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May 6, 2021

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

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

Dear Mrs. Massaro:

Enclosed please find Providence Water's responses to the twelfth (12th) 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)

BCWA 12-1: Please explain how Providence's new COSS, in particular its incorporation of the hydraulic model prepared by Pare, is consistent with the accepted ratemaking principles set forth in the AWWA M-1 Manual and please provide a citation to the M-1 Manual by page number and edition where this methodology is set forth as a generally accepted ratemaking principle.

Response:

On Page 303, the American Water Work Association's (AWWA) Manual M1 Principles of Rates, Fees and Charges (7th Edition) (M1) identifies the use of hydraulic modeling analysis as an acceptable means of identifying which mains serve a transmission function:

> Another approach to determining distribution versus transmission mains, though less common in practice and more complex to perform, is to use system hydraulic analyses to determine which water mains, by size diameter and location, function as transmission mains.

The hydraulic analysis developed by Pare was used for that exact purpose, to determine which pipes are used to deliver water to Providence Water's wholesale customers for distribution to their customers.

BCWA 12-2: Please explain how using draw rate in gallons per minute to calculate maximum day and maximum hour demands is consistent with the accepted ratemaking principles set forth in the AWWA M-1 Manual and please provide a citation to the M-1 Manual by page number and edition where this methodology is set forth as a generally accepted ratemaking principle.

Response:

The American Water Work Association's (AWWA) Manual M1 Principles of Rates, Fees and Charges (7^{th} Edition) (M1) does not specifically address the use of draw rates to calculate maximum day and maximum hour demand.

That said, neither Pare's analysis, nor Providence Water's new COSS, used draw rates to calculate maximum day and maximum hour demand, as it is described in M1. The maximum day and hour demands in M1 refer to the total demand on the highest usage day or hour of the year. This is a function of the draw rate *and* the period over which that draw rate is expressed. If the draw rate is consistent 24/7/365, then the draw rate and demands are the same. If there are periods where water it not being drawn, then the demand will be less than the draw rate. For example, a customer drawing at a rate of 3,000 gpm for 8 hours on maximum day would have a maximum day demand of 1.44 mgd (8 x 60 x 3000). The draw rate would be 4.32 mgd (3,000 x 1440). It is higher because the customer is only drawing water 1/3 of the time (8 hours at 3,000 gpm, 16 hours at 0 gpm).

Pare's analysis used the draw rate to allocate Providence Water's pipe network (in inch-miles) under different demand conditions using the process described in Pare's March 4, 2021 memorandum.

BCWA 12-3: Please state whether Mr. Smith has ever used draw rate in gallons per minute to calculate maximum day and maximum hour demands in any other cost of service study he has prepared or assisted in preparing.

Response:

Mr. Smith has never used draw rate in gallons per minute to calculate maximum day and maximum hour demands in any other cost of service study he has prepared, or assisted in preparing. That said, as described in the response to BCWA 12-2, this is not how this information was used in Providence Water's new COSS.

BCWA 12-4: Regarding Schedule HJS-13c, please explain how and why the BCWA's inch-miles total increases from base demand to maximum day demand and maximum hour demand.

RESPONSE:

The inch-miles assigned to each wholesale customer are based on the hydraulics of the pipe network, which were analyzed through computer modeling. Pare used the hydraulic analysis to identify the path of flow between the treatment plant and each wholesale customer's connection. The flow path for each wholesale customer changes based on a number of factors in the pipe network that affect system hydraulics. Those factors include 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. These factors affect the inch-mile analysis in different ways and to varying degrees of significance based on how each parameter affects system hydraulics.

With regard to increases and decreases in inch-miles, it is reasonable to assume that as a wholesale customer's draw rate increases, the infrastructure required to transport that draw rate would also increase. However, Pare observed that draw rate alone does not appear to be the most significant factor on whether inch-miles increase or decrease. Of the factors described above, draw rate relative to overall system demand appears to have the most significant impact on whether a wholesale customer's inch-miles increase or decrease from average day demand to maximum day demand to peak hour (maximum hour) demand. In general (but with some exceptions), Pare observed that when a wholesale customer's draw rate increases at a faster rate than Providence Water's overall demand, the wholesale customer's inch-miles increase. Conversely, when the wholesale customer's draw rate increases at a slower rate than Providence Water's overall demand, the wholesale customer's inch-miles decrease. For example, BCWA's draw rate increases by a factor of 1.72 between average day demand and maximum day demand, and by a factor of 1.16 between maximum day demand and peak hour demand. Providence Water's demand increases by a factor of 1.53 between average day demand and maximum day demand, and by a factor of 1.32 between maximum day demand and peak hour demand. BCWA's increase between average and maximum day demand is greater than Providence Water's, and as a result BCWA's inch-miles increase between average and maximum day demand. BCWA's draw rate increases less than Providence Water's demand between maximum day and peak hour, and as a result BCWA's inch-miles decrease between maximum day and peak hour.

Prepared by: Tim Thies, P.E. Date: 5-5-2021

(Issued April 15, 2021)

BCWA 12-5: Regarding Schedule HJS-13c, please explain how and why East Providence's inch-miles total decreases from base demand to maximum day demand and maximum hour demand.

RESPONSE:

The factors that affect East Providence inch-miles are the same factors described in the response to BCWA 12-4. East Providence draws water in such a way that its draw rate during an average day, maximum day, and peak hour demand scenario is relatively the same. While Providence Water's demand increases by a factor of 1.53 between average day and maximum day demand, East Providence's draw rate remains the same. The result is a decrease in East Providences inch-miles. Similarly, Providence Water's demand increases between maximum day and peak hour demand, but East Providence's draw rate remains the same. Therefore, East Providence's inch-miles decrease between maximum day and peak hour demand scenarios.

Prepared by: Tim Thies, P.E. Date: 5-5-2021

BCWA 12-6: Regarding Schedule HJS-13c, please explain how and why Greenville's inch-miles total decreases from base demand to maximum day demand and maximum hour demand.

RESPONSE:

The factors that affect Greenville's inch-miles are the same factors described in the response to BCWA 12-4. However, Greenville is one of two systems that appears to be an exception to Pare's observation about draw rate relative to Providence Water's demand (Smithfield is the other exception). Greenville's draw rate increases between average day and maximum day more so than Providence Water's demand, but Greenville's inch-miles decrease slightly. This is generally the opposite of what Pare observed for other wholesale customers. However, Greenville's draw rate remains unchanged between maximum day and peak hour demand, while Providence Water's demand goes up. Between maximum day and peak hour demand, Greenville's inch-miles decreased, which is similar to the pattern that Pare observed for other wholesale customers. Therefore, Greenville is an exception, but only an exception for average day demand to maximum day demand. Between maximum day demand and peak hour demand, Greenville's inch-miles changed in a manner consistent with what Pare observed with other wholesale customers.

Greenville and Smithfield have the lowest draw rates of any of the wholesale customers. It appears 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 does Providence Water's overall system demand.

BCWA 12-7: Regarding Schedule HJS-13c, please explain how and why Kent County's inch-miles total decreases from base demand to maximum day demand and then increases to maximum hour demand.

RESPONSE:

The factors that affect Kent County's inch-miles are the same factors described in the response to 12-4. Kent County's draw rate increases by a factor of 1.25 between average day and maximum day demand, and a factor of 1.39 between maximum day and peak hour demand. Kent County's rate of increase between average day and maximum day is lower than Providence Water's overall demand increase, and as such Kent County's inch-miles decrease. Kent County's rate of increase between maximum day and peak hour demand is higher than Providence Water's, and therefore Kent County's inch-miles increase.

BCWA 12-8: Regarding Schedule HJS-13c, please explain how and why Lincoln's inch-miles total decreases from base demand to maximum day demand and maximum hour demand.

RESPONSE:

The factors that affect Lincoln's inch-miles are the same factors described in the response to BCWA 12-4. Lincoln's draw rate increases by a factor of 1.46 between average day and maximum day demand, and a factor of 1.00 between maximum day and peak hour demand. Lincoln's rate of increase between average day and maximum day is lower than Providence Water's overall demand increase, and as such Lincoln's inch-miles decrease. Lincoln's rate of increase between maximum day and peak hour demand is lower than Providence Water's, and therefore Lincoln's inch-miles decrease.

BCWA 12-9: Regarding Schedule HJS-13c, please explain how and why Smithfield's inch-miles total increases from base demand to maximum day demand and maximum hour demand.

RESPONSE:

The factors that affect Smithfield's inch-miles are the same factors described in the response to BCWA 12-4. However, Smithfield's inch-miles appear to be less affected than other wholesale customers by the relative change in draw rate versus overall system demand. Smithfield's draw rate increases at a slower rate than Providence Water's overall demand, between average and maximum day, and between maximum day and peak hour demands. However, Smithfield's inch-miles increase under both scenarios. Smithfield has the lowest draw rate of any wholesale customer. As is the case with Greenville, Smithfield's inch miles are more affected by the spatial distribution of demand in the system and the size and density of the pipe network.

BCWA 12-10: Regarding Schedule HJS-13c, please explain how and why Warwick's inch-miles total increases from base demand to maximum day demand and maximum hour demand.

RESPONSE:

The factors that affect Warwick's inch-miles are the same factors described in the response to BCWA 12-4. Warwick's draw rate increases by a factor of 1.63 between average day and maximum day demand, and a factor of 1.43 between maximum day and peak hour demand. Warwick's rate of increase between average day and maximum day is higher than Providence Water's overall demand increase, and as such Warwick's inch-miles increase. Warwick's rate of increase between maximum day and peak hour demand is higher than Providence Water's, and therefore Warwick's inch-miles increase.

BCWA 12-11: Please update Schedule HJS-15A with actual water sales for FY2021*(sic)* and FY2021 to date, with actual final water sales for FY2021 when they become available.

RESPONSE: See below in HCF.

Retail	**FYE 6/30/2020**	**YTD 3/31/2021**	**FYE 6/30/2021**
Residential	8,009,680	6,720,372	Update when Available
Commercial	3,649,973	2,575,889	
Industrial	150,547	103,845	
Sub-Total Retail	11,810,200	9,400,106	
Wholesale	**FYE 6/30/2020**	**YTD 3/31/2021**	**FYE 6/30/2021**
Bristol County	1,357,972	1,237,717	Update when Available
East Providence	1,960,029	1,328,106	
Greenville	416,268	357,205	
Johnston*	432,519	274,196	
Kent County	2,574,837	1,942,531	
Lincoln	1,054,437	831,500	
Smithfield	391,142	310,631	
Warwick	3,356,533	2,853,017	
Sub-Total Wholesale	11,543,737	9,134,903	
Grand Total	23,353,937	18,535,009	

East Smithfield is no longer a wholesale customer as of 1/13/2017
Johnston is no longer a wholesale customer as fo 3/1/2021

BCWA 12-12: Regarding Schedule HJS-15B and the assignment of non-revenue water to the BCWA, please explain the steps taken to reach the calculation and, in particular, explain:

a. The derivation of 8.670 for pipe length.

b. The derivation of 1.028 for <=12."

c. The derivation of total non-billed use for the BCWA of 67,088, and show the calculation.

d. The derivation of real losses (leakage) for the BCWA of 12,842, and show the calculation

Response:

a. The 8.670 represents the length of pipe (in miles) attributable to serving BCWA under base demand conditions, based on the hydraulic model analysis. It is shown at the top of Table 2 ("Total" row) in Pare's March 4, 2021 memorandum.

b. The 1.028 represents the length of pipe (in miles) attributable to serving BCWA under base demand conditions, based on the hydraulic model analysis, for pipes 12 inches in diameter and smaller. The lengths for these mains are shown near the bottom of Table 2 ("Total" row) in Pare's March 4, 2021 memorandum.

c. The 67,088 represents BCWA's share of Aqueduct reservoir flushing and main flushing. 67,012 of the total represents the total volumes associated with flushing the Aqueduct Reservoir, multiplied by BCWA's share of pro-forma sales.

   67,012 HCF = 1,075,338 HCF x (1,494,845 HCF / 23,987,787 HCF) (or 6.23%)

   The remaining 77 HCF represents the total volumes attributable to main flushing, multiplied by BCWA's share of pipe length for mains 12 inches in diameter and smaller (see also 12-12b).

   77 HCF = 66,845 HCF x (1.028 miles / 897.495 miles) (or 0.11%)

   The sum of these two components is the 67,088 HCF.

d. Real losses (12,842 HCF), is determined by multiplying real losses (in total) by BCWA's share of pipe length as determined by the hydraulic model analysis (see also 12-12a). Real losses (in total) are calculated as annual water production, less annual sales, less specific sources of non-billable use (lines 8 – 14 on HJS-15b). BCWA's share of real losses is then calculated as follows:

12,842 HCF = 1,850,471 HCF x (8.670 miles / 1,249.331 miles) (or 0.69%)

The total miles, as noted in footnote 1 on HJS-15b includes an estimated 225 miles for customer service lines (i.e., 1,024 miles from Table 2 of Pare's memorandum + 225 miles).

BCWA 12-13: On page 8 of Harold Smith's direct testimony, he states that "the hydraulic model analysis demonstrates that the use of Providence Water's T&D system is not purely proportionate to demand, as the ASA COSS presumed. Kent County, for example, is Providence Water's second largest customer, but requires the least of amount of T&D infrastructure. Smithfield is the opposite, requiring the most infrastructure relative to the amount of water delivered. This approach improves the alignment between the way each customer uses the system and the way in which costs are allocated among the wholesale customers."

a. Please explain how the amount of infrastructure used by a wholesale customer directly correlates to base demand and please provide a citation to the M-1 Manual by page number and edition where this correlation is set forth as a generally accepted ratemaking principle.

b. Please explain how the amount of infrastructure used by a wholesale customer directly correlates to maximum day demand and please provide a citation to the M-1 Manual by page number and edition where this correlation is set forth as a generally accepted ratemaking principle.

c. Please explain how the amount of infrastructure used by a wholesale customer directly correlates to maximum hour demand and please provide a citation to the M-1 Manual by page number and edition where this correlation is set forth as a generally accepted ratemaking principle.

d. Please state whether Providence incurs costs, other than just infrastructure costs, to meet the base demand of the wholesale customers and, if so, explain what those costs are.

e. Please state whether Providence incurs costs, other than just infrastructure costs, to meet the maximum day demand of the wholesale customers and, if so, explain what those costs are.

f. Please state whether Providence incurs costs, other than just infrastructure costs, to meet the maximum hour demand of the wholesale customers and, if so, explain what those costs are.

Response:

a. In general, the same amount of infrastructure is used day after day to meet a wholesale customer's base demand. There is no language in the M-1 Manual that discusses "…how the amount of infrastructure used by a wholesale customer directly correlates to base demand…". However, the concept that meeting peak demands is more costly than meeting average demands is the underlying premise of the base extra-capacity approach to cost allocation which is discussed throughout the M-1 Manual.

b. In general, more infrastructure is required to meet a wholesale customer's maximum day demand than is required to meet base demand. This additional infrastructure could be in the form of additional treatment plant capacity, additional pumps, storage facilities and a larger portion of the pipes that comprise the transmission system. There is no language in the M-1 Manual that discusses "…how the amount of infrastructure used by a wholesale customer directly correlates to maximum day demand…". However, the concept that meeting peak demands is more costly than meeting average demands is the underlying premise of the base extra-capacity approach to cost allocation which is discussed throughout the M-1 Manual.

c. In general, more infrastructure is required to meet a wholesale customer's maximum hour demand than is required to meet base or maximum day demand. This additional infrastructure could be in the form of additional treatment plant capacity, additional pumps, storage facilities and a larger portion of the pipes that comprise the transmission system. There is no language in the M-1 Manual that discusses "…how the amount of infrastructure used by a wholesale customer directly correlates to maximum hour demand…". However, the concept that meeting peak demands is more costly than meeting average demands is the underlying premise of the base extra-capacity approach to cost allocation which is discussed throughout the M-1 Manual.

d. For the purposes of answering this question it is assumed that "infrastructure costs" are the costs associated with designing, building and maintaining the assets that comprise a utility system, also known as capital costs.

   Yes, Providence Water does incur costs other than infrastructure costs to meet average day, maximum day and peak hour demands. These are the utility's operating costs and include such things as salaries and benefits, power costs, chemical costs, and administrative costs to name a few.

e. See response to sub-question d.
f. See response to sub-question d.

BCWA 12-14: In Schedule HJS Amended Settlement-16c: Customer Class Units of Service, Providence provided calculations for “Base” and “Extra Capacity, Maximum Day Extra and Maximum Hour Extra” based on “HCF/d”. In Schedule HJS-16b: Customer Class Units of Service, Providence provided calculations for “Base Demand, Maximum Day, Maximum Hour” based on “Inch-Miles” and “Base Demand” based on “Inch-Miles <=12.”

a. Please explain in detail why Providence switched from HCF/d to Inch-Miles and why it was appropriate to make this switch.

b. Please state whether Mr. Smith has ever used Inch-Miles to make these calculations in any other cost of service study he has prepared or assisted in preparing.

c. Please provide a citation to the M-1 Manual by page number and edition where this methodology is set forth as a generally accepted ratemaking principle.

Response:

a. The switch to inch-miles, from HCF/d, was made for transmission and distribution related costs only. “Inch-miles <=12” was used exclusively to allocate the costs of the unidirectional flushing program, in recognition of the fact that Providence Water only flushes mains 12 inches and smaller. The switch was made to make use of the hydraulic model analysis conducted by Pare, which identifies the segments of Providence Water’s pipe network that are used by each wholesale customer under normal operating conditions. This is more refined than the old approach, which allocated these costs based on volumes. The presumption underlying this approach is that the use of Providence Water’s system is proportionate to volumes (i.e. larger customers use more pipes). The hydraulic model analysis revealed that this presumption does not hold for Providence Water’s system.

b. Mr. Smith has not used inch-miles to make this calculation in this exact same way in any other study he has prepared, or assisted in preparing. That said, Mr. Smith has used inch-miles data for the purpose of allocating transmission and distribution system costs. This data has been used in many prior Providence Water dockets to distinguish between transmission and distribution mains. In those dockets, pipe network related costs were split between transmission and distribution, using inch-miles information, under the presumption that mains larger than 12 inches were used by both wholesale and retail (i.e., transmission) and that mains smaller than 12 inches were used by retail only (i.e., distribution).

This approach is commonly used throughout the industry as one way to recognize that certain components of a utility's pipe network are not used to serve wholesale customers. Most utilities have the data readily available. That said, it is not the *only* way to allocate such costs. It is also not the most accurate way to allocate such costs. The hydraulic model approach is a more accurate way of applying the same logic. Instead of assuming that pipes of certain size are not used, it identifies which mains are actually used under different conditions. The simplified approach (i.e., identifying a diameter cut-off like 12 inches) is often used because the better alternative (i.e., a hydraulic model analysis) is not feasible for many utilities, even though it is more accurate.

c. Please see Providence Water's response to BCWA 12-1.

BCWA 12-15: The March 4, 2021 memorandum from Pare Corporation attached to Mr. Smith's testimony states: "An important element of this study is recognizing that the flow rate that each wholesale customer draws through Providence Water's system is not necessarily equal to their consumption on an average day, maximum day, or during a peak hour demand."

a. Please explain how the flow rate Bristol County draws through Providence Water's system is not necessarily equal to its consumption on an average day, maximum day, or during a peak hour demand.

b. Please explain how the flow rate East Providence draws through Providence Water's system is not necessarily equal to its consumption on an average day, maximum day, or during a peak hour demand.

c. Please explain how the flow rate Greenville draws through Providence Water's system is not necessarily equal to its consumption on an average day, maximum day, or during a peak hour demand.

d. Please explain how the flow rate Kent County draws through Providence Water's system is not necessarily equal to its consumption on an average day, maximum day, or during a peak hour demand.

e. Please explain how the flow rate Lincoln draws through Providence Water's system is not necessarily equal to its consumption on an average day, maximum day, or during a peak hour demand.

f. Please explain how the flow rate Smithfield draws through Providence Water's system is not necessarily equal to its consumption on an average day, maximum day, or during a peak hour demand.

g. Please explain how the flow rate Warwick draws through Providence Water's system is not necessarily equal to its consumption on an average day, maximum day, or during a peak hour demand.

RESPONSE:

(a) through (g):

During the construction of Providence's Water's hydraulic model, Pare evaluated the master meter records for all the wholesale customers and Providence Water's production records. Based on our review of those records, Pare estimated each wholesale customer's average day demand, maximum day demand, and peak hour demand.

When Pare analyzed real-time data (referred to as SCADA data) to evaluate how wholesale customers draw water, we identified that certain customers, particularly customers that pump (and East Providence which draws water in its own unique way), draw water through Providence's system differently than the way those customers consume water. Typically when developing a hydraulic model, a customer's average consumption is used as their average day demand, and their maximum single day of consumption is used as their maximum day demand. Those demands would typically be inserted in the model at the customer's location and would create a draw of water through the model's pipe network from the source to the customer. When Pare evaluated SCADA records, Pare identified that some customers, particularly customers that pump, consistently draw water at higher or lower rates than their average day consumption, maximum day consumption, or peak hour consumption.

An example would be a customer that pumps their water using either one pump or two pumps. That customer would draw water from Providence at one of three rates – 0 gallons per minute when no pumps are running, the rate equivalent to one pump running, and the rate equivalent to two pumps running. When that customer draws water, it does so most of the time with just one pump running. When their need for water increases, they might turn on a second pump and increase their draw rate to what two pumps can draw. So the draw rates match their pump capacity, not necessarily their consumption.

Smithfield, Lincoln, Greenville, and KCWA all draw their water through pumps. In general, their pumps have higher capacities than their average consumption rates. When they draw water during an average day demand scenario, they do so at a higher rate than their average demand. Also, they generally have higher pump capacities than their maximum day demands, and as such draw water during a maximum day scenario at a higher rate than their maximum day demand. Some customers have enough pump capacity to pump at higher rates than their peak hour demands, while other customers do not. The result is that Smithfield, Lincoln, and KCWA draw water during a peak hour scenario at lower rates than their estimate peak hour consumption. Greenville appears to draw water during a peak hour at a rate slightly higher than its estimated peak hour consumption.

East Providence draws water without the use of pumps. However, East Providence's connection to Providence is piped directly into East Providence's 6 million gallon storage tank. The water level in that tank is controlled by an altitude valve. When the tank is full, the altitude valve is closed and no water is drawn from Providence (draw rate of 0

MGD). When the valve opens the draw rate increases to approximately 9.3 MGD, the tank fills, and then the valve shuts. The result is a draw rate that resembles that of a customer that pumps. The difference is that the flow rate is controlled by a valve rather than a pump. Because of the way East Providence draws its water, the draw rate remains relatively consistent for average day demand, maximum day demand, and peak hour demand.

BCWA and Warwick are primarily gravity fed, although BCWA does have the ability to pump if it needs to. The draw rates for these two customers match their consumption rates for average day and maximum day demand. During a peak hour demand scenario, BCWA draws water at a slightly lower rate than their estimated peak hour demand. During a peak hour demand, Warwick draws water at a rate similar to its estimated peak hour demand.

Provided below is a table that summarizes the demand and draw rates for each wholesale customer.

Table of Demand and Draw Rates for Wholesale Customers during ADD, MDD, and PH Scenarios

WHOLESALER	Average Day Demand (MGD)	Average Draw Rate (MGD)	Maximum Day Demand (MGD)	Maximum Day Draw Rate (MGD)	Peak Hour Demand (MGD)	PH Draw (MGD)
BCWA	3.26	3.21	5.54	5.53	7.82	6.40
EP	3.74	9.30	6.36	9.30	8.97	9.30
GREENVILLE	0.91	1.68	1.54	2.70	2.18	2.70
KCWA	5.16	6.80	8.77	8.50	12.38	11.80
LWC	2.23	3.12	3.80	4.56	5.36	4.56
SMITHFIELD	0.88	1.35	1.50	2.00	2.11	2.00
WARWICK NATICK WARWICK PETTACONSETT	8.33	8.71	14.16	14.16	20.00	20.20

(Issued April 15, 2021)

BCWA 12-16: The March 4, 2021 memorandum from Pare Corporation attached to Mr. Smith's testimony states: "The draw rate for each wholesale customer was established in the model using recent SCADA data from days when Providence Water's system demand closely matched their ADD, MDD, and PH demands."

a. Who does "their" refer to, Providence or the wholesale customers?

b. Did Pare examine the actual ADD, MDD and PH demand for each wholesale customer, and if not, why not?

RESPONSE:

a. In the selected sentence, "their" refers to Providence Water.

b. Pare did examine actual ADD, MDD, and PH demands.

Prepared by: Tim Thies, P.E. Date: 4-27-2021

BCWA 12-17: The March 4, 2021 memorandum from Pare Corporation attached to Mr. Smith's testimony states: "Pare examined SCADA records for selected days to evaluate how each wholesale customer draws water from the Providence Water system." For each wholesale customer, please state:

a. The days Pare selected to evaluate.

b. The methodology and reasoning supporting the days selected.

RESPONSE:

(a) and (b)

For the development of the hydraulic model, Pare reviewed production and consumption records for the years 2016, 2017, and 2018. The specific dates that Pare reviewed when assessing wholesale customer draw rates were as follows.

i. May 23rd, 24th, and 25th, 2018
ii. July 13, 2016
iii. August 8th, 9th, and 10th, 2018, and
iv. February 8th, 9th, and 10th, 2018

Pare reviewed the SCADA records for these days for <u>all</u> wholesale customers.

For average day, May 24th was selected because on that day Providence Water's entire system (including wholesale customers) consumed 56.6 MGD, which is approximately equal to Providence Water's average day demand of 56.5 MGD. Pare also reviewed data for the day before and the day after May 24th to evaluate the consistency of the data from one day to another around that time. Pare reviewed SCADA records for all the wholesale customers for these dates because Pare expected that the wholesale customers' average demand days are on or near Providence Water's average demand day, and therefore it is Pare's opinion that these dates would be a good representation of the wholesale customers' average draw rate.

For maximum day and maximum hour, July 13, 2016 was selected because that was the single-highest water use day from 2016 through 2018. Pare reviewed SCADA records for all the wholesale customers for this date because Pare expected that the wholesale customers' maximum demand is on or near Providence Water's maximum demand day, and therefore it is Pare's opinion that these dates would be a good representation of the wholesale customers' maximum day draw rate.

The additional days were reviewed for comparison purposes. Those days included August 8th, 9th, and 10th. On those days, Providence Water used approximately 78-80 MGD, which is typical of their usage during the summer months of June, July, and August. February 8th, 9th, and 10th were also reviewed. On those days Providence Water used approximately 52 MGD, which is typical of the usage in the winter months. Pare reviewed SCADA records for all the wholesale customers for these dates.