

**LEAD-FREE WITH EQUITY: AN ENVIRONMENTAL
JUSTICE-FOCUSED PROPOSAL TO ACHIEVE LEAD-FREE
D.C. BY 2030**

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INTRODUCTION

Intellectual disabilities, kidney disease, reproductive concerns, brain damage, cardiovascular disease—what do these have in common?² These seemingly unrelated health risks are all potential consequences of lead poisoning³—a very real risk for the 22 million people living in America who currently use lead service lines for drinking water.⁴ A service line is the pipe connecting the water main to the plumbing inside a home; pipes that contain lead are referred to as lead service lines (LSLs).⁵ The Safe Drinking Water Act requires the Environmental Protection Agency (EPA) to determine maximum contaminant level goals (MCLGs) for various contaminants in drinking water, beyond which no adverse health effects are likely to occur.⁶ For lead, EPA has set the maximum level at zero, based on its toxicity and ability to accumulate in the human body over time.⁷ “No safe blood level has been identified” because lead has no known biological use, can be harmful to human health even at extremely low exposure levels, and exposure is significantly more harmful to children and other vulnerable groups.⁸ Lead poisoning can lead to a variety of serious health effects, like seizures and even death.⁹

The widespread prevalence of lead service lines has impacted communities across the country. The District of Columbia (the “District”),

2. See *Lead Poisoning*, WORLD HEALTH ORG., <https://www.who.int/news-room/fact-sheets/detail/lead-poisoning-and-health> (last visited Oct. 15, 2023) (discussing how lead can lead to various medical conditions).

3. Lead can be found in many places, including air, soil, water, and certain manufactured products. While lead-based paint poses the greatest risk based on its prevalence and difficulty to track, lead service lines can be replaced and significantly decrease the risk of lead-contaminated water. See *Learn about Lead*, EPA, <https://www.epa.gov/lead/learn-about-lead> (last visited Jan. 19, 2024) (discussing potential health risks from lead).

4. See Eric Olson & Alexandra Stubblefield, *Lead Pipes are Widespread and Used in Every State*, NAT. RES. DEF. COUNCIL (July 7, 2021), <https://www.nrde.org/resources/lead-pipes-are-widespread-and-used-every-state> (discussing danger of lead service pipes for drinking water).

5. *Getting Started with Lead Service Line Identification and Replacement*, EPA, <https://www.epa.gov/ground-water-and-drinking-water/getting-started-lead-service-line-identification-and-replacement> (last visited Jan. 19, 2024).

6. See *Basic Information about Lead in Drinking Water*, EPA, <https://www.epa.gov/ground-water-and-drinking-water/basic-information-about-lead-drinking-water> (last visited Oct. 15, 2023) (stating that The Safe Drinking Water Act requires the EPA to determine maximum contaminant level goals of various contaminants in drinking water, a point at which no adverse health effects are likely to occur).

7. See *id.* (stating that based on its toxicity and ability to accumulate in the human body over time, the EPA set the maximum level at zero for lead).

8. *Lead in Drinking Water*, CTR. FOR DISEASE CONTROL & PREVENTION, <https://www.cdc.gov/nceh/lead/prevention/sources/water.htm> (last visited Oct. 15, 2023).

9. See *Lead Poisoning*, *supra* note 2 (discussing how lead can lead to various medical conditions); see also *Lead Poisoning*, MAYO CLINIC, <https://www.mayoclinic.org/diseases-conditions/lead-poisoning/symptoms-causes/syc-20354717> (last visited Oct. 15, 2023) (discussing that lead poisoning can lead to a wide variety of health effects, as serious as seizures and death).

where thousands of lead service lines are still in use and continue to threaten the health and safety of all residents,¹⁰ can serve as a case study to remedy this nationwide issue. Given that lead service lines are the main source of lead contamination in drinking water, the District has prioritized lead pipe replacements for residents affected by the risks of lead poisoning.¹¹ Based on the Biden-Harris Justice Initiative, the Lead-Free by 2030 Initiative focuses on historically disadvantaged and vulnerable communities.¹² Closing the gap for people of color and low-income communities requires an environmental justice-focused prioritization of lead service line replacements within the most vulnerable areas in the District. Although individual action can lead to some benefits, a larger-scale initiative is needed to address the inequity issues that arise from most LSL replacement plans based on the high cost of replacements, disparate access to funding and grants, and high concentration of LSLs in historically underrepresented groups.¹³ In addition to direct health benefits for residents, a full LSL replacement will yield \$22,000 in societal benefits for reduced health impacts.¹⁴ A justice-focused program can help distribute funds to demographics that need it most to alleviate financial concerns surrounding LSL replacements, leading to an overall safer and healthier community.¹⁵

This paper will discuss the current lead service line-replacement programs in the District and propose a clear and centralized policy with an environmental justice lens to ensure equitable access to safe water across all

10. See Valeria Baron, *DC Water's Own Data Suggest Widespread Lead Contamination*, NAT. RES. DEF. COUNCIL (June 25, 2021), <https://www.nrdc.org/bio/valerie-baron/dc-waters-own-data-suggest-widespread-lead-contamination> (discussing how thousands of lead service lines are still in use in the District of Columbia).

11. See *Lead in Drinking Water*, *supra* note 8 (explaining that lead service lines are the main source of lead contamination in drinking water); see also *Lead Pipe Replacement Programs*, DC WATER, <https://www.dewater.com/replacelead> (last visited Jan. 20, 2024) (stating that D.C. has prioritized lead pipe replacement for residents).

12. See *Lead Free by 2030*, DC WATER, <https://www.dewater.com/lead> (last visited Jan. 22, 2024) (discussing the Lead Free by 2030 initiative in D.C.); see also *Justice40, A Whole-of-Government Initiative*, WHITEHOUSE.GOV, <https://www.whitehouse.gov/environmentaljustice/justice40/> (last visited Jan. 22, 2024) (explaining how the Biden-Harris Justice initiative, Lead-Free by 2030, focuses on historically disadvantaged and vulnerable communities).

13. See *Recognizing Efforts to Replace Lead Service Lines*, ENV'T DEF. FUND, <https://www.edf.org/health/recognizing-efforts-replace-lead-service-lines> (last visited Oct. 15, 2023) (explaining how a larger-scale initiative is needed to address the inequity issues that arise from most LSL replacement plans).

14. See Tom Neltner, *Eliminating Lead Service Lines Yields Huge Benefits for Reducing Premature Cardiovascular Deaths*, ENV'T DEF. FUND (Dec. 6, 2023), <https://blogs.edf.org/health/2023/12/06/eliminating-lsls-yields-huge-benefits-for-reducing-premature-cvd-deaths/> (stating that a full LSL replacement will yield \$22,000 in societal benefits for reduced health impacts).

15. See *Equity in Lead Service Line Replacement*, LSLR COLLABORATIVE, <https://www.lslr-collaborative.org/equity.html> (last visited Oct. 15, 2023) (explaining how a justice-focused program can help distribute funds to demographics that need it).

neighborhoods.¹⁶ While there are many federal initiatives and programs to remove LSLs nationwide,¹⁷ the scope of this paper is limited to opportunities within the District. This paper will evaluate the current initiatives to remove lead pipes in the District and propose that local programs focus on full LSL replacements across the District to further environmental justice and public-health goals. Though the District has prioritized LSL replacements and set aside funding for these programs,¹⁸ there are still gaps in the framework that prevent these replacement plans from being equitable, feasible, and accessible for all communities. Part I of this paper discusses the prevalence of LSLs in the District, particularly in vulnerable communities; consider the adverse effects of partial replacements; and provide examples of successful LSL replacement plans around the nation that have protected those most at risk. Part II examines replacement plans currently in place, including the Lead-Free by 2030 Initiative and its disproportionate impact on vulnerable communities. Part III provides suggestions to improve this initiative with revisions to the replacement plans and opportunities for funding to ensure vulnerable communities have access to clean water.

I. WHY IS THERE LEAD IN AMERICAN DRINKING WATER?

The presence of lead in drinking water is deeply rooted in American history. American colonies in the 1600s used lead pipes for the transportation of drinking water.¹⁹ Widespread installation and use of these pipes continued despite early identifications of health risks due to the durability, pliability, and relatively low corrosiveness of lead.²⁰ The powerful Lead Industries Association (LIA) accelerated the promotion and sale of lead pipes for

16. This paper uses the term “environmental justice” to describe the right to a safe, healthy, and sustainable environment for everyone, regardless of race, color, national origin, or income. Historically, communities of color face a disproportionate number of environmental harms. Environmental justice initiatives seek to remedy those gaps. *See generally* Renee Skelton & Vernice Miller, *The Environmental Justice Movement*, NAT. RES. DEF. COUNCIL (Aug. 22, 2023), <https://www.nrdc.org/stories/environmental-justice-movement> (defining environmental justice); *see also Environmental Justice*, S. ENV'T L. CTR., <https://www.southernenvironment.org/our-focus/environmental-justice/> (last visited Apr. 7, 2024) (defining environmental justice and explaining initiatives).

17. *See e.g.*, *Lead Service Line Replacement Accelerators*, EPA, <https://www.epa.gov/water-infrastructure/lead-service-line-replacement-accelerators> (last visited Nov. 30, 2023) (providing “targeted technical assistance” for various states through local education efforts and community outreach, guidance for Bipartisan Infrastructure Law funding, and support in developing LSL replacement plans).

18. Jessica Kronzer, *It’s Time to Change Lead Pipes, EPA Says — How DC’s Water Crisis Spurred this Move 20 Years Ago*, WTOP NEWS (Dec. 1, 2023), <https://wtop.com/dc/2023/12/its-time-to-change-lead-pipes-epa-says-how-dcs-water-crisis-spurred-this-move-20-years-ago/>.

19. *See* Jack Lewis, *Lead Poisoning: A Historical Perspective*, EPA (1985), <https://www.epa.gov/archive/epa/aboutepa/lead-poisoning-historical-perspective.html> (explaining the use of lead pipes dating back to the 1600s in the American colonies).

20. Richard Rabin, *The Lead Industry and Lead Water Pipes: “A Modest Campaign”*, 98 AM. J. PUB. HEALTH 1585, 1590 (2008).

decades as industry representatives worked closely with federal officials, plumbers' organizations, architects, and local water authorities to ensure the installation of lead pipes throughout the country.²¹ Over several decades, the LIA published a variety of materials discussing the benefits of lead pipes and provided guidance on how to install and repair the pipes.²² The marketing themes promoting lead included notions about the use of lead as "modern," emphasis on its durability, and an endorsement of lead as the "responsible" and "sustainable" option.²³ This led homeowners to mistakenly believe their lead pipes were harmless and not take any action to prevent the installation of lead pipes under their property.²⁴

The LIA was further empowered due to the lack of federal regulation and public skepticism about the health risks of lead pipes.²⁵ As literature describing the risks associated with lead contamination developed and industrial workers began noticing adverse health effects, public concern about lead pipes emerged.²⁶ The 1974 Safe Drinking Water Act did not originally set standards limiting the concentration of lead in public water systems but was later amended to include the requirement of "lead-free" pipes after EPA conducted further research into the effects of lead poisoning.²⁷ Homeowners remained uninformed about the risks of lead and continued to rely on lead pipes for their water.²⁸ Though Congress banned the installation of lead water pipes in 1986 based on more concrete findings about their adverse health effects,²⁹ up to 10 million American households and around 400,000 schools currently have water connections through lead pipes and lead service lines.³⁰ The LIA's promotion of lead pipes, the lack of immediate action by lawmakers, and the unclear scientific determinations of the health risks associated with lead contamination placed the responsibility

21. Rabin, *supra* note 20, at 1586.

22. *Id.* at 1587–88.

23. Perry Gottesfeld, *Lead Industry Influence in the 21st Century: An Old Playbook for a "Modern Metal"*, 112 AM. J. PUB. HEALTH 723, 723–24 (2022).

24. *See id.* at 724 (describing the ways that the lead industry downplayed harms).

25. Rabin, *supra* note 20, at 1588–89.

26. *Id.* at 1584; *see* David C. Bellinger & Andrew M. Bellinger, *Childhood Lead Poisoning: The Torturous Path from Science to Policy*, 116 J. CLINICAL INVESTIGATION, 853, 855–56 (2006) (providing an example of the dangers of lead exposure in children and why the governmental response was limited).

27. Rabin, *supra* note 20, at 1590; *Use of Lead Free Pipes, Fittings, Fixtures, Solder, and Flux for Drinking Water*, EPA (Apr. 5, 2024), <https://www.epa.gov/SDWA/Use-Lead-Free-Pipes-Fittings-Fixtures-Solder-and-Flux-Drinking-Water>.

28. Gottesfeld, *supra* note 23, at 5724.

29. Lauren Rosenthal & Will Craft, *Buried Lead: How the EPA Has Left Americans Exposed to Lead in Drinking Water*, APM REPORTS (May 4, 2020), <https://www.apmreports.org/story/2020/05/04/epa-lead-pipes-drinking-water#>.

30. *Fact Sheet: The Biden-Harris Lead Pipe and Paint Action Plan*, WHITE HOUSE (Dec. 16, 2021), <https://www.whitehouse.gov/briefing-room/statements-releases/2021/12/16/fact-sheet-the-biden-harris-lead-pipe-and-paint-action-plan/#>.

on homeowners to identify, remove, and replace lead pipes on their property without any clear direction.

A. Lead-Contaminated Water in the District of Columbia

In the District, LSLs were predominantly installed prior to the mid-1950s, but there are records of installations as late as 1977.³¹ The ongoing issue of lead-contaminated water was exacerbated in the early 2000s when the District received national attention for the high health risks of its drinking water.³² Some households had lead levels above 300 parts per billion (ppb), exceeding EPA's 15 ppb action level, and creating an increased risk of miscarriage and fetal death.³³ Between 2001 and 2004, there were 200 fetal deaths as a result of lead-contaminated water and 2,000 miscarriages due to lead poisoning in mothers.³⁴ At the time, it was considered the "nation's most severe lead water contamination crisis."³⁵ A few officials in the District were aware of the issues but took years to notify residents.³⁶ Six congressional investigations and a Center for Disease Control and Prevention (CDC) report emphatically stated that there was no issue with the drinking water in the District, putting residents at unknown levels of risk.³⁷ The lack of communication or clarity on the severity of the issue made it difficult for homeowners to act.³⁸

Like the more recent crisis in Flint, Michigan, the District's drinking-water crisis emerged during a change in water-supply management.³⁹ Between 2001 and 2004, the Washington Aqueduct, which supplies water for

31. *Do You Have Lead Pipes? Let Us Help You Find Out*, DC WATER, <https://www.dewater.com/resources/lead/do-you-have-lead-pipes/let-us-help-you-find-out#> (last visited Oct. 24, 2023).

32. Mary Tiemann, CONG. RSCH. SERV., *Lead in Drinking Water: Washington, DC, Issues and Broader Regulatory Implications* 1 (Oct. 7, 2004); Katherine Shaver & Dana Hedgpeth, *D.C.'s Decade-old Problem of Lead in Water Gets New Attention During Flint Crisis*, WASH. POST (Mar. 17, 2016) https://www.washingtonpost.com/local/dcs-decade-old-problem-of-lead-in-water-gets-new-attention-during-flint-crisis/2016/03/17/79f8d476-ec64-11e5-b0fd-073d5930a7b7_story.html.

33. Rebecca Renner, *Plumbing the Depths of D.C.'s Drinking Water Crisis*, AM. CHEMICAL SOC'Y (June 15, 2004); Michael Andrei, *Failure to Learn from D.C. Water Crisis Led to Flint, Edwards Tells UB Audience*, UBNOW (Oct. 20, 2016), <https://www.buffalo.edu/ubnow/stories/2016/10/edwards-renew-lecture.html#>.

34. Andrei, *supra* note 33.

35. Baron, *supra* note 10.

36. Andrei, *supra* note 33.

37. *Id.*

38. See David Nakamura, *Water in D.C. Exceeds EPA Lead Limit*, WASH. POST (Jan. 30, 2004, 7:00 PM), <https://www.washingtonpost.com/archive/politics/2004/01/31/water-in-dc-exceeds-epa-lead-limit/1e54ff9b-a393-4f0a-a2dd-7e8ceedd1e91/> (showing that homeowners were not properly notified about the lead contamination).

39. *Flint Water Crisis*, CTR. FOR DISEASE CONTROL & PREVENTION, https://www.cdc.gov/nceh/casper/pdf-html/flint_water_crisis_pdf.html#print (last visited Apr. 3, 2024).

the District, switched its treatment chemical from chlorine to chloramine⁴⁰ in accordance with an EPA rule to limit byproduct contamination.⁴¹ The chloramine, however, caused pipe corrosion and resulted in lead leaking into the water supply.⁴² Media attention and news stories first exposed the issue and the city received national attention for its “alarming” levels of lead.⁴³ It took three years for the Washington Aqueduct to act, and residents continued drinking lead-contaminated water until 2004, when the Aqueduct took steps to address the pipe corrosion, including adding orthophosphate to the water and replacing old pipes that may have been at higher risk of lead leakage.⁴⁴ Orthophosphate, a tasteless, odorless, food-grade additive, creates a protective coating inside pipes and is effective in reducing the levels of lead released in water.⁴⁵ Within a few months, the District saw lead levels drop below EPA’s standards, emphasizing how a relatively simple action made a significant change in the quality of life for residents in a short amount of time.⁴⁶ However, orthophosphate is not a suitable substitute for lead service line replacements; the protective layer can corrode over time or lose efficacy if disturbed during a partial LSL replacement.⁴⁷ More than 20 years after initial discovery of these lead pipes by government officials, many pipes await replacement.⁴⁸

B. Disproportionate Impact of Partial Replacements on Vulnerable Communities

Although everyone is equally vulnerable to lead poisoning, not everyone is equally at risk. In addition to the LIA’s influence, historical legislation incorporating discriminatory practices forced people of color to stay in older, undeveloped neighborhoods with high levels of lead contamination, creating

40. Nakamura, *supra* note 38.

41. Shaver & Hedgpeth, *supra* note 32; see EPA, EVALUATION OF WASHINGTON AQUEDUCT TREATMENT CHANGES 1 (2008) (describing the requirement to switch from chlorine to chloramine); see also EPA, ELEVATED LEAD IN D.C. DRINKING WATER: A STUDY OF POTENTIAL CAUSATIVE EVENTS 1 (2007) (describing why EPA found the switch necessary).

42. Nakamura, *supra* note 38.

43. See *id.* (providing an example of a Washington Post article with some residents’ responses, proving there was national media attention to the D.C. water crisis).

44. Shaver & Hedgpeth, *supra* note 32.

45. *Corrosion Control Treatment*, PROVIDENCE WATER, <https://www.provwater.com/water-quality/lead-center/corrosion-control-treatment#> (last visited Apr. 6, 2024).

46. Neal Augenstein, *Before Flint: D.C.’s Drinking Water Crisis Was Even Worse*, WTOP NEWS (Apr. 4, 2016), <https://wtop.com/dc/2016/04/flint-d-c-s-drinking-water-crisis-even-worse/>.

47. Analies Dyjak, *Orthophosphate and Lead Contamination in Drinking Water*, HYDROVIV (Oct. 1, 2018), <https://www.hydroviv.com/blogs/water-smarts/orthophosphate>.

48. See Baron, *supra* note 10 (explaining how although they were discovered 20 years prior, many of the pipes found to have lead contamination have yet to be replaced).

a disproportionate impact of lead exposure on people of color.⁴⁹ Federal policies, such as redlining,⁵⁰ led to state disinvestment in affected communities and residents had little access to private funding to invest in proper infrastructure. As a result, Black households are at a greater risk of lead exposure, and neighborhoods with higher percentages of residents below the poverty line have elevated blood-lead levels.⁵¹ Racial segregation has contributed to low-income communities and people of color experiencing extraordinarily high exposure to lead-contaminated water.⁵²

Like many environmental justice issues, lead-contaminated water predominantly affects people of color and low-income District residents.⁵³ With respect to general lead exposure, Black Americans have the highest mean blood-lead levels.⁵⁴ Low-income and minority populations disproportionately live in older housing units with LSLs installed before the congressional lead-pipe ban.⁵⁵ The highest blood-lead levels are predominantly in Black children, putting them at the highest risk level.⁵⁶ Despite the nation's progress in lowering overall child blood-lead levels, Black children still face the biggest risks of lead exposure and lead poisoning.⁵⁷ Poverty and education levels also contribute to the likelihood of exposure to lead-contaminated water.⁵⁸ “[T]he U.S. Government Accountability Office found higher concentrations of LSLs in neighborhoods with more markers of vulnerability,” including high poverty rates, high unemployment rates, larger minority populations, more single female-headed households, more residents who rent property rather than own, and lower educational attainment.⁵⁹

One of the most significant factors contributing to this disproportionate racialized impact is the consideration of whether to replace the entire service

49. Fadumo M. Abdi & Kristine Andrews, *Redlining Has Left Many Communities of Color Exposed to Lead*, CHILD TRENDS (Feb. 13, 2018), <https://www.childtrends.org/blog/redlining-left-many-communities-color-exposed-lead>.

50. See *Redlining*, LEGAL INFO. INST., <https://www.law.cornell.edu/wex/redlining> (Apr. 2022) (defining the practice).

51. Robert J. Sampson & Alix S. Winter, *The Racial Ecology of Lead Poisoning: Toxic Inequality in Chicago Neighborhoods*, 13 CAMBRIDGE UNIV. PRESS 261, 262, 266 (2016).

52. *Id.* at 266, 279.

53. See Karen J. Baehler et al., *Full Lead Service Line Replacement: A Case Study of Equity in Environmental Remediation*, 14 SUSTAINABILITY 352, 354 (2021) (describing the disproportionate impacts of lead-contaminated water on marginalized groups generally).

54. *Id.*

55. *Lead and Copper Rule Improvements*, EPA, <https://www.epa.gov/ground-water-and-drinking-water/lead-and-copper-rule-improvements> (last visited Apr. 6, 2024).

56. Deniz Yeter et al., *Disparity in Risk Factor Severity for Early Childhood Blood Lead Among Predominantly African American Black Children: The 1999 to 2010 U.S. NHANES*, 17 INT'L. J. ENV'T RES. & PUB. HEALTH 1552, 1552 (2020).

57. *Id.* at 1552-53.

58. *Id.* at 1552.

59. Baehler, *supra* note 53, at 354.

line or just the portion under public property. Currently, some lead-replacement initiatives, such as those in Virginia⁶⁰ and Maryland,⁶¹ offer the option to partially replace the water pipes, focusing only on the portion under public land and leaving the privately owned pipes alone. Replacing the privately owned pipes is the responsibility of the homeowner, creating unequal remedies for different neighborhoods. Additionally, partial replacements can actually increase the amount of lead that seeps into drinking water by dislodging the lead in the unreplaced pipes, increasing water contamination.⁶² Studies have shown that the process of partially replacing a lead service line, such as digging underground and cutting pipes, can release particulate lead.⁶³ The new materials from partial LSL replacements can increase corrosion⁶⁴ and create galvanic corrosion,⁶⁵ which creates a new source of lead in the pipe and further increases contamination. Additionally, fusing a lead pipe with another material can cause corrosion of the metals which will then affect the water supply.⁶⁶ Many replacement pipes are made of copper, which can cause electrochemical reactions that release lead ions.⁶⁷

EPA's Science Advisory Board notes that partial replacements do not "reliably reduce drinking water lead levels in the short term, ranging from days to months, and potentially even longer."⁶⁸ Other organizations echo this sentiment; in 2018, the National Resources Defense Council (NRDC) called for a ban on partial lead-pipe replacements in the interest of protecting public health. Per the NRDC, partial replacements will at best waste money and at worst substantially increase lead levels.

60. *LEAP – For Homeowners*, VA. DEP'T OF HEALTH, <https://www.vdh.virginia.gov/drinking-water/fcap/leap/leap-for-homeowners/> (last visited Apr. 3, 2024).

61. *Lead and Copper Rule Revisions, Service Line Inventory Requirements*, MD. DEP'T OF ENV'T, https://mde.maryland.gov/programs/water/water_supply/Documents/MDE_LCRR_SL_Inventory_Guidance.pdf (last visited Nov. 20, 2023).

62. *Id.*

63. Elise Deshombres et al., *Short- and Long-Term Lead Release after Partial Lead Service Line Replacements in a Metropolitan Water Distribution System*, 51 ENV'T SCI. & TECH. 9507, 9507 (2017); Evelyne Doré et al., *Study of the Long-Term Impacts of Lead Release from Full and Partially Replaced Harvested Lead Service Lines*, 149 WATER RES. 566, 566 (2018); Justin St. Clair et al., *Long-Term Behavior of Simulated Partial Lead Service Line Replacements*, 33 ENV'T ENG'G SCI. 53, 53 (2016).

64. Deshombres et al., *supra* note 63, at 9507.

65. Gregory Welter et al., THE WATER RSCH. FOUND., *Galvanic Corrosion Following Partial Lead Service Line Replacement*, 178-79 (2013).

66. Cyndi Roper, *The Hidden Costs & Dangers of Partial Lead Pipe Replacements*, NAT. RES. DEF. COUNCIL (Mar. 12, 2018), <https://www.nrdc.org/bio/cyndi-roper/hidden-costs-dangers-partial-lead-pipe-replacements>.

67. Melissae Fellet, *All or Nothing is a Better Strategy for Keeping Drinking Water Lead Levels Low*, CHEM. & ENG'G NEWS (July 13, 2016), <https://cen.acs.org/articles/94/web/2016/07/nothing-better-strategy-keeping-drinking.html>.

68. Deborah L. Swackhamer & Jeffrey K. Griffiths, *SAB Evaluation of the Effectiveness of Partial Lead Service Line Replacements*, EPA (Sept. 28, 2011), https://www.epa.gov/sites/default/files/2015-09/documents/sab_evaluation_partial_lead_service_lines_epa-sab-11-015.pdf.

Additionally, partial replacements are more likely to occur in low-income neighborhoods, as those who are unable to afford the cost of private replacements will opt for partial replacements instead.⁶⁹ States such as Michigan, New Jersey, and Illinois⁷⁰ have all banned partial LSL replacements, except in the case of emergency, to protect the health and well-being of their most vulnerable residents. Tenants, a uniquely vulnerable group, and low-income homeowners no longer have the option to partially replace lead service lines because of the increased risk. Funding partial replacements creates a heightened health risk to residents and increases the disparity between wealthier communities who can afford a full replacement.⁷¹ While the risks of lead contamination are concerning and require immediate action, partial replacements cause more harm than good.⁷² The cost inefficiencies, increased risk of contamination, and disproportionate impact on historically marginalized communities all emphasize the adverse impact of partial replacements.

C. Models of Successful State-Led Lead-Pipe Replacement Initiatives

Recognizing this widespread issue and its effects on vulnerable populations, many states have implemented policies for LSL. Unlike the District's current replacement plan, which requires homeowner consent, various states around the country have mandated full LSL removal for all residents.⁷³ For example, Madison, Wisconsin, successfully passed legislation mandating the replacement of all its lead pipes in 2001.⁷⁴ However, there was pushback from homeowners due to the cost-sharing model and a long battle with regulators and lawmakers based on the mandated replacement requirement rather than offering a voluntary system.⁷⁵ Madison is one of the first cities to require full replacements for all residents rather than follow a voluntary model.⁷⁶ However, homeowners had to pay for the pipe replacements on their private property, costing around \$1,300 individually (half of which was later reimbursed by the city).⁷⁷ Ultimately,

69. ENV'T DEF. FUND, LEAD PIPES AND ENVIRONMENTAL JUSTICE 2 (2020).

70. Tom Neltner et al., *State Legislation Requires Replacement of 1/4 of the Country's Lead Pipes*, ENV'T DEF. FUND (July 19, 2021) <https://blogs.edf.org/health/2021/07/19/state-legislation-requires-replacement-of-%C2%BC-of-the-countrys-lead-pipes/>.

71. St. Clair et al., *supra* note 63, at 53.

72. *Id.* at 58-59.

73. D.C. Code § 34-2158 (2024) [hereinafter *Lead Service Line Replacement Assistance*].

74. *Madison Lead Pipe Replacement Program*, CTR. FOR NEIGHBORHOOD TECH., https://cnt.org/sites/default/files/pdf/CaseStudy_Madison.pdf (last visited Apr. 3, 2024).

75. Cheryl Corley, *Avoiding A Future Crisis, Madison Removed Lead Water Pipes 15 Years Ago*, NPR (Mar. 31, 2016) <https://www.npr.org/2016/03/31/472567733/Avoiding-A-Future-Crisis-Madison-Removed-Lead-Water-Pipes-15-Years-Ago>.

76. *Id.*

77. Corley, *supra* note 75.

Madison was able to meet its goal and remove all 8,000 lead water pipes after spending \$15.5 million over 11 years.⁷⁸ Following the success of this program, Lansing, Michigan also replaced its 12,150 lead pipes for an estimated \$44.5 million in 2004, primarily funded by increasing water rates across the city.⁷⁹ The upfront cost for Madison homeowners and the water rate increase for Lansing residents both pose equity concerns, but the system used in Madison isolates the costs to homeowners.⁸⁰ In Lansing, all residents, including tenants and landlords, faced a water-rate increase, spreading the costs over a longer period and a larger population.⁸¹ Both cities successfully removed all LSLs but required financial contributions from citizens, creating a disparate impact on lower-income residents.⁸²

Most notable, however, are the replacements of nearly 24,000 pipes in Newark, New Jersey in under 3 years without a rate increase or requiring homeowners to cover the upfront costs.⁸³ A \$120 million bond from Essex County allowed officials to implement the replacement plan by spreading the cost widely across all residents and over a longer period through the bond repayment.⁸⁴ This model ensures all residents receive a full replacement and benefits the city by reducing the social and economic costs of lead exposure. The city adopted an ordinance to mandate the replacements of all lead service lines to expedite the process.⁸⁵ The city ordinance also allowed for city officials to replace the lead line even if property owners were not available to provide consent—a particularly important aspect in a city where more than 70% of residents rent property (and landlords may be inaccessible during the replacement process).⁸⁶ While some homeowners may object to this, the interest in public health and safety provides a good reason for the government to conduct the replacements without consent.⁸⁷

78. *Id.*

79. *Lansing Lead Pipe Replacement Program*, CTR. FOR NEIGHBORHOOD TECH., https://cnt.org/sites/default/files/pdf/CaseStudy_Lansing.pdf (last visited Oct. 15, 2023) [hereinafter *Lansing Lead*].

80. Corley, *supra* note 75.

81. *Lansing Lead*, *supra* note 79.

82. *Fact Sheet: The Biden-Harris Lead Pipe and Paint Action Plan*, *supra* note 30 (describing the disproportionate impact of lead exposure on minority and low-income communities, which is further exacerbated by the financial barriers to full LSL replacement).

83. Joan Leary Matthews, *Meeting the Challenge of Lead Service Line Replacements*, NAT. RES. DEF. COUNCIL (May 16, 2022), <https://www.nrdc.org/bio/joan-leary-matthews/meeting-challenge-lead-service-line-replacements>.

84. Mark J. Bonamo, *Essex County Bond Plan Eliminates Need for Newark Homeowners to Pay \$1K For Lead Service Replacement Lines*, TAP INTO NEWARK (Aug. 26, 2019, 3:50 PM), <https://www.tapinto.net/towns/newark/sections/newark-water-crisis/articles/essex-county-bond-plan-eliminates-need-for-newark-homeowners-to-pay-1k-for-lead-service-replacement-lines>.

85. Matthews, *supra* note 83.

86. *Id.*

87. *Id.*

The Biden-Harris Administration has prioritized LSL replacements with a particular focus on vulnerable communities through collaboration with local officials, water utilities, labor unions, and other organizations committed to accelerating lead-pipe replacements.⁸⁸ The District is ahead of many states concerning these goals but there are still many opportunities for environmental justice-focused programs to ensure all residents have access to safe drinking water. These state-led initiatives provide examples of how the District can ensure full LSL replacements at no cost for all communities, regardless of homeowner status, neighborhood location, or access to financial resources.

II. CURRENT LSL REPLACEMENT PLAN IN THE DISTRICT

The increased awareness about lead pipes around the nation and funding for replacements provide a favorable start to eliminating this issue. However, many of these initiatives are not accessible to the areas that need it most.⁸⁹ Vulnerable populations are not effectively receiving funding and many replacement programs are difficult to take advantage of, especially for people of color or low-income populations.⁹⁰

A. The Voluntary Cost-Sharing Model and Partial Replacements Inhibit Equitable Replacement

The District, like many other cities with lead service line replacement initiatives, requires property owners to cover part of the cost of replacements, creating a direct financial barrier for full replacements.⁹¹ As the NRDC noted, this program is “likely causing a true environmental injustice” because lower-income residents, who are predominantly in Black communities, may not be able to pay for LSL replacements.⁹² Those who cannot afford the upfront cost, which averages to around \$2,000 but can be as expensive as

88. See H.R. 3684, 117th Cong. (2021) [hereinafter *Bipartisan Infrastructure Law*] (prioritizing the elimination of lead service lines in the United States and providing an investment of \$55 billion in funding for states and local communities to expand access to clean drinking water); see also Deidre McPhillips, *EPA Proposes Requirement to Remove Lead Pipes from U.S. Water Systems Within Ten Years*, CNN (Nov. 30, 2023, 6:00 AM EST), <https://www.cnn.com/2023/11/30/health/lead-water-pipes-removed-10-years-epa-proposed-rule/index.html> (describing the proposed EPA rule as of Nov. 30, 2023, which would accelerate LSL replacement goals to eliminate nearly all lines nationwide within the next 10 years).

89. ENV'T DEF. FUND, *supra* note 69, at 8.

90. *Id.* at 7–8.

91. *Lead Pipe Replacement and Safer Drinking Water*, DEP'T OF ENERGY & ENV'T, <https://doee.dc.gov/service/lead-pipe-replacement-and-safer-drinking-water> (last visited Apr. 3, 2024).

92. Erik Olson, *Here's What's Needed to Fix the EPA's Outdated Lead in Tap Water Rule*, NAT. RES. DEF. COUNCIL (Oct. 9, 2019), <https://www.nrdc.org/bio/erik-d-olson/heres-whats-needed-fix-epas-outdated-lead-tap-water-rule>.

\$10,000, will often opt for the more dangerous but more affordable partial replacements.⁹³ Based on a study conducted in the District from 2009-2018, a neighborhood's household income is a major predictor of whether the LSL replacement is full or partial.⁹⁴

The current laws in place disadvantage renters and therefore disproportionately impact lower-income and minority populations. D.C. Code section 34-2158 bars partial LSL replacements by the District of Columbia Water and Sewer Authority (D.C. Water), which includes all lines located under public property.⁹⁵ However, the replacement of lines on private property is subject to the consent of the property owner.⁹⁶ The law does not require notification to or consent from tenants.⁹⁷ Under the current law, a property owner may consent to a partial replacement, or D.C. Water may follow through with a partial replacement if there is no response from the property owner within 120 days.⁹⁸ Additionally, the code allows for partial replacements if "necessary to repair a damaged or leaking water service line" and requests the consent of the private property owner.⁹⁹ D.C. Water will cover the cost of the replacements on the public property but property owners are responsible for paying for the private LSL replacements.¹⁰⁰

If D.C. Water does not have sufficient funds from the District or the private property owner to replace a portion of a lead water service line on private property, D.C. Water shall not replace the portion of the lead water service line on public property unless:

(A) The replacement is necessary to repair a damaged or leaking lead water service line; or

(B) In the event of an exceedance of a lead action level, the replacement is required pursuant to 40 C.F.R. § 141.84 to address the lead exposure.¹⁰¹

93. Tom Neltner, *An Environmental Justice Case Study: How Lead Pipe Replacement Programs Favor Wealthier Residents*, ENV'T DEF. FUND (Jan. 4, 2022), <https://blogs.edf.org/health/2022/01/04/an-environmental-justice-case-study-how-lead-pipe-replacement-programs-favor-wealthier-residents/>.

94. *Id.*

95. *Id.* § (a)(1).

96. *Id.*

97. *Id.*

98. *Id.* § (B).

99. *Id.* § (C).

100. *Lead Service Line Replacement Assistance*, *supra* note 73, § (3).

101. *Id.* § 4(B).

Based on this law, a lead service line will not be replaced if D.C. Water does not have adequate funds and property owners cannot afford the costs.¹⁰² While this is a good choice to avoid partial replacements, it results in a disproportionate impact on vulnerable communities not receiving any replacements.¹⁰³ A study conducted on more than 3,400 LSL replacements in the District found significant disparities between low- and high-income neighborhoods by creating financial barriers for lower-income populations.¹⁰⁴ Only 0.1% of residential service lines were replaced in neighborhoods with low median household incomes and the highest percentage of Black households. This is compared to 2.3% of households voluntarily replacing lead service lines in neighborhoods with nearly double the median household income and a majority of non-Black residents.¹⁰⁵ Higher-income neighborhoods have a higher probability of paying for the full replacement of an LSL, while residents in lower-income neighborhoods are more likely to opt for partial LSL replacements and accept the risk of greater lead exposure that comes from that process.¹⁰⁶ Predominantly minority wards with lower household incomes had around 40% full replacement rates, compared to a 73% replacement rate for high-income, less diverse neighborhoods.¹⁰⁷ The direct link between racial segregation and environmental hazards, which contributes to poor health outcomes, emphasizes the need for LSL replacement plans to place a particular focus on vulnerable populations.¹⁰⁸ With a greater risk of lead exposure and fewer resources to address lead contamination, lower-income and minority populations need LSL replacement initiatives with a focus on environmental justice.¹⁰⁹

Additionally, residents who rent rather than own property must rely on their landlords to initiate the process. Although a little over half of District residents rent their homes, there is a clear disparity between Black and white families.¹¹⁰ As of 2019, more than 72% of white families own their homes compared to 42% of Black families owning their homes.¹¹¹ Generally, people with lower incomes as well as Black and Hispanic Americans are more likely

102. *Id.*

103. Neltner, *supra* note 93.

104. *Id.*

105. ENV'T DEF. FUND, *supra* note 69, at 7.

106. Neltner, *supra* note 93.

107. Baehler et al., *supra* note 53, at 362.

108. ENV'T DEF. FUND, *supra* note 69, at 2.

109. *Id.*

110. Ally Schweitzer, *For Many Black Washingtonians, Homeownership Remains Out of Reach*, NAT'L PUB. RADIO (Feb. 14, 2020), <https://www.npr.org/local/305/2020/02/14/806030768/for-many-black-washingtonians-homeownership-remains-out-of-reach>.

111. ALANNA MCCARGO & JUNG HYUN CHOI, *CLOSING THE GAPS: BUILDING BLACK WEALTH THROUGH HOMEOWNERSHIP* 4 (Urb. Inst. ed., 2020).

to rent rather than own.¹¹² There is current legislation in place to ensure landlords disclose the existence of known lead water pipes to tenants¹¹³ with civil fines and penalties imposed on owners for failure to do so.¹¹⁴ Although this is an important first step in protecting tenants, there can still be delays in information sharing and action being taken.¹¹⁵

Moreover, requiring customers to pay for the LSL replacements raises environmental justice concerns, especially in neighborhoods predominantly comprised of people of color.¹¹⁶ Even for homeowners who have complete control over replacing their LSLs, the upfront costs nonetheless provide obstacles to obtaining a full replacement. However, the current system of lead service line replacements follows a cost-sharing model, where property owners financially contribute to the pipe replacements.¹¹⁷ This will result in slower rates of pipe replacements for low-income, minority, and other vulnerable populations, leading to more adverse health risks.¹¹⁸ Additionally, it may incentivize more low-income residents to opt for partial replacements of pipes rather than full, creating more potentially harmful risks for already vulnerable communities.¹¹⁹

B. Lead-Free D.C. by 2030

The District has responded to this complex problem in 2019 with the Lead-Free DC Initiative—a plan to replace all pipes by 2030.¹²⁰ The Initiative plans to “accelerate lead line replacement” of the estimated 41,157¹²¹ service lines that still contain lead or galvanized iron pipe. In the four years since this program was enacted, the District has replaced a little over 4,000 LSLs.¹²² In June 2023, the District provided an updated program

112. Katherine Schaeffer, *Key Facts About Housing Affordability in the U.S.*, PEW RSCH. CTR. (Mar. 23, 2022), <https://www.pewresearch.org/short-reads/2022/03/23/key-facts-about-housing-affordability-in-the-u-s/>.

113. Amendment to Lead Service Line Priority Replacement Assistance Act of 2004, 22-567 (D.C. 2019).

114. Neltner, *supra* note 93.

115. See Press Release, U.S. Dep’t of Hous. & Urb. Dev., Landlord Pleads Guilty to Lying About Lead Paint Hazards (July 11, 2001) (on file with HUD archives) (providing an example of a nine-year delay between enactment and enforcement of federal lead paint notification requirements, during which time many tenants were unknowingly exposed to lead contamination).

116. Neltner, *supra* note 93.

117. Baehler et al., *supra* note 53, at 354.

118. *Id.*

119. *Id.*

120. DC WATER, LEAD SERVICE LINE REPLACEMENT PLAN (2023).

121. See *id.* at 4 (providing a number update from the initial estimate of 28,000 pipes in 2019. This estimation is based on the number of pipes with verified and suspected lead plus a portion of the remaining pipes with no information about lead levels at the moment).

122. *Id.* (citing the introduction statement from DC Water’s CEO and General Manager, David L. Gadis).

emphasizing an “aggressive” approach to still meet the 2030 deadline, highlighting that securing further funding is essential to stay on track.¹²³ This model is based on the Biden-Harris Justice40 Initiative to “prioritize lead service line removal in disadvantaged communities that are already marginalized, underserved, and overburdened by pollution.”¹²⁴ D.C. Water has estimated it will cost \$1.51 billion to fund the entire Lead-Free by 2030 Initiative while still needing ratepayer contributions based on the number of LSLs to replace and the focus on providing discounted or free replacements to vulnerable communities.¹²⁵

The current funding model for Lead-Free DC incorporates a form of cost-sharing, requiring homeowners to contribute to the cost of the lead pipe replacements. Out of the total \$1.51 billion needed to meet the goal, the source of \$885 million, which is 58% of the total amount, has not been identified yet.¹²⁶ There are many sources of federal funding for Lead-Free DC, including the Bipartisan Infrastructure Bill contributing \$143 million (10%), the American Rescue Plan Act (ARPA) committing \$15 million (1%), and D.C. Water’s Capital Improvement Program Budget providing \$471 million from ratepayers (31%). However, there is still a large gap in meeting the required amount needed to successfully complete the program.¹²⁷

Perhaps the biggest obstacle to achieving Lead-Free by 2030 is obtaining adequate funding sources to ensure vulnerable populations have equal access to LSL replacements.¹²⁸ A variety of District-specific programs offer sources of funding directly to residents to cover the costs of private LSL replacements. For example, the Lead Pipe Replacement Assistance Program allows property owners to recover some or all of their incurred LSL replacement costs, depending on household size and income.¹²⁹ Through the Department of Energy and the Environment (DOEE), District residents may apply for assistance to fully cover the cost of LSL replacements, but the process is lengthy and requires collaboration between DOEE, D.C. Water, the property owner, and all household residents.¹³⁰

Additionally, the District’s General Fund has allocated a Lead Service Line Priority Replacement Assistance Fund (“D.C. Fund”) to provide homeowners with grants of up to \$2,500 for private LSL replacement assistance.¹³¹ According to the D.C. Code, households with known lead

123. *Id.* at 1.

124. *Id.* at 9.

125. *Id.* at 18.

126. *Id.*

127. *Id.*

128. *Id.* at 19.

129. *Lead Pipe Replacement Assistance Program*, DEP’T OF ENERGY & ENV’T, <https://doee.dc.gov/node/1451331> (last visited Nov. 29, 2023).

130. *Id.*

131. D.C. CODE § 34-2151.

service lines and an income of 60% or less than the average area income are eligible for this grant, and allocation of grants will prioritize vulnerable populations such as children, and women who are nursing or pregnant.¹³² The D.C. Fund uses a tiered approach based on household income to determine the percentage of total incurred costs that can be reimbursed.¹³³ The Lead Pipe Replacement Assistance Program and the D.C. Fund provide ample resources for residents but require knowledge of their availability in order to be accessed, which can disadvantage vulnerable communities.

III. AMENDING THE PROPOSED LSL REPLACEMENT PLAN BY PRIORITIZING VULNERABLE COMMUNITIES

To ensure that all communities have access to affordable and feasible LSL replacements, the District needs to prioritize vulnerable communities. Specifically, the District should: (1) ban partial replacements of pipes and ensure all initiatives are full LSL replacements; (2) seek more funding options to decrease the burden on homeowners and vulnerable communities through local and federal programs; and (3) offer opportunities for private funding through municipal bonds.

A. The District Must Ban Partial LSL Replacements

Given that vulnerable communities are most at risk of exposure to lead-contaminated water, and they are more likely to opt for partial LSL replacements rather than full LSL replacements based on financial limitations, the District should completely remove the option of partial replacements altogether. By only allowing residents to conduct a full LSL removal, the city will be furthering environmental justice initiatives and ensuring that vulnerable communities do not see exacerbated consequences of this initiative.

The District has already taken a big step in this direction. Past models around the country have emphasized focusing on vulnerable communities and ensuring equitable access to LSL replacements, including Madison, Lansing, and Newark.¹³⁴ Following this, District officials have increased the overall budget for this program to meet its goals. In October 2019, District Mayor Muriel Bowser approved an ordinance to appropriate \$1.8 million to fund the Lead Pipe Replacement Assistance Program, an initiative to address

132. *Id.* § 34-2153.

133. *Id.*

134. *See* discussion *supra* Section I(C).

past partial LSL replacements remaining on private property.¹³⁵ For homeowners who had a partial LSL replacements but were not able to replace the portion on their private property due to financial constraints, this ordinance will reduce overall resident exposure to lead, especially in low-income communities. Prioritizing financial assistance to address partial LSL replacements for homeowners that may have been financially excluded from past programs is an important step in the right direction, especially for environmental justice.¹³⁶ Communities predominantly comprised of people of color and low-income residents already bear a disproportionate burden of lead exposure; financial obstacles only exacerbate the health consequences by delaying full LSL replacements.¹³⁷

A complete ban on partial LSL replacements is less common but certainly possible; Illinois, New Jersey, and Michigan have already enacted a ban on partial replacements and are leading the nationwide effort to replace LSLs in all communities.¹³⁸ Banning partial replacements may slow the overall process because it will require more funding for full replacements; however, it will ultimately decrease the amount of lead exposure to residents, even with a delay in the replacements.¹³⁹ A partial replacement may seem more attractive for its efficiency, but District officials should properly conduct full replacements and ensure equitable access across all neighborhoods.¹⁴⁰ A replacement is reliant on coordination between a variety of stakeholders—including property owners, city officials, water-service providers, and tenants—which may lengthen the process, but will ultimately result in an overall benefit to all.¹⁴¹

This is also an attractive option for low-income households who may not have the resources to pay for a full replacement but would like to take steps toward addressing their lead service lines.¹⁴² However, it is ultimately a more expensive and dangerous process than opting for a full replacement.¹⁴³ Additionally, it creates a risk of future contamination when the remainder of

135. Tom Neltner, *City of Washington, DC Requires Lead Pipe Disclosure and Tackles Past Partial LSL Replacements*, ENV'T DEF. FUND (Jan. 28, 2019) <https://blogs.edf.org/health/2019/01/28/dc-lsl-disclosure-partial-lsl-replacements/>.

136. *Id.*

137. ENV'T DEF. FUND, *supra* note 69, at 2, 11.

138. Neltner et al., *supra* note 70.

139. Roya Alkafaji, *EPA Should Ensure Federal Funds Do Not Support Harmful Partial LSL Replacements*, ENV'T DEF. FUND (Nov. 8, 2022), <https://blogs.edf.org/health/2022/11/08/epa-should-ensure-federal-funds-do-not-support-harmful-partial-lsl-replacements/>.

140. Suchi Saxena et al., *Lead Service Line Replacement Stakeholders Gather at Chicago Fed to Share Fundings and Financing Strategies*, FED. RESERVE BANK OF CHI. (Dec. 2022), <https://www.chicagofed.org/research/lead/lead-service-line-replacement-funding-and-financing-strategies>.

141. *Id.*

142. *Id.*

143. Alkafaji, *supra* note 139.

the line is eventually replaced.¹⁴⁴ Dividing LSL replacements across different intervals runs the risk of disturbing the lead pipes multiple times and heightens the risk of contamination; replacing the entire service line at one time is the safest option.¹⁴⁵

B. Reallocate and Centralize District Funding

Given the disparity in access to these types of resources for vulnerable populations, the best route would be for the District to first obtain funding for the program directly and then provide free LSL replacements for all residents. This funding is already set aside for LSL replacements to ease the financial burden for homeowners, so the District should reallocate these resources to Lead-Free DC and offset the costs imposed on property owners. This achieves the same goal of providing equitable access to lead-free water but removes the barriers for disadvantaged and vulnerable communities.

While these external sources of funding may not cover the entirety of the remaining \$885 million needed to meet the goals of the Lead-Free DC plan, they could provide a starting point for filling this gap. Additionally, by pooling all LSL replacement funding available for residents, the District could streamline the accessibility and allocation of these resources. Rather than disperse financial resources across different organizations and require different processes for obtaining it, residents could work directly with D.C. Water to get funding for full LSL replacements. This would eliminate bottlenecks in the process because residents would not have to wait for reimbursement approval from an external source before requesting LSL replacements with D.C. Water. The District could also create a tiered process wherein wealthier communities contribute a certain amount of money that is funneled to disadvantaged communities. This system could rely on overall household income, the number of residents per household, history of segregation in particular neighborhoods, and other vulnerability assessments.

C. Issue Municipal Bonds

Another option is for the District to offer a municipal bond to help fund the LSL replacement plan. The \$4 trillion municipal bond market has the capacity to finance funding gaps, and LSL replacements could be an attractive initiative for these private capital markets.¹⁴⁶ A bond used to finance major water system infrastructure improvements is an attractive opportunity for investors given the low default rates and market rates of

144. *Id.*

145. *Id.*

146. Saxena et al., *supra* note 140.

return. Under D.C. Code section 1-204.61, the District may issue “general obligation bonds” for capital projects, which it has done in the past for a variety of public initiatives—including Washington Metropolitan Area Transit Authority improvements in 2023 to expand the metro rail to Dulles International Airport.¹⁴⁷ Given the large amount of money needed, D.C. Water will need high credit ratings to attract private capital investments at low rates. However, other cities have used municipal bonds for water infrastructure projects, providing an example of how this can be accomplished successfully.

For example, Denver, Colorado also uses bond sales to finance water infrastructure projects.¹⁴⁸ Recently, the city brought in \$350 million, the largest bond sale in Denver Water’s history, from two major credit agencies to finance a five-year capital program that includes replacing LSLs throughout the community.¹⁴⁹ This recent sale had the lowest interest rate ever seen for a Denver Water bond sale, allowing the city to repay bonds with funds from water sales over a 30-year period.¹⁵⁰ Investors also benefit from purchasing the bonds from Denver Water, which has a triple-A rating for its financial stability.¹⁵¹ This emphasizes the incentive for the District to request bond funding for LSL replacements; establishing relationships with credit agencies can prove the city’s financial stability and pave the way for future investment opportunities.

While this may seem like a lofty goal, using municipal bonds for city-funded projects has been successfully implemented before. In Buffalo, New York, the Buffalo Sewer Authority issued environmental impact bonds to finance sewage infrastructure improvements.¹⁵² Morgan Stanley priced these tax-exempt bonds with the option to refinance or retire the bonds after seven years, providing financial flexibility and lower debt-service costs.¹⁵³ There is a significant benefit to following this example; prioritizing LSL replacements is a sound investment for the city itself. The Environmental Defense Fund estimates that each full LSL replaced would yield \$22,000 in societal benefits

147. D.C. CODE § 1-204.61 (1997); *Metropolitan Washington District of Columbia Airports Taxable Dulles Metrorail Capital D*, MUNICIPALBONDS.COM, <https://www.municipalbonds.com/bonds/issue/592643BS8/> (last visited Apr. 3, 2024).

148. Cathy Proctor & Jay Adams, *Investing \$2.4 Billion into the System Serving 1.5 Million People*, DENVER WATER (Oct. 12, 2022) https://www.denverwater.org/tap/investing-23-billion-system-serving-15-million-people?size=n_21_n.

149. *Id.*

150. Cathy Proctor, *Denver Water’s Record Bond Sale Helps Keep Water Rates Low*, YOURHUB (May 17, 2021), <https://yourhub.denverpost.com/blog/2021/05/denver-waters-record-bond-sale-helps-keep-water-rates-low/277994/>.

151. *Id.*

152. Saxena et al., *supra* note 140.

153. Chip Barnett, *Buffalo Sewer Authority Closes on Largest U.S. Environmental Impact Bond*, BOND BUYER (June 28, 2021), <https://www.bondbuyer.com/news/buffalo-sewer-authority-sells-largest-u-s-environmental-impact-bond>.

from reduced mortality from cardiovascular disease alone.¹⁵⁴ This yields a return of over three dollars per dollar invested. Additionally, a 2019 study showed that removing lead from the entire state of Minnesota would cost anywhere between \$1.5 and \$4.1 billion over 20 years, but that the benefits, including “mental acuity and IQ” improvements and the “resulting increases in lifetime productivity, earnings, and taxes paid” would range from \$4.2 to \$8.5 billion.¹⁵⁵ Offering a municipal bond will bring more awareness about LSL replacement programs to private companies and offer the District the financial resources needed to ensure it is done equitably for all residents.

CONCLUSION

In general, LSL replacement plans are a high priority nationwide, and the District has received a lot of attention for its plan. Given the significant health risks of lead poisoning and the dangers of long-term exposure, replacement initiatives should ensure that low-income and minority groups have adequate resources to access safe water. Although the District has ambitious goals to provide clean water for all its residents by 2030, there are gaps in the framework that disproportionately threaten vulnerable communities. The voluntary cost-sharing model of LSL replacements currently in place is an inequitable proposal and threatens the safety of many District residents, particularly those who rent or rely on external consent to initiate the replacement process. Additionally, partial LSL replacement methods increase the risk of lead exposure, a practice that is more likely to occur in communities with at-risk populations.

The disproportionate impact of lead poisoning on vulnerable populations emphasizes the need for a government-led replacement program at no cost to its residents. To ensure environmental justice goals are reached, the District should ban partial replacements altogether and mandate full replacements for all LSLs. Through a centralized funding source and municipal bonds, the District can ensure a healthier and more equitable community by providing the financial resources for mandatory full LSL replacements for residents. Lead-Free DC by 2030 can be achieved as long as vulnerable communities are prioritized and supported throughout the process.

154. See Neltner, *supra* note 14 (explaining how EDF estimates that each full LSL replaced would yield \$22,000 in societal benefits).

155. *Lead in Minnesota Drinking Water: Assessment of Eliminating Lead in Minnesota Drinking Water*, MINN. DEP'T OF HEALTH DIV. (Mar. 8, 2019), <https://www.health.state.mn.us/communities/environment/water/docs/leadreport.pdf>.