Direct testimony of John J. Boisvert

STATE OF NEW HAMPSHIRE
BEFORE THE
NEW HAMPSHIRE PUBLIC UTILITIES COMMISSION

RE: PENNICHUCK WATER WORKS, INC.
DW 18- ___

2018 QUALIFIED CAPITAL PROJECT ADJUSTMENT CHARGE FILING

DIRECT TESTIMONY
OF
John J. Boisvert

February 16, 2018

Professional and Educational Background

Q. What is your name and what is your position with Pennichuck Water Works, Inc.?

A. My name is John J. Boisvert. I am the Chief Engineer of Pennichuck Water Works, Inc. (the "Company" or "PWW"). I have worked for the Company since February 1, 2006. I am a licensed professional engineer in New Hampshire and Maine.

Q. Please describe your educational background.

A. I have a Bachelor of Science degree and a Master of Science degree in Civil Engineering from the University of New Hampshire in Durham, New Hampshire. I also have a Master's degree in Environmental Law and Policy from Vermont Law School in South Royalton, Vermont.

Q. Please describe your professional background.

A. Prior to joining the Company, I served as a Team Leader for Weston & Sampson Engineers of Portsmouth, New Hampshire in their Water Practices Group from 2000 to 2006. Prior to Weston & Sampson I was employed by the Layne Christensen Company of Shawnee Mission, Kansas as Regional Manager for their Geosciences Division in Dracut, Massachusetts from 1994 to 2000. I completed graduate school in 1992 and was employed by Hoyle, Tanner, & Associates of Manchester, New Hampshire as a Project Engineer from 1992 to 1994. Prior to entering full time graduate programs at the University of New Hampshire and Vermont Law School I was employed by Civil Consultants of

South Berwick, Maine as a Project Engineer from 1986 to 1989 and by Underwood Engineers of Portsmouth, New Hampshire as a project Engineer from 1985 to 1986.

Q. What are your responsibilities as Chief Engineer of the Company?

A. As Chief Engineer, I manage and oversee the Company's Engineering Department. I lead the Company's Asset Management program. I, as head of the Engineering Department, am responsible for the planning, design, permitting, construction, and startup of major capital projects, including pipelines, reservoirs/dams, building structures, pumping facilities, treatment facilities, and groundwater supplies. The Engineering Department staff provides regular technical assistance to the Company's Water Supply Department, Distribution Department, Customer Service Department, and Senior Management.

Q. What is the purpose of your testimony?

A. I will be providing details of the major capital projects planned and budgeted for 2018-2020 as part of the Company's 2018 Qualified Capital Project Adjustment Charge ("QCPAC") filing. This testimony will present the major QCPAC projects initiated and completed in 2017 as well as proposed projects for 2018, 2019, and 2020. My testimony supports, and is in addition to, testimony being provided by the Company's Chief Operating Officer Donald L. Ware for this docket. Detailed project listings mentioned in this testimony are detailed in Mr. Ware's testimony (Exhibit 2 Pages 1 – 4).

Q. What types of projects can be described as "major capital projects"?

A. Major capital projects require significant capital investment and are approved annually in the Company's capital budget by the Company's Board of Directors. Projects are associated with dams, treatment facilities, pumping facilities, storage tanks, water main replacements, valve and hydrant replacements, building facility improvements and refurbishments, as well as non-structural efforts to improve Company performance, such as Asset Management. These generally include:

- The replacement of infrastructure that has reached the end of its useful life, does not achieve the level of service required of it (water quality, capacity, and efficiency), or the Company's ability to properly maintain it (outdated/lack of repair parts, etc.) is either impractical or more costly than replacing it.
- Infrastructure upgrades to improve system performance.
- Investments to ensure compliance with the primary and secondary Safe Drinking Water Act standards.
- Engineering studies and evaluations to assess infrastructure and system performance to aid in planning future capital investment needs.
- The implementation of processes and systems such as Asset Management, which incorporates/integrates Geographical Information Systems (GIS), Computerized Management and Maintenance System (CMMS- Oracle WAM), electronic time and record keeping, as well as inventory management, allowing the Company to have access to the data and information needed to make cost effective, immediate and long term operations and planning decisions.

Q. **What is the process that the Company employs and what are the factors the Company considers when developing the capital budget for water main replacements?**

A. The Company considers a number of factors in developing a capital budget for water main rehabilitation, replacement, and/or new construction. Many of the factors still include those which were identified by the Company in prior WICA filings. However, the Company is transitioning to an Asset Management based approach which will take prior WICA criteria into consideration, but adds in consideration for risk of asset failure, consequence of asset failure, the criticality of an asset, and required level of service for all assets including:

- Water main break/failure history;
- Water quality problems;
- Fire protection flows;
- The proximity of and support provided to key critical customers (public safety, government, hospitals, etc.;
- Coordination with gas company replacement projects;
- Geographic grouping of streets where mains to be replaced/rehabilitated for improved efficiency by keeping work in close proximity;
- The opportunity to take advantage of efficiencies gained from coordinating with the City of Nashua ("City") and Town of Amherst's ("Town") paving, storm water and sewer projects, to replace water main where aging unlined cast iron, steel, and A-C water pipes are present.

- Industry guidelines of the American Water Works Association for the replacement of water main using an average life expectancy for water main of 100 years absent specific information on a particular asset. The Company considers this rate to be reasonable until the Asset Management System allows for a more system/asset specific assessment to be performed. It will remain important when the City or Town is working on a street where the Company has an unlined cast iron, steel, or A-C water main for the Company to replace the water main. There are cost savings in pavement repair and traffic control associated with completing projects while the municipality or gas company is working on a street.

Furthermore, it is rare that the City can replace older sewers or storm drains and not undercut existing water mains. Often, the water mains are located in the same trench as the sewer main, with the sewer main being installed first and the water main laid higher in the same trench. This generally makes it impossible to replace the sewer main without adversely affecting the integrity of the water main. Unlined cast iron, steel, and A-C water main usually cannot survive loss of soil support or the vibration from heavy construction equipment without experiencing high levels of breakage. Municipal infrastructure replacement will continue to be a major driver of our water main replacement for the foreseeable future.

Q. Please describe the pipeline composition of the Company's core water distribution system.

A. As of the end of 2018, the Company had approximately 2,260,000 linear feet ("LF") of water main in its core water system. The water main targeted for replacement includes unlined cast iron water mains, steel and galvanized steel water mains, and Asbestos-Cement (A-C) water mains. The Company has approximately 241,800 LF of unlined cast iron water main, approximately 24,400 LF of steel water main, approximately 33,000 LF of unknown material (likely cast iron), and approximately 213,400 LF of A-C water mains in its core distribution system.

Q. What are the major projects the Company started in 2017 that it will be completing as part of the 2018 Capital Budget?

A. The Company planned to complete water main replacement in 2017 on three streets in Nashua prior to winter. Construction delays and the onset of winter weather required shifting the work to 2018. These streets include:

- Elm Street: Replacement of 1570 LF of 8 & 6 inch unlined cast iron (CI) with 12 inch ductile iron cement lined (DIPCL). Estimated cost $436,000
- Monroe Street: Replacement of 485 LF of 4 inch CI with 8 inch DIPCL. Estimated cost $131,000.
- West Pearl Street: Replacement of 325 LF of 8 inch CI with 8 inch DIPCL. Estimated cost $109,000.

There are eighteen (18) streets where water main replacements were complete and in service as of December 31, 2017, but final street surface restoration (paving) remains to be completed. Utility trenches are required by the City of

Nashua to rest over one winter to allow for settlement of base materials, before final pavement restoration is complete. Streets that will undergo final surface restoration in 2018 include Gillis Street, Orange Street, Buchanan Street, Lincoln Avenue, Nutt Street, Circle Avenue, Pratt Street, Zellwood Avenue, Faxon Street, Fifield Street, Fowell Avenue, Terrace Street, Beard Street, Green Street, Warren Street, Lowell Street, Lemon Street, and Mulvantity Street. $634,800 is budgeted to complete pavement restoration for these water mains replaced in 2017. Please see Exhibit 1 to Mr. Ware's testimony.

Q. Please identify and describe water main projects planned for 2018, 2019, and 2020.

A. Proposed water main construction and corresponding water main trench restoration is presented, by year, below. The vast majority of the water main being replaced is in Nashua and is near or greater than 100 years old. The pipe is generally 2 inch through 8 inch diameter unlined cast iron pipe (CI). Most of this pipe suffers from internal corrosion (tuberculation) resulting in substandard flows for fire protection. This internal corrosion also increases the risk of the delivery of substandard quality water to our customers, including bacteria (from the potential loss of chlorine residual) and colored water from flow fluctuation or pipe disturbance. Some of the work in 2018 will be done in conjunction with sewer improvements by the City of Nashua. The City schedules and completes their work annually based upon a July 1st – June 30th fiscal year and does not finalize and provide the Company with their capital project plans until March or April each year. Finally, there will be some projects undertaken, which relate to

certain water main additions needed to enhance system reliability and limit system vulnerabilities.

Planned 2018 Water Main Replacements/Additions

The Company estimates final trench pavement restoration cost for water mains added or replaced in 2017 to be approximately $635,000.

Water main replacements and additions planned for 2018 include the following locations:

- Gilman Street: Replace 1470 LF of 8 inch CI with 12 inch DIPCL
- Ritter Street: Replace 500LF of 6 inch CI with 12 inch DIPCL
- Woodward Street: Replace 300 LF of 6 inch CI with 12 inch DIPCL
- Factory Street: Replace 625 LF of 8 inch and 950 LF CI 950 LF of 16 inch DIPCL
- Pennichuck Street: Replace 100 LF of 12 inch CI with 12 inch DIPCL
- Fossa Avenue: Replace 310 LF of 6 inch CI and 2 PVC with 6 inch and 4 inch DIPCL
- Russell Avenue: Replace 775 LF of 8 inch and 275 LF of 6 inch CI with 775 LF of 8 inch and 225 LF of 4 inch DIPCL
- Taylor Street: Replace 790 LF of 6 inch CI with 8 inch DIPCL
- Burnett Street: Replace 535 LF of 6 inch CI with 12 inch DIPCL
- Field Street: Replace 325 LF of 6 inch CI with 6 inch DIPCL
- Fernwood Street: Replace 450 LF of 6 inch CI with 6 inch DIPCL
- Revere Street: Replace 760 LF of 6 inch CI with 8 inch DIPCL

- Stevens Street: Replace 760 LF of 8 inch CI and 160 LF of 6 inch CI with 760 LF of 8 inch and 160 LF of 4 inch DIPCL
- Evergreen Street: Replace 310 LF of 1.5 and 1.25 inch CI with 4 inch DIPCL
- Morton Street: Replace 290 LF of 1.5 inch CI with 550 LF of 4 inch DIPCL
- Park Avenue : Replace 300 LF of 8 inch CI and 160 LF of 2 inch CI with 300 LF of DIPCL and 160 LF of 4 inch DIPCL
- Coburn Woods: Replace 4400 LF of 2 inch PVC with 4 inch DIPCL
- Northwest Water Main Improvements, which are collectively:
    - Manchester Street: Add 2700 LF of 24 inch DIPCL on Manchester St.
    - Route 101A and Route 121 (Amherst): Add 2200 LF of 12 inch DIPCL to close loop between two long “dead end” mains.
    - Tinker Road: Replace 825 LF of 16 inch AC with 825 LF of 24 inch DIPCL.
- Lake Street: Replace 2950 LF of 6 inch CI with 12 inch DI

The listed projects above will replace and/or add approximately 24,000 feet of water main at an estimated cost of $8,300,000. Of this total, water main replacement represents about 18,000, LF or roughly 0.8% of the total pipe in the system.

<u>Planned 2019 Water Main Replacements/Additions</u>

The Company estimates final trench pavement restoration cost for water mains added or replaced in 2018 to be approximately $1,640,000.

Water main replacements and additions planned for 2019 include the following locations:

- Brook Street: Replace 225 LF of 4 inch and 915 LF of 6 inch CI with 1140 LF of 8 inch DIPCL
- Hamilton Street: Replace 410 LF of 6 inch CI with 4 inch DIPCL
- Ash Street: Replace 510 LF of 6 inch CI with 8 inch DIPCL
- Burritt Street: Replace 425 LF of 4 inch CI with 8 inch DIPCL
- Burritt Street: Replace 125 LF of 4 inch CI with 4 inch DIPCL
- Verona Street: Replace 675 LF of 6 inch CI with 8 inch DIPCL
- Sarasota Ave: Replace 250 LF of 6 inch CI with 8 inch DIPCL

The projects listed immediately above will replace approximately 2,700 LF of water main representing about 0.1% of the total pipe in the system at an estimated cost of $1,140,000. The length of water main replaced in 2019 will fall well below the AWWA target of 1%, however, the Company is balancing water main replacement expenditures with three significant capital expenditures planned for in 2019, including a new “year round” raw water intake on the Merrimack River and improvements to the Bowers Dam spillway. These projects will be discussed later in this testimony.

<u>Planned 2020 Water Main Replacements/Additions</u>

The Company estimates final trench pavement restoration cost for water mains added or replaced in 2019 to be approximately $400,000.

Water main replacements and additions planned for 2020 include the following locations:

- Fields Grove Park Crossing: Add 750 LF of 16 inch high density polyethylene HDPE to close “dead end” and loop main on Chestnut Street and Lawndale Avenue including a stream crossing.
- Benson Avenue: Replace 550 LF of 4 inch CI with 8 inch DIPCL
- Spaulding Street: Replace 950 LF of 6 inch CI with 8 inch DIPCL
- Alstead Avenue: Replace 240 LF of 4 inch CI with 4 inch DIPCL
- Spaulding Avenue: Replace 430 LF of 6, 2, & 1.25 inch CI with 4 inch DIPCL
- St Lazare Street: Replace 415 LF of 2 inch CI with 4 inch DIPCL
- Ingalls Street: Replace 200 LF of 1.5 inch CI with 4 inch DIPCL
- Nye Avenues: Replace 400 LF of 2 & 1.5 inch CI with 4 inch DIPCL
- Copp Street: Replace 350 LF of 6 inch CI with 8 inch DIPCL
- Gray Avenue: Replace 360 LF of 6 inch CI with 6 inch DIPCL
- Harvard Street: Replace 800 LF of 8 inch CI with 8 inch DIPCL
- Allds Street: Replace 1860 LF of 6 & 8 inch CI with 12 inch DIPCL
- Lawndale Avenue: Replace 1085 LF of 6 inch CI with 12 inch DIPCL
- Taylor Road: Replace 725 LF of 8 inch CI with 12 inch DIPCL
- Temple Street: Replace 900 LF of 8 inch CI with 12 inch DIPCL
- School Street: Replace 400 LF of 4 inch CI with 8 inch DIPCL

The projects listed immediately above will replace and/or add approximately 10,500 feet of water main at an estimated cost of $4,200,000. Water main replacement represents about 9,750 LF, or roughly 0.4%, of the total pipe in the system. As with year 2019, the replacement rate is lower than a targeted rate of

1%. The Company is once again balancing water main replacement in 2020 with the significant cost of replacing the 4.5 million gallon Kessler Farm Storage Tank. The Kessler Farm Tank project will be discussed later in this testimony.

Q. Your testimony states that water main replacement varies each year (2018-2020) due to balancing the investment in water main replacements with other major capital projects. What are those projects?

A. The Company has typically targeted overall capital investment (reinvestment) between $8 million-$12 million per year. The majority of the investments are associated with horizontal assets such as water main or vertical assets, including storage tanks, pumping stations, treatment facilities, dams, and process related improvements (SCADA, Asset Management, etc.). In some years there may be more need for horizontal asset investment than vertical. In other years the opposite may be true.

2018 projects are dominated by water main replacements and additions as presented previously in this testimony.

The 2019 budget anticipates less water main replacement because of the construction of a new raw water intake on the Merrimack River (estimated cost - $5,500,000), improvements to the Bowers Dam Spillway (estimated cost - $90,000 in 2018 and $900,000 in 2019), and the rebuild of the Twin Ridge Community Water System Pumping Station (estimated cost - $330,000).

The new intake will replace the current “in bank” intake, with a new intake at the bottom of the river, which will draw water from the river further out from the banks

of the Merrimack River, and have access to water at a depth below the surface. Compared to the existing river bank channel, the new intake will be able to function 365 days per year. The existing intake cannot function in winter when ice conditions are present. The new intake is in final design because of the complexity of the project, and final permits are expected in early 2018, with actual construction of the intake to incur in the summer of 2019.

Improvements are needed to the Bowers Dam Spillway to ensure passage of the 100 year flood and to improve the operation of the current stop log and flashboard.

The Twin Ridge Station project will significantly replace an aging building structure, as well as aging pumps, piping filters, and controls. The existing station and tankage are over 30 years old. To manage budgets and provide adequate project oversight the Company has planned less water main replacement in 2019.

In 2020, the Company anticipates a resumption of increased water main replacement activity over 2019 but not fully back to the level of 2018, due to the Kessler Farm Tank Project. The Kessler Farm Tank Replacement Project (estimated cost $3,080,000) will replace an existing 4.5 million gallon welded steel tank with a new 4.5 million gallon precast pre-stressed concrete tank. The interior and exterior coatings of the existing steel tank, which were repainted in 2002, have reached the end of their useful lives. The estimated cost to recoat the interior and exterior of the existing tank would be in excess of $1,000,000, and would need to done again in another fifteen years, or so. Replacing the

existing tank with a new concrete tank, which does not require significant annual or regular maintenance other than periodic inspection and cleaning over an 80 year design life, brings significant long term economic advantages to bear over the restoration of the existing tank. The steel tank was painted slightly more than 15 years ago, and would need to be painted 5 or more times (once every 15 years), at a cost of $1,000,000 or more each time, over the next 80 years. Replacement of the steel tank with a concrete will result in a net savings of more than $2,000,000 in maintenance cost (painting) over the 80 year design life.

Q. Does this conclude your testimony?

A. Yes.