STATE OF NEW HAMPSHIRE
BEFORE THE
NEW HAMPSHIRE PUBLIC UTILITIES COMMISSION

RE: PENNICHUCK WATER WORKS, INC.
DW 20- ___

2020 QUALIFIED CAPITAL PROJECT ADJUSTMENT CHARGE FILING

DIRECT TESTIMONY
OF
John J. Boisvert

January 28, 2020

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 2020-2022 as part of the Company's 2020 Qualified Capital Project Adjustment Charge ("QCPAC") filing. This testimony will present the major QCPAC projects initiated and completed in 2019 as well as proposed projects for 2020, 2021 and 2022. 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 1 Pages 1 – 5).

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. The Company is transitioning to an Asset Management based approach which considerations 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 infrastructure 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 (either sewer replacement or total repaving) where the Company has an unlined cast iron, steel, or A-C water main residing under that street, for the Company to replace the water main in coordination with the City or Town's project. 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 were installed 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 2019, the Company had approximately 2,200,000 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 265,000 LF of unlined cast iron water main, approximately 5,700 LF of steel water main, approximately 9,900 LF of unknown material (likely cast iron), and approximately 207,000 LF of A-C water mains in its core distribution system.

Q. What are the major projects the Company started in 2019 that the Company will be completing as part of the 2020 Capital Budget?

A. The Company completed a number of water main replacement/additions in 2019. The projects went used and useful just prior to winter. Final landscaping and paving could not be completed in 2019 and this work will carry over into the 2020 budget. These carry over projects include:

<u>Northwest High Pressure System</u>

- Manchester Street: Final site restoration.
- Routes 101A/Route 121 (Amherst): Final site restoration/paving
- Tinker Road: Final site restoration/paving

- Deerwood Drive/NW Blvd. Loop: Final site restoration/paving

Other Final Paving for Water Main Replacement

- Simon Street & Will Street
- Garden Street
- Lake Street

Other Capital Projects

- West Hollis Street Check Valve (Nashua): Valve pit replacement
- Replacement of the Kessler Farm Booster Station: Replace pumping and mechanical equipment
- Continuation of the Federal AWIA Risk and Resiliency Assessment and Emergency Response Plan
- Asset Management: Continuation of GIS QA/QC ahead of the implementation of a new Computerized Management and Maintenance System (CMMS)

Q. What were the major water main projects completed in 2019?

A. The following water main projects were completed in 2019

<u>Northwest High Pressure System</u>

- Manchester Street: Added 1,700 LF of 24 inch DIPCL on Manchester Street.
- Routes 101A/Route 121/Veterans (Amherst): Added 2,200 LF of 12 inch DIPCL to close dead end water mains

- Tinker Road: Replaced 825 LF of 16 inch AC with 825 LF of 24 inch DIPCL
- Deerwood Drive: Added 3,400 LF of 12 inch AC with 1300 LF of 24 inch DIPCL
- NW Blvd Loop: Added 3,400 LF of 20 inch HDPE including Rail Road Right of Way pipe jacking

Water Main Replacements

- Gilman Street: Replaced 1,470 LF of 8 inch CI with 12 inch DIPCL
- Elm Street: Replaced 875 LF of 6 inch CI with 12 inch DIPCL
- Monroe Street: Replaced 310 LF of 4 inch CI with 8 inch DIPCL
- Garden Street: Replaced 74 LF of 8" CIP with 8 inch DIPCL and reconnect City Hall Fire serviced relating to the Elm Street work
- West Pearl St: Replaced 260 LF of 8 inch CI with 8 inch DIPCL
- Harvard Street: Replaced 800 LF of 8 inch CI with 8 inch DIPCL

City of Nashua Sewer/Paving Related Projects

- Chase Street: Replaced 470 LF of 6 inch CIP with 470 LF of 6 inch DIPCL
- Ash Street: Replaced 710 LF of 6 inch CIP with 710 LF of 12 inch DIPCL
- Lake Street: Replaced 2,950 LF of 6 inch CI with 12 inch DIPCL
- Vilna Street: Replaced 15 LF of 1.5 inch steel with 2 inch HDPE for paving program

- Ferryalls Court: Replaced 35 ft of 1" copper water main crossing Canal Street with a 4" DIPCL water main
- Salvail Court Replace 1.5" Steel water main and install a 4" DIPCL Water Main (contaminated area)
- Simon Street at Will Street Upgrade: Abandon pump station pit and clean up intersection pipe work for improved flows

These projects represent an investment of approximately $6,956,000 in the replacement of aging infrastructure.

In 2019, the Company successfully negotiated a pavement restoration agreement with the City of Nashua over streets where water mains were replaced from 2015 through 2018. The Company was able to issue payment to the City in an amount just over $286,000 for the City to accept restoration responsibility at an amount less than the Company would have had to pay its contractor's. As part of this agreement, the City assumes management of street/pavement restoration relieving the Company from this responsibility.

Q. Please identify and describe water main projects planned for 2020, 2021, and 2022.

A. Proposed water main construction and corresponding water main trench restoration is presented, by year, below. The 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 fire

flows. 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 2020 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 2020 Water Main Replacements/Additions

Water main work is anticipated within the City and the Town of Amherst as part of ongoing replacement of aging infrastructure. The projects total approximately $975,000 in reinvestment. Much of this effort will be associated/coordinated with other utility work and road reconstruction.

Specific Projects are as follows:

- 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
- 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

- Amherst Dodge Road: Abandon Approx. 700 LF of AC Main and Transfer 2 services & 1 Hydrant to an existing 8 inch DIPCL water main

Planned 2021 Water Main Replacements/Additions

Approximately 15,000 LF of water main replacement is anticipated in 2021. Roughly 4,300 LF will be associated/coordinated with City sewer projects with the remainder of the work consisting of aging infrastructure replacement at a budget of approximately $4,852,000. The specific locations include:

- Linwood Street: Replace 960 LF of 6 inch CI with 8 inch DIPCL
- Balcom Street: Replace 1,240 LF of 6 inch CI with 1240 LF 8 inch DIPCL
- Euclid Avenue: Replace 425 LF of 6 inch CI with 425LF 8 inch DIPCL
- Fairview Street: Replace 800 LF of 6 inch CI with 800 LF 8 inch DIPCL
- Sargent Street: Replace 1,900 LF of 6 inch CI with 1900 LF 16 inch DIPCL
- Courtland Street: Replace 1,170 LF of 4 inch CI with 1170 LF 16 inch DIPCL
- Alld Street: Replace 1,860 LF of 6 & 8 inch CI with 12 inch DIPCL
- Lawndale Avenue: Replace 1,085 LF of 6 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
- City Sewer Projects: Replace approximately 4,300 LF of CI with DICLP

Planned 2022 Water Main Replacements/Additions

Water main replacements total approximately 17,000 LF for 2022 at a budget of $5,415,000 and includes the following locations:

- 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 Avenue: 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
- Coburn Woods: Replace 4,400 LF of 2 inch PVC with 4 inch DIPCL
- City Sewer Projects: Replace approximately 4,300 LF of CI with DICLP

- Sawyer Street: Replace 1,600 LF of 6 inch CI with 12 inch DIPCL
- Woodward Street: Replace 360 LF 8 inch CI with 470 LF 8 inch DIPCL
- Blosson Street: Replace 2,400 LF of 6 inch CI and 8 inch CI with 24,00 LF of 8 inch DIPCL

Q. Your testimony states that water main replacement varies each year (2020-2022) 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. Most 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 rather than vertical assets. In other years the opposite may be true.

Q. What were the other major projects completed in 2019?

A. In 2019 the Company completed the replacement of the existing Merrimack River Intake with the construction of a new deep-water Merrimack River Intake. The new intake replaced the current “in bank” intake, with a new intake in a deeper section of the river. The project went used and useful in December 2019. Final site restoration and tree plantings are scheduled for the spring of 2021. The total

project cost will approach $6,600,000 of which $5,500,000 came from a low interest loan from the New Hampshire Drinking Water and Groundwater Trust Fund. The remainder from tax-exempt bonds issued by the Company as a part of its annual bonding process in conjunction with this QCPAC process.

The Company accelerated the change out of activated carbon filter media at the Company's main treatment facility in Nashua. The carbon that was replaced has been in service for over 6 years and based upon recent testing, the carbon's ability to adsorb taste and odor compounds as well as volatile and synthetic organic compounds was almost fully exhausted. The other driving factor was the pending PFAS drinking water regulations proposed by the NHDES. New activated carbon was found to successfully reduce PFAS concentrations to below the limits being proposed by NHDES. The Company was able to replace carbon in four of its six filter beds within the 2019 budget at a cost of approximately $990,000. The remaining two filters are scheduled for carbon replacement in the spring of 2020.

Q. Please identify and describe other projects planned for 2020, 2021, and 2022.

A. The projects are described by year below as follows:

<u>2020 Vertical Projects</u>

The 2020 budget includes improvements to the Harris Dam earth embankment and dike (estimated cost - $965,000). Improvements are needed to ensure the

Harris Dam has enough freeboard for the spillway to pass 2.5 times the 100-year flood based upon current and updated NHDES requirements

Supply Pond Dam will be evaluated in response to a Letter of Deficiency issued by the NHDES. The primary focus will be on the spillway capacity to ensure that the spillway can pass the required flood flows Evaluation. Design of the improvements will be completed in 2020 at an estimated cost of $32,000. Capital improvement costs, if necessary, will be budgeted in future capital budgets.

2020 will include the change out of the activated carbon filter media in the remaining two filter beds at the Company's main treatment facility in Nashua. The two filters (Filter #3 and Filter #4) will be changed out at a cost of approximately $500,000.

The Kessler Farm Tank Replacement Project (estimated cost $3,338,000) 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, this repainting process would need to performed again in another fifteen years, based upon past experience. 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, as compared to the painting/restoration of the existing tank. As mentioned above, 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.

The Company's existing Computerized Management and Maintenance System (CMMS), Oracle WAM, will be replaced in 2020. The Company's current version of WAM will go unsupported by Oracle in 2021, and as such, would either need to be upgraded to the latest version of Oracle WAM, or replaced with an alternative work order management system. The Company hired a consultant to assess the impacts the upgrade to the latest version of the Oracle WAM software would have on our current system and business processes. The consultant indicated that the Company would need to invest over $1,000,000 to upgrade to the new Oracle WAM version. Further research completed by the consultant, as well as independent research by Company staff, found the estimated cost to upgrade consistent with what other utilities of similar size had incurred in accomplishing this upgrade, and the upgrade did not include some of the functionality used by the Company which would continue to be needed by the Company going forward. The Company researched other CMMS vendors and identified the "Cityworks" work order management application package, as a viable alternative to replace the Oracle WAM application, and would meet the

needs of the Company going forward at a lower cost than WAM. The Company sought competitive proposals from qualified Cityworks implementation vendors. Vendor selection was made in December 2019 and the Company is working with the selected vendor towards a “go live” date of December 31, 2020. The project budget for implementation is $600,000 including internal capitalized labor.

2021 Vertical Projects

The replacement of the Milford Booster Station is also anticipated in 2021. The replacement will eliminate an over 30-year old below ground (confined space entry) station and include pumping equipment upgrades to ensure the Company can meet its contractual obligations to the Town of Milford for water purchases from the Company. Replacement of the Milford Booster station is estimated at $660,000.

The Company plans to complete a reconstruction of the Bowers Dam, including upgrades to the spillway, to ensure passage of the required flood flows and for more efficient operations of the overall required height of the dam spillway. The work will also include, depending upon the final analysis and design, enhancements to the earthen abutments to increase stability and ensure against overtopping during potential and designed for, flood events. The estimated cost for this work is $1,000,000.

2022 Vertical Projects

The Company is not anticipating any significant projects of this type in 2022.

Q. Does this conclude your testimony?

A. Yes.