

BUSINESS CASE

SUMMARY

- Replacement of 11,000 feet of over 75-year old unlined cast iron water distribution pipe with new 8-inch ductile iron (DI) pipe to eliminate the loss of 25 million gallons of water per year (MGY), equal to 0.4% of total production and 1% of total system water loss. (150gal/connection/day*365days)
- SRF loan amount = \$2M
- Water saving (green) portion of loan = 100%
- Annual water savings = 25 million gallons

BACKGROUND

- The water distribution system has approximately 413 miles of distribution pipe ranging from 2 to 48 inches in diameter. The water system is 98% metered and includes master meters (or production meter) at the source water supply (after treatment).
- As part of a water loss management plan, the City of Wilmington calibrates production water meters quarterly. A system-wide leak detection survey is planned for next fiscal year and is anticipated every 2 years, thereafter. Currently, over 30 breaks and leaks per 100 miles occur annually, well over the AWWA target of 15. Over the past 6 years, the City has implemented an aggressive asset rehabilitation program of the water distribution system. The pipes were selected for assessment based on the size of the mains, breakage history, and frequency of water quality complaints.
 - The City has concluded that all unlined, cast iron pipes must be replaced.
- Unlined cast iron pipe accounts for 70% (292 miles) of the 413 miles of distribution pipe. This project will replace 11,000 feet of pipe (2.1 miles or approximately 1.0% of the unlined cast iron pipe) with 8-inch DI pipe.
 - The remaining 30% of the distribution system includes DI pipe installed between 1975 and 2012. Because this pipe has been found to be in better condition, there is no alternative pipe replacement project that would yield the same (or better) water efficiency gains.
- In Fiscal Year, 2011, the water treatment plant processed an average of 17.9 million gallons per day or 6,547 million gallons per year (MGY). Based on the water balance, the system had an authorized water consumption of 3,680 MGY. The total system water loss of 2,925 MGY is the difference between the water produced and the authorized consumption.
- The system water loss is comprised of the following:

- Apparent losses of 27% or 789 MGY, are comprised of unauthorized consumption, customer metering inaccuracies, and systematic data handling errors. Real losses = 2,136 MGY
 - 156 gallons per connection, per day
 - Infrastructure leakage index (ILI) = 13.1

RESULTS

- 130 pipeline repairs were made during the last year. The highest frequency of repairs was in the early 1900s pipes, with most of the repairs occurring on smaller diameter pipe. The leak repair records, the leak detection survey, and condition assessment assisted with determining which sections of distribution mains are most prone to leaks and are the highest priority for replacement.
- The area of interest has experienced a higher rate of water main breaks than many other areas.
- The City has concluded that the average loss from water services is approximately 156 gallons per connection per day
- The area of interest is a densely populated area with many water services that, due to the age of the infrastructure, may contribute to the water leakage.

CONCLUSIONS

- By replacing 11,000 feet of pipe, the City anticipates conserving 25 MGY, therefore, reducing the volume of water withdrawn, treated, and pumped from the reservoir.
- The cost to pump and treat water is \$0.285 per 1,000 gallons. Cost savings from reduced leaks are estimated at \$7,125 (25,000 x \$0.285).
- The energy savings of avoiding pumping the 25 MGY in water lost from the reservoir to the service connection, an elevation difference of 350 feet, is 39,000 kilowatt-hours per year.