City of Duluth
Water System Needs
2023

Summary of System

- Treatment Plant
- Pump Stations & Reservoirs
- 433 miles of distribution pipe
  - Ranging in size from 1 inch to 48 inches
  - Ranging in age from new to 143 years old

System Components

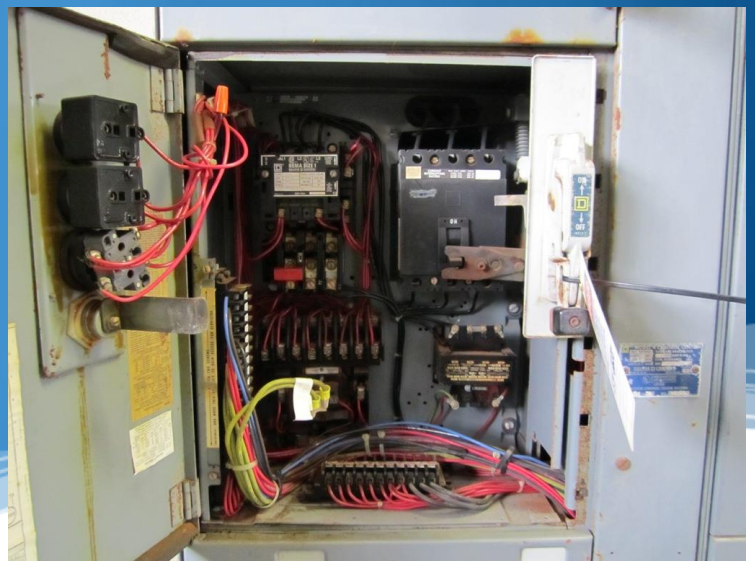
- Water Treatment Facility
  - Pump House (1898) & Lakewood Treatment Plant (1975)
- Transmission mains
  - 42” (1898)
- Pump stations
  - 12 pumping facilities throughout system
- Reservoirs
  - Over 67 million gallon capacity
- Distribution mains
  - Over 430 miles of mains
- Service lines
  - Estimated more than 10,000 lead services of about 31,000 total services on system

Lakewood Water Treatment Facility

- Original pump station built in 1898 still in use
- Original filtration plant built in 1975
- Much of the equipment is original and needs replacement
- Corrosion due to high moisture levels

Lakewood Water Treatment Facility

- Electrical upgrades include Generator/Power project planned for 2024-25 with Resiliency Grant - $8,000,000



Lakewood Water Treatment Facility

- 2 sets of pumps: 1 Low (from lake) & 1 High (treated to distribution system) alternate operation of sets
- Rated for 32 million gals./day (mgd)
- Average Daily Volume of 9.7 million gallons is pumped through our system
- Estimated cost >$3,000,000

Lakewood Water Treatment Facility

- Pump Station & Filtration Building roof and building structural repairs: $1,850,000

Lakewood Water Treatment Facility

- Other improvements/replacements over next 15 years - $30 million
- City submitted $13,400,000 State Bond (2024) request for equipment, building repairs, and filter improvements

42 Inch Water Main

- 1935 maintenance

42 Inch Water Main
Riveted Steel Main

- Installed in 1898
- 49,224 feet in length
- Bad break in 2015
- >$20,000,000 replacement cost

42 Inch Water Main

- Break (crack) at 63rd Avenue East

Pumping Stations

- 12 Pumping Stations are required to move water throughout the city
- A breakdown at a major station could put thousands of homeowners out of water
- Middle Booster was replaced in 2022
- Woodland Booster is planned for 2024-2025
- Other pump stations continue aging

Pumping Stations

- Woodland Pumping Station (34th Ave E & 4th St)

Pumping Stations

- Pumps and controls over 50 years old
- Replacement parts not available
- $300,000 in electrical upgrades planned for 2024 (Proctor, Lakeside, Orphanage)

Reservoirs & Tanks

- Reservoirs & Tanks in fair to good shape
- Leak repair, lining and coating expected in 10 years
- Tank replacement for Upper Lakeside in 2025 currently estimated at $500,000

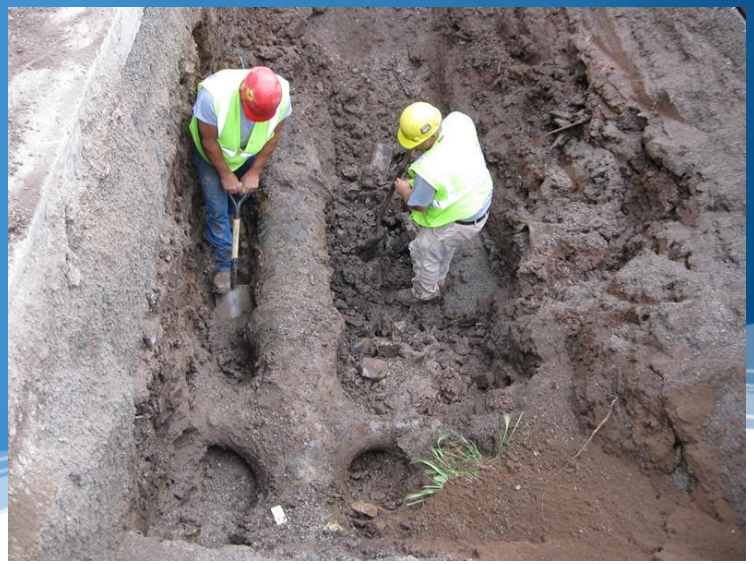
Age of Water Mains

Decade	Age	Length of Pipe (Miles)
1880-1889	134-143	25.38
1890-1899	124-133	26.46
1900-1909	114-123	39.08
1910-1919	104-113	74.84
1920-1929	94-103	44.42
1930-1939	84-93	20.97
1940-1949	74-83	23.95
1950-1959	64-73	34.36
1960-1969	54-63	26.10
1970-1979	44-53	26.81
1980-1989	34-43	14.57
1990-1999	24-33	24.58
2000-2009	14-23	43.62
2010-2019	4-13	25.19
2020-2023	0-3	7.15

Age of Water Mains

- Approximately 50% of the system is greater than 90 years old

- 50 miles of pipe were installed before 1900

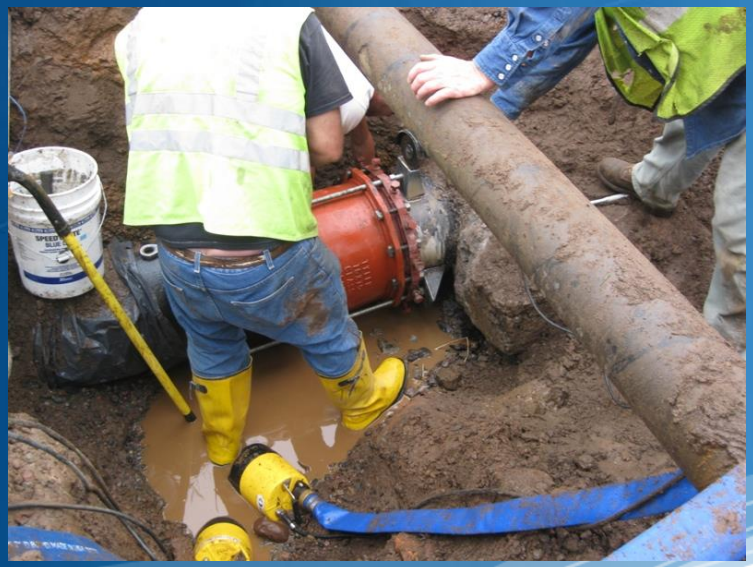


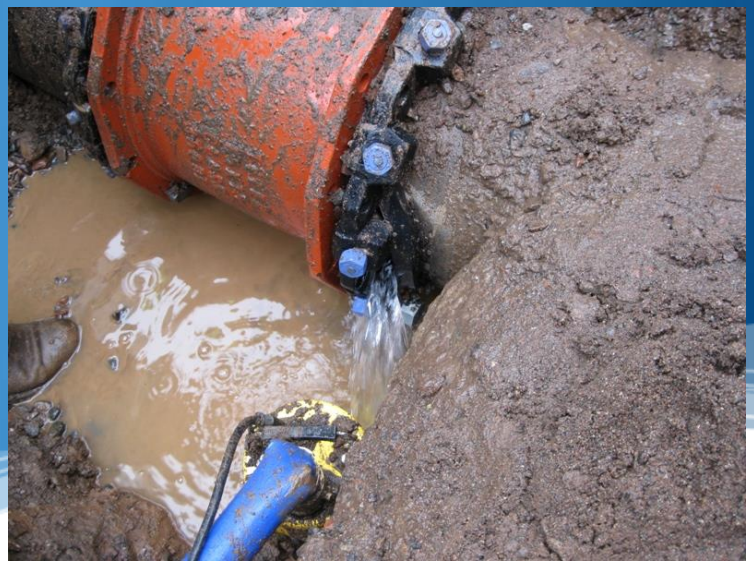
Water Main Breaks and Leaks

- Breaks must be fixed immediately
- Leaks can be fixed the following day

Water Main Breaks

- 51 breaks in 1971
- 195 breaks in 2002 (highest year)
- Average 107 breaks per year (2010-2019)
- Average cost per break of $11,000
- Annual repair cost 107 x $11,000 = $1,177,000





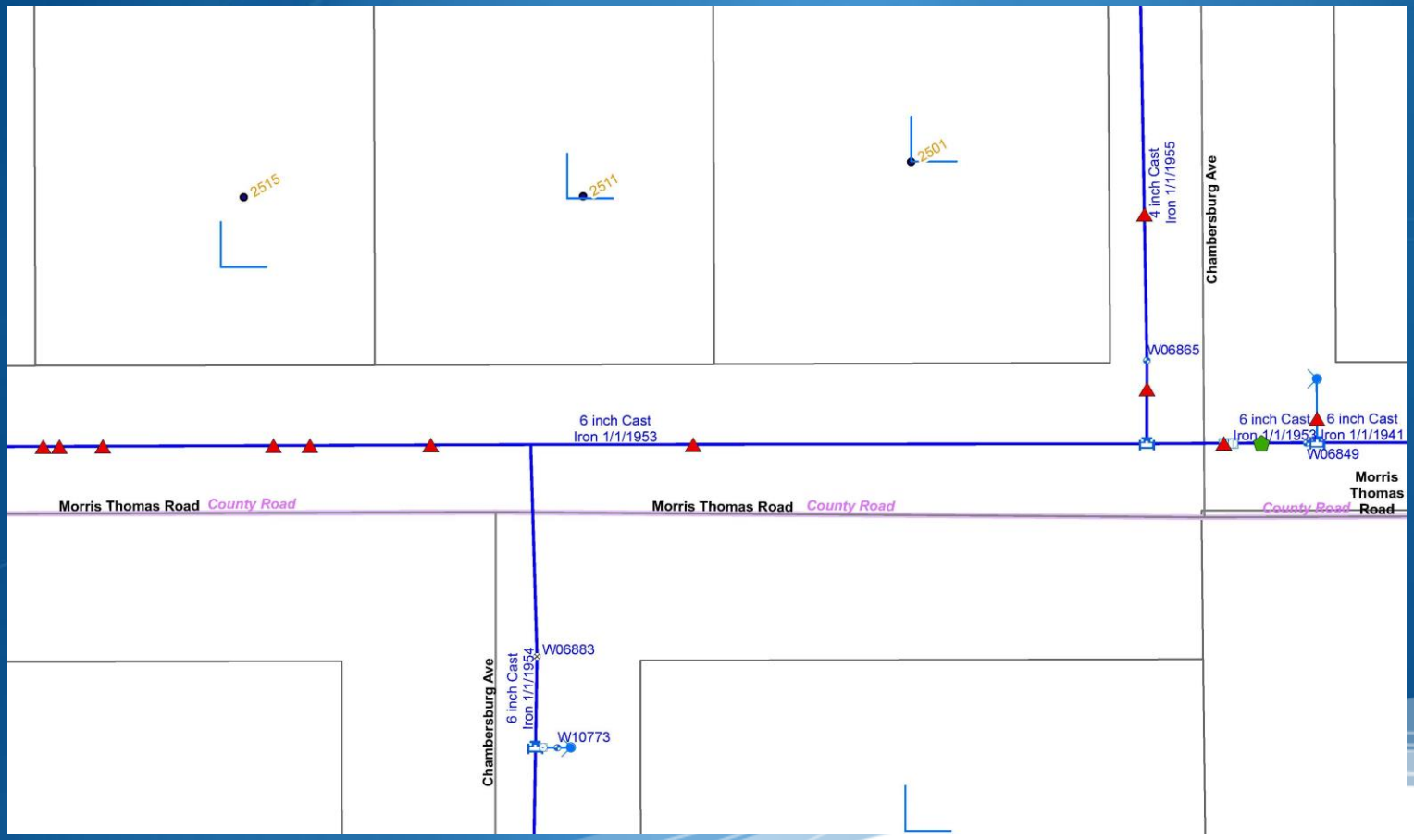
Water Main Breaks

Average Water Main Breaks per Year per Decade

Decade	Breaks per Year
1930s	4
1940s	6
1950s	11
1960s	30
1970s	50
1980s	55
1990s	55
2000s	141
2010s	107
2020s (thru 2022)	95

Water Main Breaks

Database Image of Breaks Shown on GIS Mapping



Water Main Leaks

- Water leaks within the city are also excessive
- Average 80 main leaks per year
- Typical water loss in range of 10%-15% of total water supply
- Lost water costs $1,500,000 a year

Water Main Leaks

- 80 total water leaks per year
- Current annual repair cost 80 x $11,000 = $880,000

Total Repair Costs

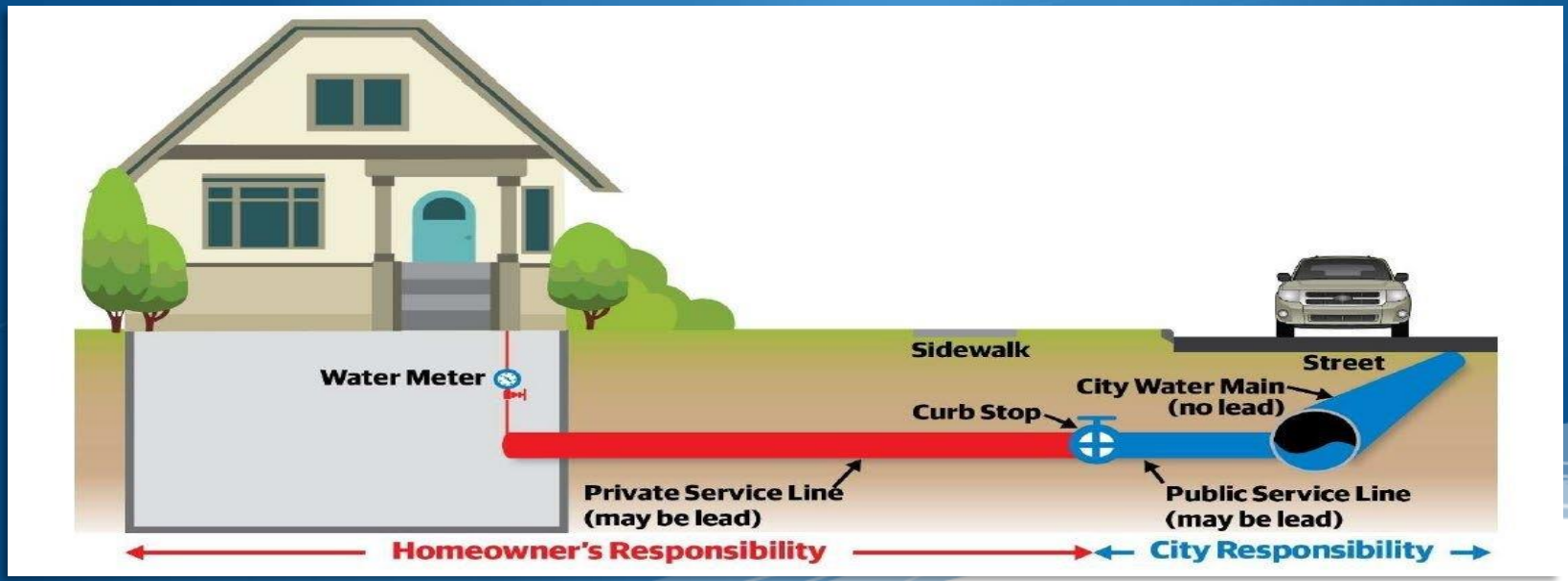
- 187 repairs per year X $11,000 per repair = $2,057,000 per year in repairs
- Cost for lost water: $1,500,000
- Total annual cost for deteriorating water mains equals $3,557,000

Replacement Schedule

- Assumed pipe life of 100 years
- 433 miles of pipe
- 433 ÷ 100 = 4.33
- Need to replace 4.33 miles of pipe per year to keep up with old pipe plus pump station, reservoir and water plant upgrades
- Current replacement average is 2.5 miles per year
- This ignores poor quality pipe from 50's and 60's

Lead Water Services

- EPA rules changes effective in October 2024 require removal of lead from water supply
- Federal and State funding authorized
- Public Facilities Authority (PFA) to distribute grants and loans soon



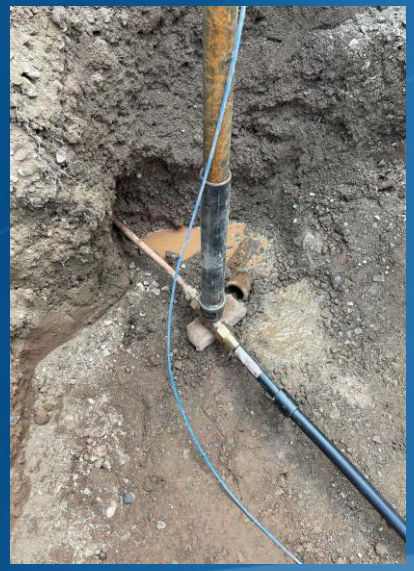
Lead Water Services

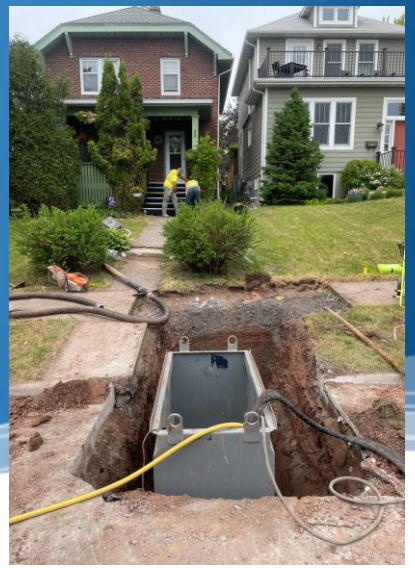
Current City of Duluth activities:

- Inventory, water sampling, filter pitcher program, and public education
- Water meter replacements $6.5M (American Rescue Plan (ARP) funded)
- Annually, Utility Operations replaces up to 40 public service lines for about $9,000 per service = $360,000 investment
- ARP funded $1.5M “pilot” project replacing both public and/or private service lines for 94 homes on East 8th St. between 8th and 14th Avenues East
- 2024 Replacement projects design in process

Lead Water Services

- 31,000 total water services
- We expect 9,000 to 11,000 will be confirmed lead, requiring replacement
- Replacement costs (including both public & private portion of service line) $12,000 to $20,000 per service
- EPA may require 930 services replaced per year
930 x $16,000/service = $14,880,000 per year
- Total for 10,000 services x $16,000 per service = $160,000,000 total in 2023 dollars





Lead Water Services

2024 Replacement Projects

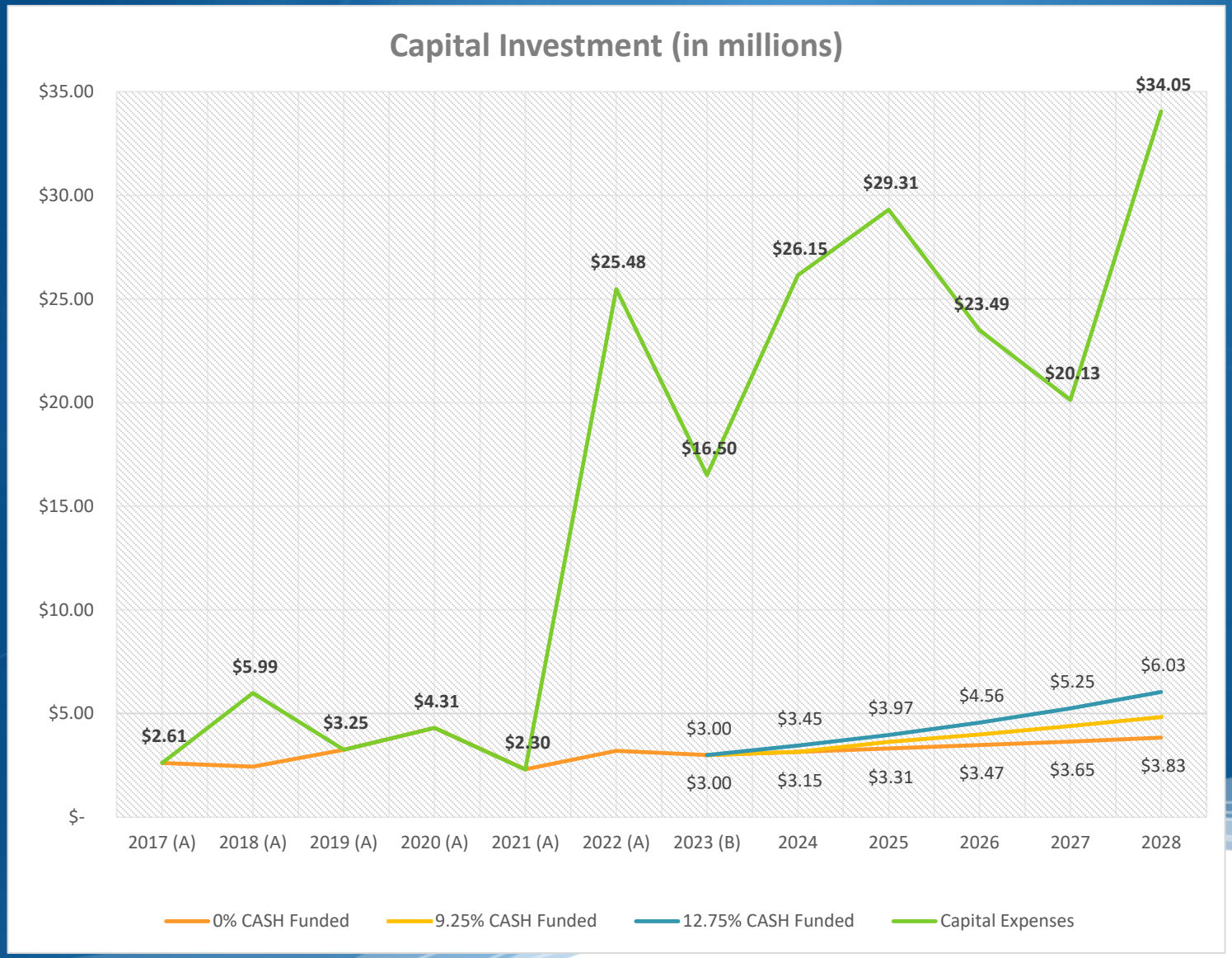
- Locations include: schools & daycares, Gary, New Duluth, Lincoln Park, high priority (broken & compromised lead services, street projects)
- Funding request through MN Public Facilities Authority (PFA) totaling $12,500,000
- Approximately 800 services to be replaced

Lead Water Services

Prioritization

- Sensitive Populations – Infants and Children – Schools and Childcare facilities
- Areas of known high childhood exposure
- Areas with high concentration of lead lines
- Disadvantaged consumers
- High priority locations (compromised services, street projects)

Capital Investment



Proposed Rate Increase

- VOLUME CHARGE - increase of 9.25% per year for 5 years
- Existing (2023) residential volume rate - $4.62/CCF
- Proposed residential volume rate in 2024 - $5.05/CCF
- Proposed residential volume rate in 2028 - $7.19/CCF

Water Rate Increase Average Duluth Home

- Water Volume (6 units)

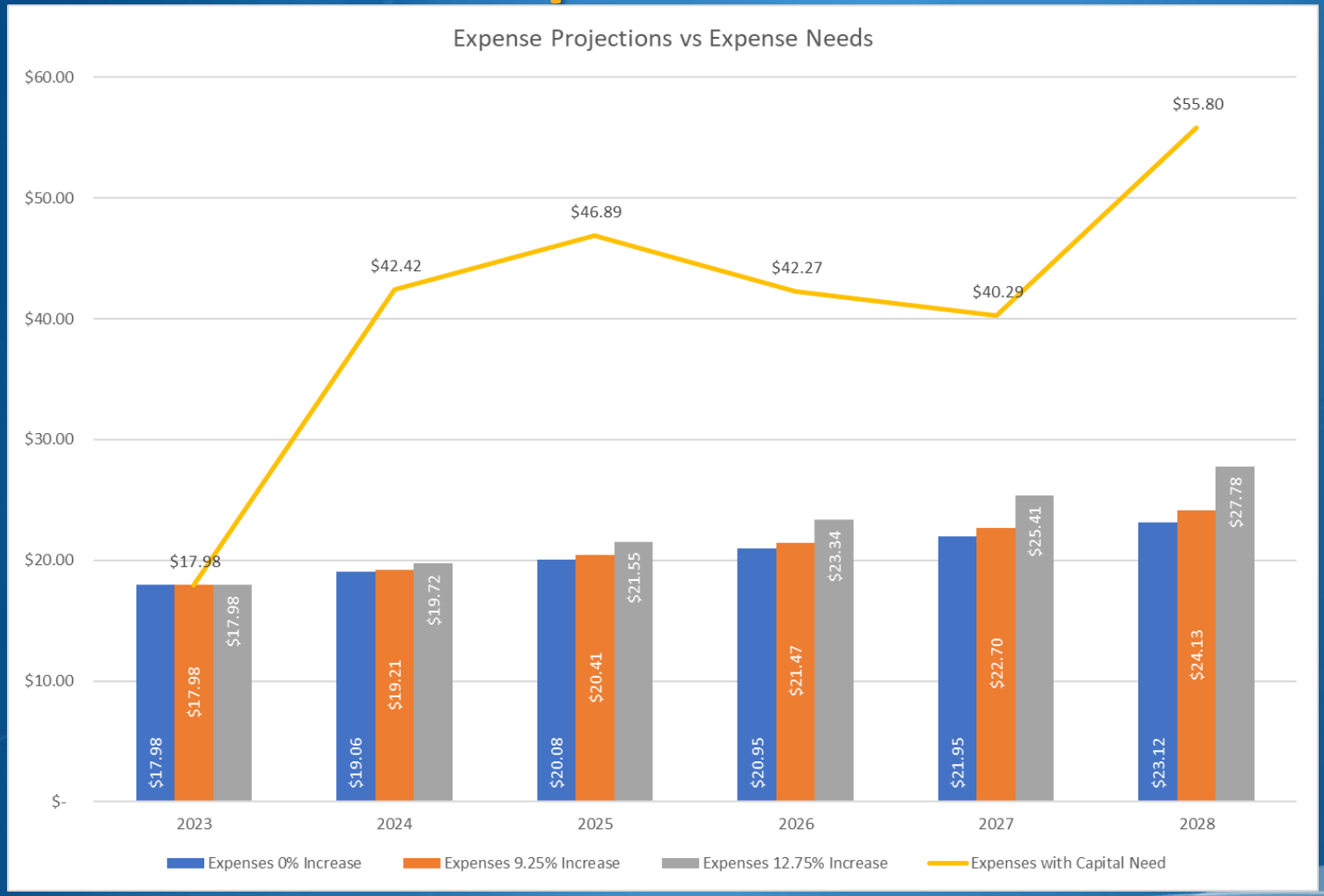
- $2.56 per month increase in year 2024
- $33.99 total water volume bill in 2024
- $12.86 per month increase in year 2028
- $49.51 total water volume bill in 2028 (48% increase)

Rate Increase
Average Single Senior

- Water Volume (2 units)

- $0.86 per month increase in year 2024
- $16.37 total water volume bill in 2024
- $4.28 per month increase in year 2028
- $20.65 total water volume bill in 2028 (26% increase)

Expenses



Expenses with Capital Need shows the projected expenses plus the 5-year capital plan as presented to the DPUC in 2023. To fill the funding gap, the City is pursuing other sources such as federal and state monies as well as issuing debt.

Thank you

Questions?