b>
<b>Initial Status 0.5 ≤ p ≤ 0.9 (total 216)</b>	2 confirmed lead (lead observed in at least one point).	Add property to list for LSL replacement.
	201 confirmed copper (copper observed at all points).	If water quality is non-detect, then remove property from LRP.
	13 incomplete (could not complete observation at all points).	Return to property to obtain all observation points. Or proceed with other investigation.
<b>Initial Status p &lt; 0.5<sup>3</sup> (total 0)</b>	0 confirmed lead (lead observed in at least one point).	Add property to list for LSL replacement.
	0 confirmed copper (copper observed at all points).	Remove property from LRP.
	0 incomplete (could not complete observation at all points).	Return to property to obtain all observation points. Or proceed with other investigation.
<b>Total Number of Properties Potholed Independent of the 2022 ALSLR Program (Investigative Potholing, First Six Months Only)</b>		216

<sup>1</sup> Potholing to investigate the material of the service line at properties not included in the 2022 ALSLR Plan contributes to the count of the required 1.4 percent investigations.

<sup>2</sup> The number of potholes completed as shown in Appendix INV-2B Line by Line p-Value Changes by Status (First Six-Month Period of 2022) does not match data shown in this table due to a time lag between field activities and the data being collected, reviewed, confirmed, and added to the LRP database.

<sup>3</sup> This includes critical customers that were originally assigned a p-value < 0.5. No critical customers under this category were potholed in the first six months of 2022.

Results for water quality sampling at properties included in the 2022 ALSLR Plan are presented in Table 16 (i.e., verification pre-LSL replacement sampling) and results from properties not included in the 2022 ALSLR Plan are presented in Table 17 (i.e., investigative sampling). As of Feb. 25, 2021, results from water quality sampling are assessed against a reduced threshold concentration used to indicate lead in pre-LSL replacement samples. A lower threshold was selected because of the degree of lead reduction achieved when pH is consistently maintained at  $8.8 \pm 0.3$  across the distribution system.<sup>29</sup> This means that any sample collected on or after May 1, 2020, with lead measured above 3 µg/L in the second or third bottle of the 3-bottle test is considered conclusive for a LSL. Lead measured below this threshold at properties with an initial status of possible or suspected lead (i.e., p-value ≥ 0.5) is inconclusive for non-lead and additional investigations or review of data are needed to determine the status of the service line material. Lead measured below this threshold at properties with an initial status of unlikely lead (i.e., p < 0.5) is considered conclusive for non-lead and no additional investigations are undertaken and the property is not added to the LRP. Finally, lead measured below the detection limit of 1 µg/L is also considered indicative of non-lead when and only when copper is observed at three or more points. In summary, whereas water quality sampling above 3

<sup>29</sup> See monthly reports and Appendix REG-1 Copies of Letters for Compliance-Related Submissions (First Six-Month Period of 2022).

µg/L is conclusive for lead, additional steps are taken to confirm non-lead and the p-value is not reduced to 0 based on water quality results alone.

**TABLE 16. OUTCOMES FROM WATER QUALITY INVESTIGATIONS<sup>1</sup> AS PART OF THE 2022 ALSLR PLAN (JAN. 1 TO JUNE 3, 2022)**

Service Line Status in Baseline Inventory	Water Quality Sampling Outcome	Update Inventory and Follow-up Action during First Six-Month Period of 2022
<b>Initial Status 0.5 ≤ p ≤ 0.9 (total 800)</b>	310 confirmed lead (lead measured > 3 µg/L in the second or third sample bottle from the 3-bottle test).	Add property to list for LSL replacement.
	490 inconclusive (lead measured ≤ 3 µg/L in the second or third sample bottle from the 3-bottle test).	Review historical and potholing data to confirm status. Or proceed with other investigation.

<sup>1</sup> Excludes customer requested sample results. These samples were collected at properties included in the 2022 ALSLR Plan (and therefore do not count toward the required 1.4% investigations).

**TABLE 17. OUTCOMES FROM WATER QUALITY INVESTIGATIONS<sup>1</sup> INDEPENDENT OF THE 2022 ALSLR PLAN (JAN. 1 TO JUNE 3, 2022)**

Service Line Status in Baseline Inventory	Water Quality Sampling Outcome	Update Inventory and Follow-up Action during First Six-Month Period of 2022
<b>Initial Status 0.5 ≤ p ≤ 0.9 (total 718)</b>	196 confirmed lead (lead measured > 3 µg/L in the second or third sample bottle from the 3-bottle test)	Add property to list for LSL replacement.
	522 inconclusive (lead measured ≤ 3 µg/L in the second or third sample bottle from the 3-bottle test)	Review historical and potholing data to confirm status. Or proceed with other investigation.

<sup>1</sup> Excludes customer requested sample results. These samples were collected at properties independent of the 2022 ALSLR Plan and therefore do count toward the required 1.4% investigations, if the conditions that define an investigation are met.

All other investigations that support the determination of a service line material that count toward the 1.4% required investigations were made using desktop methods, as shown in Table 18. In summary, desktop investigations were used to support the determination of material designation of either a suspected or possible LSL at 13 properties during the first six-month period of 2022.<sup>30</sup>

<sup>30</sup> See Appendix INV-2B Line by Line p-Value Changes by Status (First Six-Month Period of 2022).

**TABLE 18. NUMBER OF INVESTIGATIONS PERFORMED TO DETERMINE THE MATERIAL OF THE SERVICE LINE BETWEEN JAN. 1 AND JUNE 3, 2022**

<b>Number of Properties Investigated</b>	<b>Count</b>
<b>Required Number of Investigations</b>	1,169 (1.4% of all suspected and possible lead services from the September 2019 inventory)
Number of Investigative Potholing in the First Six Months of 2022 as reported in the LRP database (from Table 15) <sup>1</sup>	216
Number of Investigative Water Quality Sampling in the First Six Months of 2022 as reported in the LRP database (from Table 17) <sup>2</sup>	718
Number of Desktop Investigations in the First Six Months of 2022	2
<b>Total Number of Investigations Completed Dec. 4 to Dec. 31, 2021</b>	231
<b>Total Number of Investigations Completed in the First Six Months of 2022</b>	936
<b>Number of Investigations Not Previously Reported</b>	0
<b>Total Number of Investigations Completed in 2022</b>	936

[Updated LSL Inventory Map \[7.B.ii.g\]](#)

On March 5, 2020, the LSL Inventory was made publicly available on the Denver Water lead website (<https://www.denverwater.org/your-water/water-quality/lead>).

On June 30, 2022, the publicly available map was updated and reposted, incorporated the June 27, 2022, LSL Inventory. An updated inventory summary table is provided with each semi-annual report.<sup>31</sup> The website map is updated quarterly to reflect these changes to the LSL Inventory and will be updated and re-posted in the fall.

[Summary of Changes to the LSL Inventory \[7.B.ii.h\]](#)

Between Jan. 1 and June 3, 2022, updates to the LSL Inventory continued as additional data were gathered and reviewed. During this period, 3,373 changes were made to the LSL Inventory of which 3,370 were changes to the status of the service line (i.e., p-value).<sup>32</sup> This included changes based on confirmation from Denver Water, customers and distributors; review of historical data; direct evidence such as water quality and/or potholing; and replacements. In addition to material status changes, two service lines were removed from the inventory as tap cuts or non-potable service connections. Service lines previously deemed inactive were added back to the inventory upon review of the data, affecting one property in this reporting period.<sup>33</sup> These changes are shown in Figure 3 and are accounted for in Table 12.

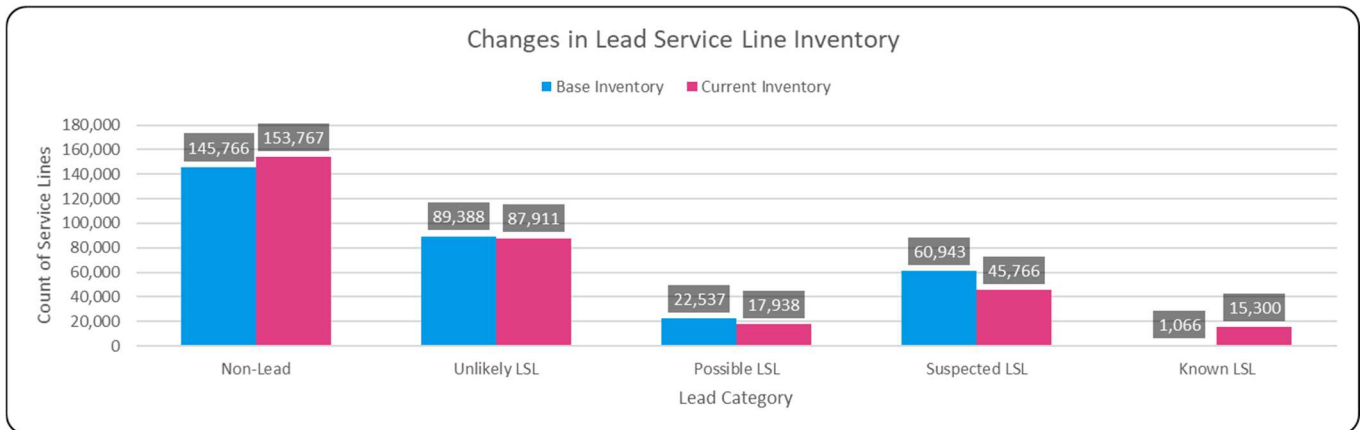
<sup>31</sup> See Appendix INV-1 Summary of Service Line Status and p-Value (First Six-Month Period of 2022).

<sup>32</sup> See Appendix INV-2B Line by Line p-Value Changes by Status (First Six-Month Period of 2022).

<sup>33</sup> See Appendix INV-2B Line by Line p-Value Changes by Status (First Six-Month Period of 2022).



**FIGURE 3. CHANGES IN THE BASE<sup>1</sup> AND CURRENT INVENTORY  
(JAN. 1 TO JUNE 3, 2022, USING DATA FROM COLUMNS 2 AND 5 FROM TABLE 12)**



<sup>1</sup> “Possible lead” as defined in the Order includes service lines with  $0.5 \leq p\text{-value} < 0.8$ . In the Initial Inventory, Feb. 5, 2020, Submittal of Table 12, service lines with  $p\text{-value} = 0.7$  were included as “suspected lead.” For the Initial Inventory shown here, 431 service lines at  $p\text{-value} = 0.7$  are included under “possible lead”. “Known lead” includes properties that are either known to be lead or that have had a lead service line replaced.

## 7.B.iii LSL Replacements

Section 7.B.iii of the Variance requires that Denver Water report and maintain records of LSL replacements, including the following:

*iii. LSL Replacements.*

- a. the address and date of all LSL replacements occurring during the variance, including by year;*
- b. the type of LSL replacement (full, partial including galvanized, by third party);*
- c. the unique customer identification number of Customer Premises on the refusal list and documented attempts to contact the property owner; and*
- d. those Customer Premises where Denver Water performed a partial LSL replacement due to an emergency repair and property owner consent could not be obtained.*

*Text is taken verbatim from the Order, dated Dec. 16, 2019.*

Replacements under the ALSLR Program started on March 5, 2020, and results from Jan. 1 through June 3, 2022, are described in this section. An overview of the LSL replacement requirements is shown in Table 19.

**TABLE 19. OVERVIEW OF 7.B.III REQUIREMENTS**

Paragraph Reference	Description	Refer to
4.A	Implement accelerated LSL replacement within 90 days of the effective date.	Contractors were given Notice to Proceed on March 5, 2020.
4.E	Offer post-LSL replacement sampling within six months.	Ongoing.
7.B.iii.a	Address and date of all replacements.	See Appendix. <sup>34</sup>
7.B.iii.b	Type of replacement.	See Table 20 and Appendix. <sup>34</sup>
7.B.iii.c 4.H	Refusal list with service point id and documented attempts for customer contact. Track changes in customer account holders against Service Line Refusal List.	See Appendix. <sup>35</sup>
LRPP III.D (p 62)	Provide education and filters to residents of multi-family properties on the Service Line Refusal List.	Not applicable for this reporting period.
7.B.iii.d	Number of properties where an emergency repair was performed using a partial LSL replacement and consent was not granted by the property owner to replace a lead service line in full.	See Table 20 and Appendix. <sup>36</sup>
LRPP III.D (p 57)	Replace LSL at properties with consistently high lead release and critical care customers.	Described in this section.
LRPP III.D (p 58)	Complete approximately 2,000 investigations per year in the first five years of the Lead Reduction Program to update the predictive model and improve the quality of information in the LSL Inventory.	See Table 18.
LRPP III.D (p 60)	Property owners will be reminded via English and Spanish signage placed at the limits (ends of streets) within geographic work areas four to five weeks in advance of construction.	Implemented July 20, 2020.
LRPP III.D (p 60)	Provide flushing instructions following LSL replacement.	Provided to all customers in post-LSL replacement education package. <sup>37</sup>

### Summary of LSL Replacement Activity during the Reporting Period including Address and Date of Replacement [7.B.iii.a]

Denver Water T&D crews started LSL replacements in the third program year on Jan. 2, 2022, and ALSLR contractors started on March 8, 2022. The ALSLR contractors focused primarily on geographic task order work areas, with newly consented properties from adjacent task orders from previous program years. Newly consented properties include properties that had an ownership change that resulted in the new owner providing consent, or properties that were either a refusal or no response that recently changed to consented. A total of ten geographic task orders each with approximately 460 properties were developed and issued to three ALSLR

<sup>34</sup> See Appendix LSL-1 Addresses and Types of Replacement (First Six-Month Period of 2022).

<sup>35</sup> See Appendix LSL-3 LSL Replacement Refusal List (First Six-Month Period of 2022).

<sup>36</sup> See Appendix LSL-4 Properties with a Partial Replacement (Cumulative since LRP Inception).

<sup>37</sup> See Second Quarter Report of 2020.

contractors. A list of addresses and dates for each replacement can be found in the appendices.<sup>38</sup>

Denver Water T&D completed LSL replacements as part of water main replacement work and emergency repairs as well as assisting with geographic area LSL replacements. Denver Water T&D crews continue to target critical customers at schools, daycare centers, and child care facilities within City and County of Denver to confirm the status of the service line and replace lead where found. The properties originally included in the 2020 and 2021 ALSLR Plans that required additional follow-up to make three reasonable attempts at contact were included in the 2022 ALSLR Plan. Any daycare or child care facility added to CDPHE's licensed child care facility dataset since 2020 was added to the 2022 ALSLR Plan. At the start of the year, the critical customer list included 1,335 properties verified as critical customers within the City and County of Denver: most of these were properties from the 2020 and 2021 ALSLR Plans with a small number of newly identified critical customers for the 2022 ALSLR Plan. Since the start of the year, 1,209 properties were removed from the critical customer list upon confirmation of a non-LSL and nine LSLs are scheduled for replacement in the 2022 ALSLR Plan. At the end of this reporting period, 117 critical customers remain with either possible, suspected, or known lead. For these remaining properties, all contact attempts have not resulted in a response. Investigation of service line materials and replacement (as needed) will be completed as consent is received.

As part of the Elevated Lead Response Plan, Denver Water T&D crews perform individual replacements within approximately two weeks at properties where lead is measured above 150 µg/L and within approximately two months at properties where lead is measured above 25 µg/L if the property is not already scheduled for replacement as part of the 2022 ALSLR Plan.

Protocols to manage the health and safety concerns of COVID-19 are reinforced with mask use by field crews and customers along with physical distancing protocols to allow work to continue.

#### Type of LSL Replacements Completed during this Reporting Period [7.B.iii.b]

The types of replacements completed between Jan. 1 and June 3, 2022, are summarized in Table 20. Denver Water maintains a detailed list of the type of LSL replacements completed and the associated addresses.<sup>39</sup>

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<sup>38</sup> See Appendix LSL-1 Addresses and Types of Replacement (First Six-Month Period of 2022).

<sup>39</sup> See Appendix LSL-1 Addresses and Types of Replacement (First Six-Month Period of 2022).

**TABLE 20. TYPE OF LSL REPLACEMENTS (JAN. 1 TO JUNE 3<sup>1</sup>, 2022)**

Type of LSL Replacement Jan. 1 to June 3, 2022	Denver Water (Watermain, Emergency, and ALSLR) <sup>2</sup>	Third Party (Developer, Homeowner, and Other) <sup>3</sup>	Total
<b>Full Lead Replacement<sup>4</sup></b>	781	145	926
<b>Partial Lead Replacement, such that no Lead Remains After Replacement<sup>5</sup></b>	435	1	436
<b>Full Galvanized Replacement</b>	2	0	2
<b>Partial Galvanized, such that no Lead or Galvanized Remains After Replacement</b>	178	0	178
<b>TOTAL REPLACEMENTS in Reporting Period, with no Lead Remaining After Replacement</b>	<b>1,396</b>	<b>146</b>	<b>1,542</b>
<b>TOTAL REPLACEMENTS Not Previously Reported<sup>6</sup></b>	18	1	19
<b>TOTAL REPLACEMENTS completed since LRP Inception</b>	<b>11,001</b>	<b>868</b>	<b>11,869</b>
<b>Emergency Repair, Partial Replacement (i.e., where consent was NOT granted and lead may remain in the ground)</b>	19	1	20

<sup>1</sup> Properties that had a replacement on or before June 3, 2022, may not have been captured in the database for this report due to the time necessary to QA the data following the replacement date. Replacements affected by this time lag will be reported in the Second Semi-Annual Report.

<sup>2</sup> Includes LSL replacements completed as part of water main projects, emergency repairs, scheduled repairs, and ALSLR individual and geographic replacements completed by Denver Water or its contractors.

<sup>3</sup> Includes LSL replacements completed by developers, property owners and other government agencies as identified in Appendix LSL-1 (Addresses and Types of Replacement (First Six-Month Period of 2022)).

<sup>4</sup> Includes replacements of service lines described as lead-lead, lead-galvanized, lead-unknown and galvanized-unknown. This also includes service lines designated as either unknown-unknown or copper-copper with p-value  $\geq 0.5$  at properties where a service line replacement was completed by someone other than the ALSLR contractors (such as third party).

<sup>5</sup> Includes replacements of service lines described as lead-copper, lead-PEX, lead-PVC and copper-unknown. If verification reveals copper at three or more locations, the service line is counted as replaced if the p-value is  $\geq 0.5$ . See Appendix LSL-1 (Addresses and Types of Replacement (First Six-Month Period of 2022)).

<sup>6</sup> This includes replacements completed in the second six-month period of 2021 but not previously reported (18 added); see Appendix LSL-5 (Addresses and Types of Replacements for Properties Not Previously Counted and Duplicates (from 2021)).

### Customer Consent and Refusal List for LSL Replacement [7.B.iii.c]

Distribution of notification letters, including consent forms, was initiated on Dec. 6, 2021, to property owners included in the 2022 ALSLR Plan. Since then, notifications were mailed to all properties identified in the geographic work areas of the 2022 ALSLR Plan, after which multiple contacts are made to obtain signed consent forms.<sup>40</sup> Reconnaissance or pre-construction meetings are conducted with each property owner to plan the LSL replacement work and schedule the replacement.

<sup>40</sup> See Appendix LSL-3 LSL Replacement Refusal List (First Six-Month Period of 2022).

A summary of the number of property owners contacted and number of signed consent forms returned is presented in Table 21. Between Jan. 1 and June 3, 2022, a total of 67 property owners refused to participate in the ALSLR Program or were non-responsive following multiple attempts at contact. At least three attempts to obtain voluntary consent from a property owner are undertaken before work can start to replace the LSL.

**TABLE 21. SUMMARY OF CONSENT AND LSL REFUSAL LIST (JAN. 1 TO JUNE 3, 2022)**

Description	Customer Consented <sup>1</sup>	Customer Refused <sup>2</sup>
<b>Total Number of Properties for which Consent was Given or Refused Dec. 4 to Dec. 31, 2021</b>	195	26
<b>Total Number of Properties for which Consent was Given or Refused during the First Six Months of 2022</b>	2,779	67
<b>Total Number of Properties for which Consent was Given or Refused Year-to-Date</b>	2,779	67

<sup>1</sup> The total number of signed consent forms represent only the ALSLR contractors. Detailed consent collection activity is not comprehensively tracked for replacements other than ALSLR contractors. A revised procedure to track this information for all replacements is under development for implementation in 2022.

<sup>2</sup> The total number of refusals year-to-date includes attempts made by the ALSLR contractors at properties with descriptions of “consent not granted due to refusal” and “non-responsive” after at least three attempts were made and the task order goes through administrative close out. When a customer refuses or is non-responsive, the service point ID is provided to the COE team for follow-up. See explanations in Appendix LSL-2 LSL Replacement Refusal List (Dec. 4 to Dec. 31, 2021) and Appendix LSL-3 LSL Replacement Refusal List (First Six-Month Period of 2022).

A range of outreach methods is used to contact property owners.<sup>41</sup> At least two attempts at contact by mail plus one attempt at contact in person is made before a property is considered non-responsive. While the ALSLR contractors are in an area with active construction activity, additional attempts such as door knocking, phone calls and emails may be made to contact the property owner to seek consent. If an owner refuses to participate in the ALSLR Program, the property is added to the LSL Replacement Refusal List, as well as an explanation for refusal if available. If a property owner declines due to a previous undocumented service line replacement, additional information may be requested from the owner to document a past replacement to support the removal of the property from the LRP.

When a property owner declines to participate, Denver Water is committed to continuing engagement with the property owner to encourage participation. A database is maintained to track attempted contacts at properties where consent to replace the LSL has not been provided.<sup>42</sup> An outreach approach was identified for customers with properties on the 2020 and 2021 Refusal List who have not had ownership change and been contacted through the ownership change follow-up process. Investigative potholes are planned for later this year at properties from the 2020 and 2021 Refusal Lists provided there is no conflict, no street moratoriums or the property is already identified as lead as part of 2022 Task Orders. This outreach will be conducted in 2022 with the goal of gaining consent for service line replacement

<sup>41</sup> See Appendix COE-15 2022 COE Plan included with the Second Semi-Annual Report of 2021.

<sup>42</sup> See Appendix LSL-3 LSL Replacement Refusal List (First Six Months of 2022).

despite previous contact attempts and refusal. Additionally, any change to the property ownership triggers additional outreach to obtain consent to replace the LSL. Between Jan. 1 and June 3, 2022, 21 changes in ownership occurred at properties on the Refusal List. Follow up is underway to gain consent for replacement from the new owner within 91 days of the change of ownership.<sup>43</sup>

A property is described as “non-responsive” while the task order for the affected work order remains open (i.e., there is ongoing construction activity). A property is added to the Refusal List as task orders for a work area are closed out (i.e., the construction crew demobilizes).<sup>42</sup> This process is part of administrative close out of the task order.

There are circumstances where consent has been given, but an inspection of the property reveals a safety or security hazard that prevents the LSL replacement from being performed. The property owner is informed both verbally and in writing that the hazard must be addressed within 14 days of receiving the notification. If the problem is not fixed within that time frame, the property is treated as not responsive and is added to the list of “non-response” until the issue is resolved and the LSL can be replaced.<sup>44</sup>

#### Emergency Repairs Resulting in a Partial LSL Replacement [7.B.iii.d]

During this reporting period, 20 partial replacements occurred as a result of emergency repair, watermain replacement, or third-party contractor work (i.e., some lead may remain in the ground). This affected a total of 67 properties since program inception in January 2020 as a result of:<sup>45</sup>

- No consent or no available contact information for the property owner and therefore consent could not be obtained at the time of the work (this affected eight properties).
- The property owner declined replacement at the time of the work (this affected 17 properties).
- No consent to perform the full replacement due to no response from the property owner (this affected 29 properties).
- Restricted access due to the interior plumbing arrangement (this affected six properties).
- Property redevelopment (two properties).
- To be rescheduled because property owner was not comfortable with replacement during COVID-19 (two properties).
- Restricted access due to gas station logistical constraints (one property).

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<sup>43</sup> See Appendix LSL-6 Ownership Changes for Properties on the Refusal List.

<sup>44</sup> See Appendix COE-D.12 Safety or Repairs Needed Notification Letter of Second Quarter Report (2020).

<sup>45</sup> See Appendix LSL-4 Properties with a Partial Replacement (Cumulative since LRP Inception).

- Meter to main replaced, potholing to be performed meter to house to confirm material (two properties).

Attempts to obtain consent to complete the replacement in full were made and outreach with the property owner continues in order to seek consent or address any safety issues that currently bar entry to the property.



## 7.B.iv Filters

Section 7.B.iv of the Variance requires that Denver Water report and maintain records related to its filter distribution program. Specifically, Section 7.B.iv requires reporting and recordkeeping of the following:

*iv. Filters.*

- a. addresses of Customer Premises where filters and replacement cartridges have been provided, and certification of the number of homeowners with known, suspected, or possible LSLs that are not part of filter program because they use their own filter or bottled water;*
- b. the total number of filters and replacement cartridges distributed per Program Year;*
- c. the percent filter adoption for each year of the variance, and the method used to determine this rate;*
- d. a list of unique customer identification numbers reporting the use of bottled water or a filter certified NSF/ANSI (53) for removal of lead, and any changes in the list;*
- e. a list of unique customers identification numbers for customers enrolled in the filter program who have refused a filter or replacement cartridges or have opted out of enrollment in the filter program;*
- f. filter lead sampling results collected under paragraph 5.F above;*
- g. information about filter use and maintenance under paragraph 5.F; and*
- h. Denver Water shall notify CDPHE and EPA within 10 Days of receiving sample results if data indicate measurable lead in filtered drinking water and shall provide the measured levels of lead in filtered water.*

*Text is taken verbatim from the Order, dated Dec. 16, 2019.*

The Filter Program targets properties with known, suspected, and possible LSLs (i.e., with p-values 0.5 and higher). The Filter Program includes the distribution of pitcher filters, ongoing outreach and education to encourage pitcher filter use and the distribution of filter cartridge replacements. Using the current LSL Inventory from Table 12, it is estimated that Filter Program participants consist of approximately 92,366 Denver Water household units.

This section summarizes the milestones of the Filter Program to date, including filter refusals/opt-outs, six-month supply of replacement filters distributed post-LSL replacement, filter survey results from the ALSLR Program, and filter performance testing in the field. An overview of the filter reporting requirements is shown in Table 22.

**TABLE 22. OVERVIEW OF 7.B.IV REQUIREMENTS**

Paragraph Reference	Description	Refer to
<b>7.B.iv.a</b>	Address of all customers enrolled in the Filter Program and provided with filters and cartridges. Certification of number of customers with a known, suspected or possible LSL that use their own filter or bottled water.	See Appendix. <sup>46</sup>
<b>7.B.iv.b</b>	Total number of filters and cartridges distributed per year.	See Annual Report.
<b>7.B.iv.c</b>	Percent filter adoption rate per year. Description of method to determine the filter adoption rate.	See Appendix. <sup>47</sup>
<b>7.B.iv.d</b>	Maintain list of addresses and Service Point Identification that use a filter or bottled water and any changes to the list.	See Appendix. <sup>48</sup>
<b>7.B.iv.e</b> <b>5.A</b>	Maintain Filter Refusal or Opt-Out List. Maintain list of addresses and SP IDs that have refused enrollment in the Filter Program or opted out.	See Appendix. <sup>49</sup>
<b>7.B.iv.f</b> <b>7.B.iv.g</b> <b>5.F.ii</b>	Confirmation of filter performance in the field (50+ locations included in the LCR compliance sampling). Collect samples using a protocol approved by EPA and CDPHE. Collect additional information regarding the use and operation of the filter.	See Appendix <sup>50</sup> for sample results from March 21 to June 2, 2022. Protocol for filter sample collection approved July 17, 2020, by EPA. Included in this section.
<b>7.B.iv.h</b>	Notify CDPHE and EPA within 10 days of receiving sample results indicating measurable lead in filtered samples.	See Appendix. <sup>50</sup>
<b>5.A</b>	Begin distribution of education materials, filters and replacement cartridges within 90 days of the effective date. Complete distribution of first six monthly supply within 270 days of the effective date.	Distribution completed Sept. 21, 2020, as described in Third Quarter Report of 2020.
<b>5.B</b>	Distribute replacement cartridges to customers enrolled in the Filter Program per the filter manufacturers' recommended replacement rate and until six months after LSL replacement.	See this section. Distribution as part of Filter Program since March 24, 2020. See Appendix. <sup>51</sup>
<b>5.C</b>	Provide education materials within two weeks of a change in customer account.	See Appendix. <sup>52,53</sup>

<sup>46</sup> See Appendix FIL-1A Filter Delivery Addresses (Dec. 4 to Dec. 31, 2021) and FIL-1B Filter Delivery Addresses (First Six-Month Period of 2022).

<sup>47</sup> See Appendix FIL-12 Formal Filter Adoption Survey Detailed Responses

<sup>48</sup> See Appendix FIL-2A Filter Program Opt-Outs (Dec. 4 to Dec. 31, 2021) and FIL-2B Filter Program Opt-Outs (First Six-Month Period of 2022).

<sup>49</sup> See Appendix FIL-3A Filter Program Refusals (Dec. 4 to Dec. 31, 2021) and FIL-3B Filter Program Refusals (First Six-Month Period of 2022).

<sup>50</sup> See Appendix FIL-4 Confirmation of Filter Performance in Field Results (First Six-Month Period of 2022).

<sup>51</sup> See Appendix FIL-5A Replacement Cartridge Distribution Addresses (Dec. 4 to Dec. 31, 2021) and FIL-5B Replacement Cartridge Distribution Addresses (First Six-Month Period of 2022).

<sup>52</sup> See Appendix FIL-6A Occupancy Changes – COE Distribution (Dec. 4 to Dec. 31, 2021) and FIL-6B Occupancy Changes – COE Distribution (First Six-Month Period of 2022).

<sup>53</sup> See Appendix FIL-7A Occupancy Changes – Pitcher Filter Distribution (Dec. 4 to Dec. 31, 2021) and FIL-7B Occupancy Changes – Pitcher Filter Distribution (First Six-Month Period of 2022).

Paragraph Reference	Description	Refer to
	Provide filters and replacement cartridges within 35 days of a change in customer account.	
<b>5.D</b>	Offer filters to 1983 to 1987 households with formula-fed infants and children under 2 and lead > 3 µg/L in the first bottle of the 3-bottle test. Develop COE plan to focus on this audience.	See this section and results in section 7.B.i CCT. See 2020, 2021, and 2022 COE Plans.
<b>5.E.i</b>	Survey enough customers enrolled in the Filter Program to receive 1,059 responses. Seek approval from CDPHE and EPA for the filter adoption survey questions prior to distribution.	See Annual Report. Approved on Sept. 10, 2020. <sup>54</sup>
<b>5.F.i</b>	Confirmation of filter performance before distribution within 90 days of the effective date.	Submitted Feb. 13, 2020. Approved April 1, 2020. See First Quarter Report of 2020.
<b>5.G</b>	Document contact to provide lead outreach and education materials to at least 95% of customers enrolled in the Filter Program each year.	To be presented in the Second Semi-Annual Report of 2022.
<b>LRPP Executive Summary (p 9) and III.C (p 56)</b>	If the localized filter adoption rate is less than 75%, additional outreach and education will be provided to that area.	Not applicable for this reporting period.
<b>LRPP III.C (p 55)</b>	Survey filter use as part of ALSLR Program following LSL replacement.	See this section and Appendix. <sup>55</sup>

### Initial Filter Distribution to All Customers Enrolled in the Filter Program [7.B.iv.a]

Denver Water began filter distribution on Feb. 12, 2020, with distribution to customers included in the ALSLR Program in 2020 (year 1). Denver Water initiated broader filter distribution on March 28, 2020, to all customers enrolled in the Filter Program. Initial filter distribution was completed on Sept. 21, 2020.

Pitcher filter distribution continues for occupancy changes and customer requested replacements for broken or missing pitcher filters, as shown in Table 23 for pitcher filter distribution.

<sup>54</sup> See Third Quarter Report of 2020 (Appendix FIL-29 OMB Approved Filter Adoption Survey Questions).

<sup>55</sup> See Appendix FIL-8 Informal Filter Adoption Survey Results Summary (First Six-Month Period of 2022).

**TABLE 23. SUMMARY OF FILTER DISTRIBUTION (JAN. 1 TO JUNE 3, 2022)**

Description	Count	Comment
<b>Total Number of Households Provided with a Filter Kit between Dec. 4 and Dec. 31, 2021</b>	337	See Appendix. <sup>56</sup>
<b>Number of Households that Use their own NSF-Certified Filter or Bottled Water between Dec. 4 and Dec. 31, 2021</b>	1	See Appendix. <sup>57</sup>
<b>Number of Households that Declined to Use a Filter or Bottled Water between Dec. 4 and Dec. 31, 2021</b>	9	See Appendix. <sup>58</sup>
<b>Initial Pitcher Distribution for Customers Enrolled in 2022</b>	49	See Appendix. <sup>59</sup>
<b>Total Number of Households Provided with a Filter Kit between Jan. 1 and June 3, 2022</b>	2,352	See Appendix. <sup>60</sup>
<b>Number of Households that Use their own NSF-Certified Filter or Bottled Water between Jan. 1 and June 3, 2022</b>	15	See Appendix. <sup>61</sup>
<b>Number of Households that Declined to Use a Filter or Bottled Water between Jan. 1 and June 3, 2022</b>	43	See Appendix. <sup>62</sup>

New customers enrolled in the Filter Program in 2022 are included in the count for initial distribution of pitcher filters in Table 23, along with customers that were previously enrolled in the Filter Program but that failed to receive their initial pitcher filter. Together, this represents approximately 2.5% of the current 92,366 customers enrolled in the Filter Program. In general, the customers did not receive a pitcher filter due to either missing or erroneous address or unit number information:

- 1) At residential properties with a general address to allow customers to receive filters.
- 2) At multi-unit commercial properties with a general address to allow customers to receive filters. Some of these were identified from customers calling in to alert Denver Water of additional units or through review of unit numbers for completeness.

Addresses where filters could not be delivered were investigated for accuracy and a filter kit and program introduction booklet were sent once the address could be confirmed. Corrective actions have been implemented to reconcile all known addresses, identify incorrect addresses, and distribute pitcher filters as required.<sup>63</sup> As part of this exercise, 2,600 properties were reviewed during the first six-month period of 2022.

An analysis of return-to-sender addresses was performed in 2020 and described in the Third Quarterly Report for 2020; this exercise was not repeated in 2021 or 2022. However, throughout 2022, return-to-sender addresses continued to be investigated and upon

<sup>56</sup> See Appendix FIL-1A Filter Delivery Addresses (Dec. 4 to Dec. 31, 2021).

<sup>57</sup> See Appendix FIL-2A Filter Program Opt-Outs (Dec. 4 to Dec. 31, 2021).

<sup>58</sup> See Appendix FIL-3A Filter Program Refusals (Dec. 4 to Dec. 31, 2021).

<sup>59</sup> See Appendix FIL-9 Initial Pitcher Filter Distribution After 2020 (First Six-Month Period of 2022).

<sup>60</sup> See Appendix FIL-1B Filter Delivery Addresses (First Six-Month Period of 2022).

<sup>61</sup> See Appendix FIL-2B Filter Program Opt-Outs (First Six-Month Period of 2022).

<sup>62</sup> See Appendix FIL-3B Filter Program Refusals (First Six-Month Period of 2022).

<sup>63</sup> See Appendix FIL-9 Initial Pitcher Filter Distribution After 2020 (First Six-Month Period of 2022).

reconciliation a filter kit is re-sent to the correct address or if vacant, the property is removed from the LRP.

### Replacement Filter and Replacement Filter Cartridge Distribution to Customers Enrolled in the Filter Program [7.B.iv.b]

Between Jan. 1 and June 3, 2022, replacement filters were distributed to an additional 2,352<sup>64</sup> customers enrolled in the Filter Program.

During this same period, 75,288 replacement filter cartridges were distributed to customers enrolled in Filter Program in accordance with the manufacturer’s recommendation for replacement within six months.<sup>65</sup> Replacement filters mailed to 41 properties were returned-to-sender.<sup>66</sup> An unsuccessful delivery prompts an investigation and, upon reconciliation, a replacement filter is re-sent to the correct address or if vacant, the property is removed from the LRP. Following the improvements made in July 2021 to address late filter distribution, all properties enrolled in the Filter Program received replacement filter cartridges within the six-month replacement interval.<sup>67</sup> A summary of distribution of post-LSL replacement filters is provided in Table 24.

**TABLE 24. SUMMARY OF SIX-MONTH SUPPLY POST-LSL REPLACEMENT FILTER DISTRIBUTION (JAN. 1 TO JUNE 3, 2022)**

Description	Count	Comment
<b>Number of Households Provided with Six-Month Supply of Filter Replacements Post Lead Service Line Replacement between Dec. 4 and Dec. 31, 2021<sup>1,2</sup></b>	180	This includes emergency repairs and replacements performed by Denver Water and third parties. See Appendix. <sup>68</sup>
<b>Number of Households Provided with Six-Month Supply of Filter Replacements Post Lead Service Line Replacement between Jan. 1 and June 3, 2022<sup>1,2</sup></b>	1,952	This includes emergency repairs and replacements performed by Denver Water and third parties. See Appendix. <sup>69</sup>

<sup>1</sup> This value may not match the number of lead service line replacements completed between Jan. 1 and June 3, 2022: for example, if a customer received their initial filter pitcher and replacement filters within two months of having their lead service line replaced, additional replacement filters are provided on the six-month replacement schedule and not as part of the lead service line replacement activities.

<sup>2</sup> This value includes filter distribution to properties where the lead service line replacement was completed by a third party, as identified in Table 20.

<sup>64</sup> This number refers to the number of properties that received a new filter based on occupancy changes, high-capacity, broken filters, lost filters, etc. The number of filters distributed to these properties totals 2,424.

<sup>65</sup> See Appendix FIL-5B Replacement Cartridge Distribution Addresses (First Six-Month Period of 2022). These are the number of properties without duplicates (sometimes the property will receive more than one). The number of replacement filter cartridges with duplicates is 87,940.

<sup>66</sup> See Appendix FIL-11 Filter Program Replacement Cartridge Returns (First Six-Month Period of 2022).

<sup>67</sup> See Appendix REG-1 Copies of Letters for Compliance-Related Submissions (First Six-Month Period of 2022) and the First Semi-Annual Report of 2021.

<sup>68</sup> See Appendix FIL-10A Distribution of Post Lead Service Line Replacement Six-Month Cartridge Replacement Supply (Dec. 4 to Dec. 31, 2021).

<sup>69</sup> See Appendix FIL-10B Distribution of Post Lead Service Line Replacement Six-Month Cartridge Replacement Supply (First Six-Month Period of 2022).

## Occupancy Changes [5.C]

Denver Water was notified of 2,564 occupancy changes between Jan. 1 and June 3, 2022.<sup>70</sup> Occupancy changes are tracked daily to provide multiple mailings per week to allow new occupants to receive their LRP Introductory Letter and LRP Overview Booklet within 14 days of the change in occupancy. Occupancy changes are added to weekly filter distribution batches to allow new occupants to receive a pitcher filter within 35 days of notice of new occupancy. Both the introductory materials and the filter were distributed within 14 and 35 days respectively, at all properties where a change in occupancy occurred for this reporting period.<sup>71</sup>

## Filter Distribution to Formula-fed Infants in Select Households [5.D]

As described in Table 9, no 1983 to 1987 households with formula-fed infants requested enrollment in the Filter Program during the first six-month reporting period of 2022, i.e., a select household as identified in paragraph 5.D of the Variance.<sup>72</sup>

## Formal Filter Adoption Survey [7.B.iv.c, 7.B.vi.c]

The formal Filter Adoption Survey was approved by EPA on Sept. 10, 2020. The survey for 2022 was distributed on March 7, 2022, to 15,000 properties or about 16% of customers enrolled in the Filter Program.<sup>73</sup> The Filter Adoption Survey participants submitted survey responses online or mailed in hard copy responses. Survey respondents had to answer questions one through three (regarding filter adoption for filter water used for drinking, cooking, and infant formula) to be included in the analysis and calculation of the overall percent adoption. A total of 1,512 survey responses were received between March 7 and May 13 (Table 25). The overall adoption rate is incorporated into the equivalency model presented in the annual report.

**TABLE 25. SUMMARY OF FORMAL FILTER ADOPTION SURVEY RESULTS**

Question	Count		Percent	
	Yes	No	Yes	No
Filtered or bottled water used for drinking water	1,411	101	93%	7%
Filtered or bottled water used for cooking or participant does not cook	1,097	415	73%	27%
Survey participant has an infant in household or is expecting and uses filtered water or bottled water for infant formula preparation	49	3	94%	6%

<sup>70</sup> See Appendix FIL-7B Occupancy Changes – Pitcher Filter Distribution (First Six-Month Period of 2022).

<sup>71</sup> See Appendix FIL-7B Occupancy Changes - Pitcher Filter Distribution (First Six-Month Period of 2022) and Appendix FIL-7A Occupancy Changes – Pitcher Filter Distribution (Dec. 4 to Dec. 31, 2021). There were ten properties in FIL-7A that were not delivered within 35 days but were all delivered within 39 days.

<sup>72</sup> See Appendix CCT-4 Summary of Water Quality Sampling Results from Select Households (1983 to 1987 Homes, Cumulative since LRP Inception).

<sup>73</sup> See Appendix FIL-12 Formal Filter Adoption Survey Detailed Responses.

### Informal Filter Adoption Survey [7.B.vi.c]

Informal surveys of filter use are conducted during ALSLR pre-construction meetings and during virtual meetings asking customers about filter adoption and use. Responses from 528 participants were captured in the LRP database from the pre-construction meetings.<sup>74,75</sup> This accounts for 11% of all customers who are expected to have their LSLs replaced in 2022 and suggests that most customers are using filtered or bottled water for drinking, cooking and infant formula:

- Of the 528 responses, the majority of customers indicated that they used filtered or bottled water for drinking (80%) and cooking (75%).
- All households with a formula-fed infant indicated that they used filtered water when preparing formula.

Informal surveys of overall filter use and barriers to using filtered water for cooking are conducted as part of virtual community meetings when those meetings focus on filter use. No virtual community meetings focused on filter use occurred in the first half of 2022 but will occur in the second half of the year. The results of the informal surveys will be presented in the second semi-annual report.

### Filter Opt-Out List of Customers using Bottled Water or an Alternate Filter [7.B.iv.d]

The number of properties that choose to opt-out of the Filter Program to date is relatively small. Customers that opt-out of the Filter Program are contacted by Denver Water to understand the reason for opting out. Of the 116 customers that have opted out since the launch of the Filter Program, 12 use bottled water as an alternative to the filter and 24 use their own filter certified National Sanitation Foundation 53 for lead removal. For the 80 remaining customers, Denver Water was unable to confirm if the customer was using an NSF 53 certified filter.<sup>76</sup> A summary of the Filter Program opt-outs is shown in Table 26. Contact with customers continues to be attempted as part of an annual reminder to customers that have opted out or refused to participate in the Filter Program.<sup>77</sup>

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<sup>74</sup> See Appendix FIL-8 Informal Filter Adoption Survey Results Summary (First Six-Month Period of 2022).

<sup>75</sup> See Appendix FIL-13 Informal Filter Adoption Survey Detailed Responses (First Six-Month Period of 2022).

<sup>76</sup> See Appendix FIL-2B Filter Program Opt-Outs (First Six-Month Period of 2022).

<sup>77</sup> The use of an NSF 53 certified filter could not be confirmed at some properties based on call center records. This affected 14 customers that indicated that they use their own filter; these properties were moved from the Opt-Out List to the Refusal List.

**TABLE 26. SUMMARY OF FILTER PROGRAM OPT-OUTS**

Program Year	Number of Properties			
	Total Opt-Outs	Confirmed Using Own Supplied NSF 53 Certified Filter	Confirmed Using Bottled Water	No Confirmation of NSF 53 Certified Filter or Bottled Water
2020 (Jan. 1 to Dec. 31, 2020)	63	9	6	48
2021 (Jan. 1 to Dec. 3, 2021)	42	5	5	32
2021 (Dec. 4 to Dec. 31, 2021)	1	1	0	0
2022 (Jan. 1 to June 3, 2022)	10	9	1	0
Total Removed from LRP due to Non-Lead Designation or LSL Replacement	9	9	0	0
Total Since LRP Inception	116	24	12	80

**Filter Refusal List [7.B.iv.e]**

From Jan. 1 to June 3, 2022, notice of refusal to participate in the Filter Program was received for 43 properties.<sup>78</sup> The reasons given for refusal include the pitcher is too heavy to use or the resident had a water quality test and is not concerned about the low level of lead in their water. This brings the total number of refusals to 146 since the inception of the LRP. A summary of the refusals to date is shown in Table 27.

**TABLE 27. SUMMARY OF FILTER REFUSAL LIST**

Reporting Period	Number of Properties Refusing to Participate
2020 (Jan. 1 to Dec. 31, 2020)	30
2021 (Jan. 1 to Dec. 3, 2021)	64
2021 (Dec. 4 to Dec. 31, 2021)	9
2022 (Jan. 1 to June 3, 2022)	43
Total Removed from LRP due to Non-Lead Designation or LSL Replacement	4
Total Since LRP Inception	146

<sup>78</sup> See Appendix FIL-3B Filter Program Refusals (First Six-Month Period of 2022).



## Summary of Data to Document Filter Distribution and Filter Program Participation

Additional details related to filter kit distribution are provided in the Appendices:

- List of premise addresses for all households where filter kits were provided.<sup>79</sup>
- List of six-month supply of replacement filters provided after LSL replacement.<sup>80</sup>
- List of premise addresses and service point identification numbers for all households that refuse to participate in the Filter Program.<sup>81</sup>
- List of premise addresses that have returned replacement cartridges to sender.<sup>82</sup>
- Filter adoption survey results summary from informal filter use surveys conducted in the field as part of LSL replacement and virtual meeting filter survey summary.<sup>83</sup>
- Detailed responses from the informal filter use field survey responses collected as part of LSL replacement activities.<sup>84</sup>
- Confirmation of pitcher filter performance in the field.<sup>85</sup>
- List of premise addresses and service point identification numbers for all households that opt-out of the Filter Program.<sup>86</sup>
- Replacement filter distribution.<sup>87</sup>
- Occupancy changes for pitcher filter distribution.<sup>88</sup>
- Occupancy changes for filter education information.<sup>89</sup>
- Initial Filter Distribution after 2020.<sup>90</sup>

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<sup>79</sup> See Appendix FIL-1B Filter Delivery Addresses (First Six-Month Period of 2022).

<sup>80</sup> See Appendix FIL-10B Distribution of Post Lead Service Line Replacement Six-Month Cartridge Replacement Supply (First Six-Month Period of 2022).

<sup>81</sup> See Appendix FIL-3B Filter Program Refusals (First Six-Month Period of 2022).

<sup>82</sup> See Appendix FIL-11 Filter Program Replacement Cartridge Returns (First Six-Month Period of 2022).

<sup>83</sup> See Appendix FIL-8 Informal Filter Adoption Survey Results Summary (First Six-Month Period of 2022).

<sup>84</sup> See Appendix FIL-13 Informal Filter Adoption Survey Detailed Responses (First Six-Month Period of 2022).

<sup>85</sup> See Appendix FIL-4 Confirmation of Filter Performance in Field Results (First Six-Month Period of 2022).

<sup>86</sup> See Appendix FIL-2B Filter Program Opt-Outs (First Six-Month Period of 2022).

<sup>87</sup> See Appendix FIL-5B Replacement Cartridge Distribution Addresses (First Six-Month Period of 2022).

<sup>88</sup> See Appendix FIL-7B Occupancy Changes - Pitcher Filter Distribution (First Six-Month Period of 2022).

<sup>89</sup> See Appendix FIL-6B Occupancy Changes - COE Distribution (First Six-Month Period of 2022).

<sup>90</sup> See Appendix FIL-9 Initial Pitcher Filter Distribution After 2020 (First Six-Month Period of 2022).

### Confirmation of Filter Performance in the Field [7.B.iv.f]

Field sampling is conducted by Denver Water in conjunction with LCR compliance sampling (see section 7.B.i). All samples collected to meet this requirement for the first six-month compliance period of 2022 are included in this reporting period. Samples were collected from 50 properties between March 21 and June 2, 2022. Samples are collected using a protocol with three sample bottles to differentiate between lead measured in the first draw LCR compliance sample and lead measured in water used in filter testing and referred to as the filter influent sample. The third sample is collected from filter effluent and used with the filter influent sample to calculate the percentage of lead removal.

Lead was measured in the unfiltered tap water at less than 1 µg/L in 14 samples collected on the same day the filter effluent sample was collected. Lead was measured below the detection limit in filtered water at 41 of the 50 properties and below 3 µg/L at all properties with two exceptions.<sup>91</sup> Both of these properties had their pitcher filter replaced (post-filter lead was measured at 2.7 and 3.8 µg/L). If lead is measured above 10 µg/L from a filter, the filter is removed from the property, the customer is provided with a new filter, and the “old” filter is sent to the Denver Water lab for additional testing (using the water supplied from the lead pipe rack). No properties in this reporting period had lead measured above 10 µg/L in the filter effluent sample.

Results from filter testing in the field are also reviewed to identify properties with elevated lead in the first bottle for inclusion in the Elevated Lead Response Plan. There were no properties with lead measured above 15 µg/L in the first bottle.<sup>92</sup>

### Information About Filter Usage and Maintenance Collected during Filter Performance Testing [7.B.iv.g, 7.B.vi.c]

Observations of filter use during filter performance testing in the field are reported with sampling results. When there are customers who are identified for inclusion in the filter performance testing in the field that do not use their filter, a sample is not collected from the filter. For this reporting period, no customers indicated that they did not use the filter provided by Denver Water.<sup>93</sup>

### Confirmation of Direct Contact with 95% of All Customers Enrolled in the Filter Program [5.G]

In 2022, proof of contact with customers enrolled in LRP is measured based on the mailing of filter reminder postcards. The postcards are to be mailed in the second half of 2022 and will be discussed in the second semi-annual report.

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<sup>91</sup> See Appendix FIL-4 Confirmation of Filter Performance in Field Results (First Six-Month Period of 2022).

<sup>92</sup> When lead is measured above 15 µg/L in the first draw sample, the property is scheduled for LSL replacement within two months.

<sup>93</sup> See Appendix FIL-4 Confirmation of Filter Performance in Field Results (First Six-Month Period of 2022).

## 7.B.v Compliance Metrics per Paragraphs 2.C, 3.D, 4.I, 5.G and 6.B

Section 7.B.v of the Variance requires that Denver Water report and maintain records of the following compliance metrics:

*v. Compliance Metrics. Results achieved under the compliance metrics in paragraphs 2.C [CCT Metric], 3.D [LSL Inventory Compliance Metric], 4.I [Accelerated LSL Replacement Compliance Metric], 5.G [Filter Communication Compliance Metric] and 6.B [Comprehensive LRPP Performance Metric] above.*

*Text is taken verbatim from the Order, dated Dec. 16, 2019.*

A summary of the performance metrics that will ultimately be used to evaluate the overall performance of the LRP is presented in Table 28. Summary of Compliance.

**TABLE 28. SUMMARY OF COMPLIANCE**

Paragraph	Description	Comment
2.C	<b>C. Corrosion Control Treatment Metric.</b> Denver Water must consistently <u>maintain in all parts of the System a minimum target pH of 8.5 during the first year of operation</u> under this Variance. In the future, Denver Water must maintain pH and alkalinity within the ranges designated by CDPHE in its modification decision under Section 11.26(3)(d)(ii) of 5 CCR 1002-11.	See Section 7.B.i
3.D	<b>D. LSL Inventory Compliance Metric.</b> Denver Water <u>must investigate a minimum of 1.4% of the total estimated number of suspected and possible LSLs</u> in the LSL Inventory each Program Year (based on a subset of Y as described in paragraph 3.A above), as adjusted. These investigations are performed independently of the LSL replacements.	See Section 7.B.ii
4.I	<b>I. Accelerated LSL Replacement Compliance Metric.</b> Denver Water <u>must annually achieve at least a 7.0% cumulative average Program Year LSL replacement rate</u> as determined based on reporting required in paragraph 7.B.	See Section 7.B.iii
5.G	<b>G. Filter Communication Compliance Metric.</b> Denver Water <u>must make direct contact with lead outreach and education materials to 95% of all customers enrolled in the Filter Program</u> in every Program Year. . . Compliance shall be documented by mailing lists and mail receipts, lists of customer email addresses for customers who elect to receive email communication, or other forms of documentation approved by CDPHE.	See Section 7.B.vi
6.B	<b>B. Comprehensive LRPP Performance Metric.</b> Denver Water must demonstrate to EPA's satisfaction, using the updated equivalency model results as reported under paragraph 7.C, that the <u>combined actual performance of the LRPP as implemented continues to be "at least as efficient as" orthophosphate treatment in reducing lead exposure</u> on an annual basis. Denver Water may account for the CCT optimization period in this demonstration.	See Annual Report for 2020

## 7.B.vi Communications, Outreach and Education

Section 7.B.vi of the Variance requires that Denver Water report and maintain records for COE activities:

- vi. Communications, Outreach and Education. A summary of activities conducted under the Communications, Outreach and Education program, including the updated communications, outreach and education plan for the new Program Year. The summary will include, at a file minimum:*
- a. a description of outreach activities conducted, including copies of the outreach materials provided;*
  - b. a list of any partner organizations who conducted, or were involved in the implementation of the communications, outreach and education plan; and*
  - c. if in-person or telephone surveys are conducted, the answers to filter usage survey questions that were asked, and date and time of call.*

*Text is taken verbatim from the Order, dated Dec. 16, 2019.*

During the first six months of 2022, Denver Water continued its public outreach and engagement efforts based on the strategies described in the 2022 COE Plan. This included hosting two virtual community meetings on construction preparedness, convening the Stakeholder Advisory Committee for two quarterly meetings, promoting proper filter use through a paid media campaign and developing new tactics to encourage customers to complete water quality sampling kits. COE efforts specific to each LRP element are also included in those element sections of this report and are detailed in Table 29.

**TABLE 29. OVERVIEW OF 7.B.VI REQUIREMENTS**

Paragraph	Description	Comment
<b>7.B.vi</b>	2020 COE Plan 2021 COE Plan 2022 COE Plan	See First Quarter Report of 2020. See Fourth Quarter Report of 2020. See Second Semi-Annual Report of 2021.
<b>7.B.vi.a</b>	Description of COE activities conducted. Copy of materials.	Discussed in this section. See Appendices for copies of materials included. <sup>94</sup>
<b>7.B.vi.b</b>	Ambassador Program Overview.	See Section 7.B.vii.
<b>7.B.vi.c</b>	Response, date and time of in-person surveys of filter adoption and use.	See Section 7.B.iv. See Appendix. <sup>95</sup>
<b>8.G</b>	Notify customers enrolled in Filter Program of LRP and launch multi-media campaign.	Multi-media campaign launched March 23, 2020.
<b>LRPP III.E (p 64)</b>	Targeted messaging to homes with copper piping and lead solder to flush the tap after periods of non-use.	See 2020, 2021 and 2022 COE Plans.
<b>LRPP III.F (p 74)</b>	Stakeholder Advisory Committee	Discussed in this section.

**Outcomes of COE Activities between Jan. 1 and June 3, 2022 (unless otherwise noted) [7.B.vi.a]**

- Denver Water hosted two bilingual, one-hour virtual community meetings in February and May 2022 focused on preparing customers for LSL replacement. To promote the meetings, 10,632 outbound calls were made to customers identified for LSL replacement in 2022 the day before and the day of the events, with 6,133 bilingual voicemail messages left for those who did not answer. In total, 952 customers participated in a virtual community meeting during the first six months of the year.
- In addition, Denver Water received requests for LRP presentations and/or attendance at community events from 10 local, state and national organizations and held these presentations at various times during this reporting period.
- The Stakeholder Advisory Committee convened for two quarterly meetings on Jan. 20 and April 17. The meetings included progress updates on the LRP, an overview of 2021 Learn by Doing insights, overview of survey results on committee members’ experience and discussion on increasing the return rate for post-replacement water quality sampling kits. The next meeting will be held in July 2022.

<sup>94</sup> See Appendices COE-3 through COE-6, and COE-8 through COE-16 for a copy of materials.

<sup>95</sup> See Appendix FIL-13 Informal Filter Adoption Survey Detailed Responses (First Six-Month Period of 2022).

- Contact was made on 10 occasions with Denver City Council and Mayor’s Office and officials in suburban jurisdictions to share information and updates on the LRP.
- The LRP website received 278,854 visits and 506,266 page views since the launch of comprehensive LRP information on March 5, 2020.<sup>96</sup>
- LRP TAP stories published on denverwater.org/TAP received 4,451 views.<sup>97</sup>
- Denver Water social media activity reached 106,910 individuals.
- The LRP was mentioned in 50 news media stories, with a potential aggregate readership of 324 million across online news, blogs and television.<sup>98</sup>

The following section highlights COE program activities carried out in 2022 from Jan. 1 through June 3 (unless otherwise noted), organized by strategy type.

## Public Outreach

Overview of activity grouped by outreach component:

- Virtual Meetings
  - Denver Water hosted two bilingual, one-hour construction preparedness virtual community meetings on Feb. 15 and May 17 for customers slated to receive a service line replacement in 2022.
  - The meetings were an opportunity to inform customers about what to expect before, during and after service line replacement, including the importance of filter use and flushing.
  - To promote the meetings, 10,632 outbound calls were made to customers identified for service line replacement the day before and the day of the event, with 6,133 bilingual voicemail messages left for those who did not answer. 952 customers participated in these meetings.<sup>99</sup>
  - The voicemail provided information about why they were receiving the call, where to learn more about the LRP and how to contact Denver Water Customer Care. Voicemails were recorded in both English and Spanish.
  - Presentations were made to organizations upon request to provide an overview of the LRP, gather feedback and identify areas for potential coordination. These meetings included the following:
    - West Colfax Community Association (Jan. 19).

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<sup>96</sup> See Appendix COE-16 Website Traffic.

<sup>97</sup> See Appendix COE-14 TAP Stories Published.

<sup>98</sup> See Appendix COE-12 Earned Media Report.

<sup>99</sup> See Appendix COE-4 Construction Preparedness Virtual Community Meeting Email Invitation.

- Denver’s Early Childhood Council and Denver Water – Protecting your Families and Children (Feb. 1).
  - Association of State Drinking Water Administrators – Water System Inventory Case Studies (Feb. 16).
  - Colorado Housing Counseling Coalition (March 3).
  - Rocky Mountain Early Childhood Conference (March 11).
  - Elyria, Globeville, Swansea Partners Registered Neighborhood Organization (March 17).
  - Globeville and Elyria-Swansea Community Meeting – co-hosted by Globeville, Elyria-Swansea Coalition, Focus Points and Denver Water (March 24).
  - Cornell Institute of Public Affairs (March 25).
  - Colorado Lead Coalition Quarterly Meeting (April 20).
  - Globeville Community Meeting – hosted by Denver Water (May 3).
- Stakeholder Advisory Committee
    - The Stakeholder Advisory Committee met for its first and second quarterly meetings of 2022 on Jan. 20 and April 17.
      - Representatives reflected a diverse group of organizations, including health care, education, nonprofit and government.<sup>100</sup>
      - At the January meeting, Denver Water provided an overview of LRP progress through 2021 and a preview of the committee member survey for members to provide feedback on their experience. The meeting also included a recap of 2021 Learn by Doing insights and an overview of the Variance extension background and next steps.
      - The committee member survey was distributed via email to members in January 2022. The survey asked members questions about their experience serving on the Stakeholder Advisory Committee and opportunities to improve engagement with the committee as the program advances. Six of 11 members responded to the survey. Results and action steps were shared at the second quarter meeting on April 17.<sup>101</sup>
        - Overall, members reported positive experiences with the committee, indicating that they felt the committee was valuable, serving its role and engaged in meetings.

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<sup>100</sup> See Appendix COE-1 Stakeholder Advisory Committee 2022 Membership List.

<sup>101</sup> See Appendix COE-2 Stakeholder Advisory Committee 2022 Member Survey Results.

- Some members expressed a desire for additional engagement between meetings and ideas for additional membership. In response, Denver Water will begin sending monthly updates on the program dashboard to the committee and is exploring membership from additional organizations.
  - Members also expressed interest in an in-person meeting and tour of the Denver Water Operations Complex. Denver Water is exploring this opportunity for the third quarter meeting.
  - At the second quarterly meeting on April 17, Denver Water provided an update on LRP progress, an overview of the committee member survey results, and updates on the Variance extension process and pursuit of federal funding. The meeting also included a discussion on Denver Water’s planned efforts to increase the return rate of post-replacement water quality sampling kits. Committee members were in support of Denver Water’s plans to encourage returns through a gift card drawing and updating materials to be more engaging.
- Government Relations
  - Ten proactive contacts and/or meetings were held with local government officials and staff, including Denver City Council and Mayor’s Office and officials in suburban jurisdictions, to share information and updates for the LRP.
    - Now that the LRP is in well underway, most of these updates included information on upcoming work areas and construction in respective Denver City Council Districts as well as updates on issues potentially impacting customers.
  - Outside of the proactive updates, staff continues to be responsive to questions from government officials, as needed.
  - Denver Water also streamlined its internal coordination to be more efficient in outreach to City Council members and Registered Neighborhood Organizations to provide updates on construction and other timely program topics.
- Distributor Communications
  - An update on the LRP was provided at the March 15 distributor forum meeting.
  - Updates on the LRP were published in the May distributor newsletter.
  - An intergovernmental agreement was established with Wheat Ridge Water District for LSL replacement reimbursement during its capital improvement project.



- Distribution of water quality sampling kits and results continues when requested by distributors' customers. Distributor LRP customers also receive replacement filters and, when there is a change in occupancy, a new filter kit.
- Paid Media
  - The successful paid media strategy implemented in 2020 and 2021 was continued during this reporting period to promote the LRP with a focus on areas where residents may not be using filtered water as commonly as others, per the filter adoption survey results.
  - The first campaign of 2022 ran from Feb. 21 through March 28, generating 3.6 million impressions through digital media and driving over 7,400 visits to the LRP website.<sup>102</sup>
- Earned Media
  - The LRP was covered in digital, print and broadcast news, including 9News, The Colorado Sun, Colorado Politics, El Comercio de Colorado and Water Finance & Management, among others.<sup>103</sup>
  - There were 255 posts about the LRP on social media channels in this reporting period, resulting in 106,910 impressions. Ambassador Program partners also shared Denver Water social media posts on their own networks.
  - Denver Water also provided content for organization and neighborhood newsletters on request.
- Digital Communications
  - Denver Water distributed an email on April 13 to a database of 46,012 subscribers. The email shared recent TAP stories on program progress, a new video on how Denver Water schedules service line replacements and an overview of the investigations process to determine service line material.<sup>104</sup>
    - Since the previous reporting period, the subscriber database evolved, and multiple subscriber lists were consolidated. Denver Water is currently evaluating this update and how to best manage its audience categories within the subscriber database.
  - Five TAP stories were published on [denverwater.org/TAP](https://denverwater.org/TAP) that included content related to the LRP. As of June 3, these stories received a total of 4,451 views.<sup>105</sup>

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<sup>102</sup> See Appendix COE-13 Paid Digital Media Campaign Overview.

<sup>103</sup> See Appendix COE-12 Earned Media Report.

<sup>104</sup> See Appendix COE-11 April Subscriber Email.

<sup>105</sup> See Appendix COE-14 TAP Stories Published.

- The LRP website, [denverwater.org/Lead](https://denverwater.org/Lead) (English) and [denverwater.org/Plomo](https://denverwater.org/Plomo) (Spanish), was updated with the recordings of the construction preparedness virtual community meetings, dashboards, an updated LSL inventory and an updated pipe replacement map with the work areas for 2022. Since the launch of the LRP, [denverwater.org/Lead](https://denverwater.org/Lead) has received 278,854 visits and 506,266 page views. There were 22,958 unique website visits from Jan. 1 to June 3, 2022. Since launching in October 2021, [denverwater.org/Plomo](https://denverwater.org/Plomo) (the Spanish version of the website) has received 1,368 visits and 2,262 page views. There were 619 unique website visits from Jan. 1 to June 3, 2022.<sup>106</sup>

### Material Development and Owned Media [7.B.vi.a]

The following materials were developed through June 3, 2022:

- The public-facing dashboard was updated to share progress and key metrics for the LRP through May 2022.<sup>107</sup> The updated dashboard is posted monthly to [denverwater.org/Lead](https://denverwater.org/Lead) and is available in both English and Spanish.
- Information on the LRP was included in the January, March and June issues of WaterNews, the monthly bill insert included with the bills of more than 180,000 customers who receive a bill from Denver Water. The information covered program progress through 2021, proper filter use and encouragement to complete a filter adoption survey if received, the work of community partners and the Spanish-language program website published in 2021.<sup>108</sup>
- Service Line Investigations
  - A potholing notification postcard was developed to notify customers of upcoming investigative potholing activity outside of their property.<sup>109</sup>
  - In 2021, email content and a call script were also developed to notify customers identified for upcoming investigation potholing and interior inspection activities of the work and what they need to know and/or do. These continue to be updated and used in 2022.
- ALSLR Program
  - A digital version of the service line replacement consent form was developed and launched with customers in the second quarter of 2022. Customers now have the option of completing the consent form by signing either the hard copy or the online

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<sup>106</sup> See Appendix COE-16 Website Traffic.

<sup>107</sup> See Figure 1.

<sup>108</sup> See Appendix COE-3 January, March and June Issues of WaterNews.

<sup>109</sup> See Appendix COE-6 Investigation Potholing Notification Postcard.

version of the form. The hard copy also includes a QR code linking to the online version.<sup>110</sup>

- Water Quality Sampling
  - To encourage the return of water quality sampling kits, Denver Water launched a random gift card drawing for customers who return samples. Materials, including the sampling kit box sticker and inside kit letter were updated to promote the opportunity.<sup>111</sup>
  - Customers began receiving updated materials and information on the gift card drawing in late May 2022. Impacts of the gift card drawing on return rates will be assessed in the coming months.
  - The post-replacement water quality sampling kit offer letter was also updated to include information on the drawing and to be more visually engaging for customers with photographs and iconography to grab attention and highlight the most important pieces of information.<sup>112</sup>

### Internal Communications and Coordination

The following summarizes efforts to continue to educate Denver Water’s employees and contractors about the components and messaging of the LRP. This ongoing engagement supports the ability of Denver Water staff and representatives to provide customers with accurate information and enhances efforts to make the LRP accessible by all.

- Internal trainings and information-sharing sessions continued to be held as needed or requested to update Denver Water teams and departments on the LRP and prepare them for handling customer or community inquiries as appropriate. Seventeen sessions were held between Jan. 1 and June 3.
- Talking points continue to be developed and updated for Denver Water Customer Care and other customer-facing groups to support consistent and timely responses to customer inquiries.

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<sup>110</sup> See Appendix COE-5 Service Line Replacement Consent Form (Updated).

<sup>111</sup> See Appendix COE-8 Water Quality Sampling Kit Outside Box Sticker (Updated) and Appendix COE-9 Water Quality Sampling Kit Inside Box Letter (Updated).

<sup>112</sup> See Appendix COE-10 Water Quality Sampling Kit Post-Replacement Offer Letter (Updated).

## Above and Beyond Stories

- Contractor teams continue to provide support to community members on non-construction issues when they see individuals in need of assistance while out in the field. Several examples of these efforts have included assisting community members with mobility challenges. In March, a contractor team member ran to help an elderly woman with a walker who had dropped her groceries down the street. In April, a contracting team member helped an elderly man with a walker carry his bags to a taxi in order to get to a doctor appointment.
- In May, a homeowner who had received a service line replacement reported that their basement freezer had been unplugged during the replacement and, as a result, freezer contents had spoiled. While the contractor team was able to determine that the freezer had not been touched as part of their work, they provided \$300 in gift cards to the customer so that they could re-stock their freezer.
- In May, contractors became aware of a customer living in a neighborhood slated for upcoming service line replacements who was supporting the program by encouraging her neighbors to participate. The resident took initiative to speak to her neighbors about the importance of replacing lead service lines, resulting in an additional five to 10 returned consent forms granting permission to move forward with replacements at those properties. Denver Water and the contractor team thanked the resident with a gift basket and gift cards.
- In March and May, Denver Water hosted or co-hosted two community events in the Globeville and Elyria Swansea neighborhoods. In addition to providing an overall update on the program, Denver Water shared construction information specific to these areas and received feedback from community members on the potential impact of these construction plans. In response, Denver Water adjusted its construction schedule to accommodate activity on a busy roadway in the area that connects to a local school.

## 7.B.vii Health Equity and Environmental Justice

Section 7.B.vii of the Variance requires Denver Water to report and maintain records related to activities implemented to achieve its Health Equity and Environmental Justice principles:

- vii. Health Equity and Environmental Justice. A summary of activities conducted and designed to address health equity and environmental justice (HE&EJ) principles set forth in the LRPP, including:*
- a. a description of how the HE&EJ principles are being incorporated into the accelerated LSL replacement program, lead filter program, and communications, outreach and education plan;*
  - b. socioeconomic or demographic data collected through the survey that may inform the filter adoption rate by neighborhood or demographic group to the extent practical;*
  - c. socioeconomic or demographic data collected from or other sources (e.g., census data, local public health agencies) to target communications, outreach and education programs to specific neighborhoods, demographic cohorts, or non-English speaking groups; and*
  - d. documentation that outreach and education materials have been provided to at least 95% of the households enrolled in the filter program.*

*Text is taken verbatim from the Order, dated Dec. 16, 2019.*

A commitment to HE&EJ informs all aspects of the LRP, supporting accessibility, awareness and equitable participation for all customers. An overview of HE&EJ reporting requirements is presented in Table 30.

**TABLE 30. Overview of 7.B.vii Requirements**

Paragraph Reference	Description	Refer to
<b>7.B.vii LRPP V (p 77)</b>	Summary of activities conducted and designed to address HE&EJ principles.	See Annual Report. See LRPP (p 77).
<b>7.B.vii.a</b>	Description of how HE&EJ principles were incorporated into the implementation of the: <ul style="list-style-type: none"> <li>• ALSLR Program.</li> <li>• Filter Program.</li> <li>• COE Plan.</li> </ul>	See First Quarter Report of 2020 and updates in this section.
<b>7.B.vii.b</b>	Socioeconomic and demographic data collected through the filter adoption survey.	See Appendix. <sup>113</sup>
<b>7.B.vii.c</b>	Socioeconomic or demographic data collected from other sources to target communications, outreach and education programs to specific neighborhoods, demographic cohorts, or non-English speaking groups.	See this section for how data informed COE activities.
<b>7.B.vii.d</b>	Documentation that outreach and education materials have been provided to at least 95% of the households enrolled in the Filter Program.	See Section 7.B.vi.a. To be described in Second Semi-Annual Report for 2022.
<b>LRPP V (p 77)</b>	Commitment to continue to consult and collaborate with the organizations and HE&EJ experts, stakeholders, community members and customers to continually improve upon integration of the HE&EJ principles with the Lead Reduction Program.	See this section.
<b>LRPP V (p 79)</b>	Collaborate with other agencies to address lead exposure from all sources.	Described in this section.

The following sections describe how HE&EJ principles were integrated into the various components of the LRPP during the first half of 2022.

[Incorporating HE&EJ Principles via Communications, Outreach and Education \[7.B.vii.a, 7.B.vi.b and to support 7.B.vii.c\]](#)

[Ambassador Program](#)

Denver Water’s Ambassador Program is a partnership with community organizations to educate customers in historically underserved geographic or cultural communities about the LRP. These customized collaboration efforts expand the LRP’s reach, build awareness of program requirements and create momentum for behavior change in the appropriate culture and language most valued in harder-to-reach communities. There are three components of the Ambassador Program:

<sup>122</sup> See Appendix HEJ-5 Summary of Socioeconomic and Demographic Indicators from 2022 Formal Filter Adoption Survey.

- **Contract Partners:** Conduct extensive on-the-ground outreach using culturally appropriate messaging with tailored outreach strategies to reach enrolled customers in prioritized communities.
- **Sponsorship Awards:** The sponsorship awards initiative launched in 2021 and provides funding to community organizations to either leverage their existing programs/services/events or create new opportunities to promote the LRP in targeted communities.
- **Information Partners:** Community organizations are recruited for their willingness to use their communication channels to promote the LRP.

### *Contract Partners*

- [CREA Results](#) is a community organization that specializes in the Latinx community. This group supported community outreach activities in the following neighborhoods:
  - Barnum.
  - Barnum West.
  - Clayton.
  - Elyria-Swansea.
  - Globeville.
- During the second six months of 2022, CREA Results engaged in the following work:
  - Placed LRP information at 124 high-traffic locations such as restaurants, coffee shops and recreational centers to promote the LRP.
  - Participated in 31 in-person or virtual events to educate residents within five targeted neighborhoods about the LRP with an estimated reach of 2,449 people.
  - Conducted email, phone and/or door-to-door outreach to 219 customers in targeted neighborhoods to encourage customers in the LRP to participate in the program and answer questions.
  - Conducted three educational workshops on the LRP with 36 community influencers who can assist in promoting awareness and participation among customers.
  - Hosted four radio shows and aired four public service announcements about the LRP on KNRV (1150 AM), a Spanish-language radio station, with an estimated reach of 10,000 listeners per show.
  - Secured three articles in El Comercio de Colorado, a prominent Spanish-language publication with an estimated circulation of 25,000 readers per issue.<sup>114</sup>

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<sup>114</sup> See Appendix HEJ-1 Ambassador Partner Spanish Language Articles.

- Secured one article in El Pueblo Católico, which is published by the Catholic Church and distributed throughout the state with an estimated distribution of 15,000 readers.<sup>115</sup>
- Secured an interview on Estrella TV, a Spanish language television show, with an estimated viewership of 6,300.
- Posted LRP information on Facebook 39 times with an estimated 5,931 views.
- Re-posted three LRP videos in Spanish on CREA’s Facebook page, which has 1,678 followers.
- Included LRP information in four CREA monthly newsletters with a distribution of 665 readers per issue.<sup>116</sup>

### *Sponsorship Awards*

During the first six months of 2022, the following community organizations participated in the Ambassador Program as sponsorship awardees:

- [Una Mano, Una Esperanza](#) is a community organization that specializes in the Latinx community. This group supported community outreach activities in the Barnum, Barnum West, Swansea and Westwood neighborhoods.
  - Coordinated a training to help residents become child care providers and included information about the LRP during two workshops, with 31 participants.
  - Promoted the LRP at 15 community locations and/or events such as food banks, school events and Una Mano, Una Esperanza service programs reaching a combined total of 958 people.
  - Promoted the LRP on Facebook with 998 views.
- [NEWSSED](#), a community development corporation focused on solving long-term economic problems in disadvantaged communities by securing and coordinating resources for neighborhoods.
  - Posted LRP information on Facebook, which reached an estimated 97 people.
  - Created a partnership webpage featuring LRP videos in Spanish and TAP articles on the NEWSSED website, reaching an estimated 34 people. The partner webpage also included a direct link to the LRP website.

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<sup>115</sup> See Appendix HEJ-1 Ambassador Program Spanish Language Articles.

<sup>116</sup> See Appendix HEJ-1 Ambassador Program Spanish Language Articles.



- Provided LRP information to 68 clients.
- [Denver Public Schools](#) is the public school system for the City and County of Denver.
  - Educated 12 family liaisons (staff working directly with families within a school) about the LRP to help families identify if they are in the LRP and how to participate. Liaisons were able to take this information and have conversations with families and others about the LRP.
  - Included information about the LRP in three newsletters sent to 3,259 recipients.
  - Shared information twice about the LRP on Facebook with an estimated 670 views.
  - Shared LRP information with DPS families at eight community events (parent graduations, Children’s Day Celebration, FACE Centers) reaching 533 people.
- The [Center for African American Health](#) offers African American and Black Metro Denver communities culturally responsive resources that support them in overcoming the root causes of health problems so they can maximize their individual and family health.
  - Featured the LRP in its May and June newsletters with a monthly distribution of 4,710 people.<sup>117</sup>
  - Distributed information on and/or discussed the LRP with 217 people through various community outreach activities.
  - Promoted the LRP on social media platforms with approximately 2,659 impressions from Instagram, Facebook and Twitter.
- [Denver Metro Community Impact](#) is a convener of an organizational network working to understand neighborhood interests.
  - Interviewed 40 African American families enrolled in the LRP in the Park Hill and Clayton neighborhoods to gain a better understanding of the African American and Black community perspective on the LRP, as well as to inform development of future messaging and outreach activities.
- The [Denver Digs Trees](#) program helps residents to cultivate greener, healthier, more vibrant communities by providing Denver residents with free and low-cost trees for planting on both private and public property. Denver Water sponsored Denver Digs

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<sup>117</sup> See Appendix HEJ-1 Ambassador Program Spanish Language Articles.

Trees works to support environmental stewardship through the LRP. This sponsorship helped to support:

- Distribution of over 1,200 trees throughout Denver to mostly low-canopy neighborhoods, representing over 600 homes.
- Distribution of over 400 fruit and ornamental trees were distributed on Earth Day 2022, adding food sources and beauty to landscapes.

#### Examples of Partners in Action:

- Denver Public Schools family liaisons were given information about the Lead Reduction Program to share with the families they work with at various schools throughout the district. One of those family liaisons is also the Asian Community Specialist. She teaches English classes on Saturdays at Lincoln High School where she shared LRP information with her students (adults) in Vietnamese. She read the English material to the group in their language, Vietnamese, to help them fully understand the program.
- Una Mano, Una Esperanza coordinated a workshop in the Latino community to help residents become child care providers. The workshop was particularly targeted to community members who are currently family, friends and neighbor providers and would like to become licensed. Included in the training was information about Denver Water's LRP. After the training was completed, Una Mano, Una Esperanza staff heard that people in the training were telling other people in the community what they learned about the LRP, which confirmed that attendees retained information about the LRP and were sharing what they learned with others. Una Mano, Una Esperanza also heard stories about mothers using Denver Water's "Life is Better with Water" stickers to encourage their children to drink filtered water by placing stickers on their water pitchers for their children to read when they open the refrigerator.

#### *Virtual Community Meetings*

Spanish interpretation has been available for every virtual community meeting conducted through 2020 and 2021, including the construction preparedness meetings in February and May 2022. Meetings were fully bilingual, from the initial meeting promotion to the meeting presentation, poll questions and Q&A responses. The meeting recordings are also available in Spanish and English at [denverwater.org/Plomo](https://denverwater.org/Plomo) and [denverwater.org/Lead](https://denverwater.org/Lead).

#### *Critical Customer Outreach*

A combination of outreach efforts, including mailing, email, phone calls and door-knocking continues to be conducted in 2022 to complete LSL replacements at critical customer facilities such as schools and child care centers. These efforts have exceeded the baseline of two

mailings and a door knocking as Denver Water continues to work to gain consent for all critical customer facilities.

### *Materials*

All customer-facing materials produced in 2022 have been translated into Spanish. The construction preparedness virtual community meetings presentation, promotional materials and follow-up communications were provided in both Spanish and English. Monthly dashboards for the LRP are available in Spanish and English at [denverwater.org/Plomo](https://denverwater.org/Plomo) and [denverwater.org/Lead](https://denverwater.org/Lead).

The Spanish version of the LRP website, [denverwater.org/Plomo](https://denverwater.org/Plomo), continues to be updated and available to customers. To access the Spanish content, customers may simply click on the green “Español” button in the top right-hand corner of [denverwater.org/Lead](https://denverwater.org/Lead) or visit [denverwater.org/Plomo](https://denverwater.org/Plomo).

### *Tenant Outreach*

Introductory program materials and filter kits continue to be provided to apartment complexes for distribution to tenants upon move in. Coordination also continues with property managers to track material distribution.

### *Early Childhood*

In consultation and collaboration with Denver’s Early Childhood Council, a virtual training was conducted on Feb. 1 for child care providers to educate them on the LRP and how to participate in and support the LRP at their facilities. The training had 33 attendees.<sup>118</sup>

Denver Water also sponsored and participated in the Rocky Mountain Early Childhood Conference on March 11 and 12, engaging nearly 200 individuals through a table to share information and a presentation on the LRP.

Through collaboration with Denver Health, information on the LRP is being included in “Warm Welcome” bags for families with newborns at Denver Health. Approximately 1,800 Warm Welcome bags were distributed during the first six months of 2022. Similarly, through partnership with the Tepeyac Community Health Center, information on the LRP is being included in information packets provided at pre-natal visits at their clinic. The information allows parents to understand the importance of filtering water when expecting and when preparing infant formula. Approximately 40 women received information via the pre-natal visits between January and May 2022.

Denver Water completed research and compiled a list of non-government organizations (non-profit, industry associations, etc.) that support early childhood to evaluate outreach opportunities within these categories. Staff will work on outreach to these groups in the second half of 2022. Additionally, Denver Water added a representative from the City and County of

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<sup>118</sup> See Appendix HEJ-2 Denver Early Childhood Council Training Flyer.

Denver's Office of Children's Affairs to the LRP Stakeholder Advisory Committee to integrate the perspective of early child care supporters into the committee.

### HE&EJ Principles Applied to ALSLR Program [7.B.vii.a]

Denver Water updated its multicultural training program and delivered it to ALSLR field observers and contractors on Jan. 7, 2022. The training included the following topics:

- Denver Water customer journey.
- Multicultural awareness.
- Multicultural principles.
- Self-awareness and working across cultures.
- Audience language discussion.
- Working with customers when English is not a first language and protocol for interpretation.
- Managing behaviors when working in the public sector (in the field and inside homes).
- Key program messages.
- Review of materials customers receive, including new documents developed since the original training in February 2020.

In 2022, Denver Water has continued to work with its community partners to support additional outreach efforts in areas with lower consent form return rates for service line replacement. These efforts go beyond the minimum two mailings and door-knocking attempts required to gain consent and provides the opportunity for community partners to leverage their understanding of and connections with specific communities. If a need is identified, community partners support outreach through door-to-door canvassing, phone calls and/or emails to customers to encourage consent form returns and help answer questions or guide customers to additional resources. When employed, this complements the additional efforts by Denver Water to conduct phone and email outreach beyond the required mailings and door knocking.

Construction field crews continue to use the iSpeak poster, which allows customers to select their preferred language from among 64 languages represented in the poster. Crews are then able to work with the customer and Denver Water to provide support in the preferred language.<sup>119</sup>

In March and May, Denver Water also hosted or co-hosted two community events in the Globeville and Elyria Swansea neighborhoods. In addition to providing an overall update on the program, Denver Water shared construction information specific to these areas and received

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<sup>119</sup> See Appendix HEJ-4 iSpeak Poster.

feedback from community members on the potential impact of these construction plans. In response, Denver Water adjusted its construction schedule to accommodate activity on a busy roadway in the area that connects to a local school.<sup>120</sup>

### [2023 ALSLR Work Areas](#)

2023 ALSLR work area planning is underway and will be presented in the second semi-annual report.

### [HE&EJ Principles Applied to Filter Program \[7.B.vii.a\]](#)

All customers enrolled in the Filter Program received their initial filter kit in 2020 with enough replacement filters to last approximately six months. The distribution of additional replacement filters began on Aug. 27, 2020, an approximate five-month cycle following the same schedule used for the initial filter distribution. This distribution continues in 2022.

In 2020, outreach was conducted with leasing offices to support providing filter kits and program materials to new tenants on move-in. This outreach continues in 2022 as described earlier in this section.

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<sup>120</sup> See Appendix HEJ-3 Globeville, Elyria Swansea Community Events Flyers.

## Learning by Doing

Five of the six elements that together make up the LRP are used to evaluate the overall effectiveness of the program (COE Plan, LSL Inventory, Filter Program, ALSLR Program and Corrosion Control Treatment). The sixth element is Learning by Doing — presented as a strategy (versus a desired outcome), as quantitative performance metrics were not identified in the Variance.

As part of the Learning by Doing element of the LRP, Denver Water is committed to:

- Evaluate the performance of the LRP to improve outcomes.
- Establish an Advisory Committee to inform Denver Water on more efficient and effective ways to implement the LRP to achieve the Variance goals.

This means that Denver Water incorporates the Learning by Doing approach to improve outcomes during the life of the LRP. During the first six months of 2022, efforts continued to identify potentially more efficient or effective ways to implement the LRP in the Learning by Doing log. The outcomes tracked in the Learning by Doing log are presented as an independent report at the end of each program year.

The following are Learning by Doing activities from the first six months of 2022:

- Since the inception of the formal filter adoption survey in 2020, socioeconomic and demographic data are collected with the intention of informing the filter adoption rate by neighborhood or demographic group. The results of the 2020 and 2021 formal filter adoption survey demonstrated that the data are not statistically significant to make determinations at that level.
- When a task order is closed out, properties with p-values  $\geq 0.5$  on the Refusal List remain. In 2022, Denver Water contractors began to pothole at properties on the Non-Response and Refusal Lists that are adjacent to areas previously included in the 2020 and 2021 task orders if water quality results are inconclusive or unavailable and if there is no paving moratorium on the street. Gathering this additional information helps advance the inventory when water quality data are either not available or inconclusive and helps inform outreach to encourage customers to participate in the program if they are found to have a LSL, especially at rental properties where the owner may be non-responsive. For properties on the Non-Response List, potholing is conducted on both the public (main to meter) and private (meter to building) sides of the service line. For properties on the Refusal List, only the public side is potholed. Although this effort has just begun, LSLs have been identified at several properties that are on the Non-Responsive or Refusal Lists. A similar protocol to address properties on the Refusal and Non-Response Lists in 2022 work areas is in development for the second six months of 2022.

- On March 23, 2022, Denver Water was informed that a replacement filter purchase order sent to the filter distributor contained a mixture of filter cartridges certified for lead removal, as well as some filter cartridges not certified for lead removal.<sup>121</sup> Upon further investigation, it was determined that 12 of the 16,102 filter cartridges were not certified for lead removal. Of those 12 filters, six were either returned by customers or undeliverable, leaving six properties that may have received and begun using the incorrect filter. Since it was not known which 12 properties received the incorrect filter, all 16,102 filters were replaced out of caution and the potentially impacted customers were notified via mail, phone and email. Denver Water continues to work closely with the filter manufacturer and distributor to ensure quality control practices are in place along the supply and distribution chains so that this error does not occur again.

Efforts continue to use the Learning by Doing approach to address challenges and improve effectiveness of outreach in hard-to-reach communities.

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<sup>121</sup> See Appendix REG-1 Copies of Letters for Compliance-Related Submissions (First Six-Month Period of 2022).