



June 15, 2021

Mrs. Luly Massaro
Commission Clerk
RI Public Utilities Commission
89 Jefferson Boulevard
Warwick, RI 02888

The Hon. Jorge O. Elorza
Mayor

Ricky Caruolo
General Manager

RE: Dk 4994; New Cost of Service Study Data Requests

BOARD OF DIRECTORS

Xaykham Khamsyvovong
Chairperson

Joseph D. Cataldi
Vice Chairperson

Michael J. Correia
Councilperson

Jo-Ann Ryan
Councilperson

Sara Silveria
Ex-Officio

Cristen L. Raucci, Esq.
Member

Dr. Alma M. Guerrero Bready
Member

Carissa R. Richard
Secretary

William E. O'Gara, Esq.
Legal Advisor

Dear Mrs. Massaro:

Enclosed, please find Providence Water's responses to the thirteen (13th) set of data requests from Bristol County Water Authority.

Thank you for your attention to this matter.

Sincerely,

Mary L. Deignan-White

Mary L. Deignan-White
Division Manager-Finance

cc: service list(via email)

MEMBER

Rhode Island Water Works Assn.
New England Water Works Assn.
American Water Works Assn.
Water Research Foundation

An EPA WaterSense Partner

(401) 521-6300

125 Dupont Drive
Providence, RI 02907

www.provwater.com

Follow us @provwater

Like us at:
facebook.com/Providencewater

PROVIDENCE WATER SUPPLY BOARD
RIPUC DK. 4994
Bristol County Water Authority Set 13
NEW COST OF SERVICE STUDY

(Issued May 25, 2021)

BCWA 13-1: With regard to Pare's March 4, 2021 Memorandum included with Providence's April 1, 2021 New Cost of Service Study submitted to the Commission:

- a. Please provide all Excel files (including active formulas and links) that were used as inputs or outputs for the hydraulic model.
- b. For any constant values within the Excel files, please provide a description and source of the value.
- c. Please provide a list and description of all assumptions, inputs and outputs used in the hydraulic model.
- d. If not included in the Excel files above, please provide Tables 1 through 4 in Excel, with formulas (where applicable) showing how each value was calculated and descriptions and sources for any constants.
- e. For Table 1, please reproduce this table in Excel to include a row for Retail.
- f. For Tables 2 through 4, please reproduce these tables in Excel to include a column for Retail.

RESPONSE:

- a. Attached are the following excel files in electronic format. Due to their large size, they will only be provided electronically.
 1. Tables 1 through 4 from the March 4, 2021 memorandum are included in an Excel workbook titled, "Wholesale Eval Summary v8". The tables from the memorandum are on a sheet titled, "Summary". Also in this workbook are spreadsheets that calculate the inch-miles for each pipe segment that each wholesale customer uses during an average day demand (ADD), maximum day demand (MDD), and peak hour demand (PH) scenarios.
 2. The model output files (pipe report, junction report, and pump report, and tank report) are included as excel files.
 3. A summary of Providence Water's production data for the period January 2016 through December 2018 is included and titled, "Plant Flow Data 2016, 2017, 2018".
 4. A summary of Providence Water's customer meter records for the period January 2016 through December 2018 is included and titled, "Consumption Data".
 5. A folder of Excels titled, "Pipe Mapping" is attached. The files within that folder outline the pipe tracing for each wholesale customer for Average Day, Maximum Day, and Peak Hour demand scenarios.
- b. Constant values from the excel files are as follows:
 1. Pipe report:
 - a. Length (provided from Providence Water GIS)

PROVIDENCE WATER SUPPLY BOARD
RIPUC DK. 4994
Bristol County Water Authority Set 13
NEW COST OF SERVICE STUDY

(Issued May 25, 2021)

- b. Diameter (provided from Providence Water GIS)
- c. Material (provided from Providence Water GIS)
- d. C-value (provided from Providence Water GIS)
- 2. Junction report:
 - a. Elevation (extracted from the Rhode Island Statewide LIDAR)
 - b. Demand (calculated from Providence Water customer meter and production records).
- 3. Tank report
 - a. Dimensions (from Providence Water record drawings)
 - b. Operating ranges (from Providence Water SCADA records).
- 4. Pump report
 - a. Pump curves (from Providence Water records)
 - b. Elevations (from Providence Water records)
- c. A list of Pare's assumptions when performing this hydraulic model evaluation are as follows:
 - 1. Pare assumed that Providence Water's GIS accurately represents Providence Water's pipe infrastructure.
 - 2. Pare assumed that there are no substantial discrepancies between the plans that Pare reviewed for the pump stations and tanks and actual as-built conditions.
 - 3. Pare assumed that Rhode Island Statewide LIDAR data is accurate.
 - 4. Pare assumed that Providence Water's peak hour demand during the study period (January 2016 through December 2018) occurred on their maximum day over that same period.
- d. Tables 1 through 4 are included in the attached Excel files in electronic format. Due to their large size, they will only be provided electronically. The formulas used to calculate the values in those tables are included in the appropriate cells. The source data for those tables is included in the same Excel workbook, but on subsequent sheets (see response to (a), above). Some of the source data is directly linked to subsequent sheets, while other source data has been cut and pasted from sheets in the workbook.
- e. A row for Retail has been added to Table 1.
- f. A column for Retail has been added to Tables 2 through 4.

PROVIDENCE WATER SUPPLY BOARD
RIPUC DK. 4994
Bristol County Water Authority Set 13
NEW COST OF SERVICE STUDY

(Issued May 25, 2021)

BCWA 13-2: With regard to Providence's responses to the BCWA's twelfth set of data requests:

- a. BCWA 12-4: In Excel, please provide a table showing the calculation of the demand factor changes mentioned (i.e., factor of 1.53, etc.).
- b. BCWA 12-6: Please explain why Greenville and Smithfield are exceptions to Pare's observation about draw rate relative to Providence Water's demand.
- c. BCWA 12-15: Please provide the table in Excel, with formulas (where applicable) showing how each value was calculated and descriptions and sources for any constants.
- d. BCWA 12-17: The response states that July 13, 2016 was chosen for maximum day and maximum hour because it was the single highest water use *day* from 2016 through 2018. Since that day was also chosen for maximum hour, was it also the day with the single highest water use *hour*?

RESPONSE:

- a. An Excel file with the table from response 12-4 is attached in electronic format. Due to their large size, they will only be provided electronically.
- b. In response 12-6 Pare described an observation that we made about a general correlation we saw between inch-miles, wholesale customer draw rate, and Providence Water's overall system demand. At this time, it is unclear why Smithfield and Greenville are exceptions to this observation. As indicated in the response 12-6, there are several factors that affect the inch-mile analysis for the wholesaler customers, including but not limited to wholesale customer draw rate, Providence Water's overall system demand, the spatial distribution of demand in the system, the density of the pipe network along the flow path, the sizes of pipes along the flow path, and the overall distance between the treatment plant and the wholesale customer connection. Pare can only hypothesize as to why Greenville and Smithfield are exceptions to Pare's observations. As noted in response 12-6, Greenville and Smithfield have the lowest draw rates of any of the wholesale customers. It is possible that at relatively low draw rates, other factors, such as the spatial distribution of demand, and the size and density of the pipe network, have a more significant impact on inch-miles than demand or draw rate. However, this is only one possibility. It would require more study to understand how each parameter in the hydraulic model (i.e., geospatial demand distribution, pipe size, C-factor, etc.), considered individually and in concert with other parameters, affects the inch-mile analysis.
- c. A copy of the table from 12-15, in Excel, is attached in electronic format. Due to their large size, they will only be provided electronically.
- d. Pare assumed that the peak hour demand for the system occurred on the maximum day for the period of study, which is a reasonable assumption and consistent with AWWA M32, Section 5.2.2, which states, "Maximum hour demand is modeled using peaking factors from maximum day demand demands...".

PROVIDENCE WATER SUPPLY BOARD
RIPUC DK. 4994
Bristol County Water Authority Set 13
NEW COST OF SERVICE STUDY

(Issued May 25, 2021)

BCWA 13-3: With regard to Schedule HJS-17: Unit Cost of Service:

- a. Please explain why the Units of Service for “CTA – Supply, Treatment & Low Service”, “High Service & Retail” and “Retail Only” are based on Extra Capacity but for “CTA – Transmission & Distribution” the Units of Service are not based on Extra Capacity.
- b. Please explain why the total Inch-Miles for “CTA – Supply, Treatment & Low Service” are the same for Base, Max Day and Max Hour (10,773 inch-miles).

Response:

- a. CTA Transmission and Distribution system units of service were not based on extra capacity because this would be an inconsistent use of the data. The inch-miles for each customer are based on the flow through each pipe segment, relative to the other customers, under each demand scenario. There are no extra capacity units in this approach because each component of demand is evaluated separately.
- b. The inch-miles are the same because 10,773 represents the total inch-miles in Providence Water’s system, which is the same regardless of customer demand (i.e., base, max day and max hour).