PROVIDENCE WATER

Tap Water Delivers

August 2, 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 first(1rst) set of data requests from Greenville Water District and Lincoln Water Commission.

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)

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PROVIDENCE WATER SUPPLY BOARD
RIPUC DK. 4994
Greenville-Lincoln Set 1
NEW COST OF SERVICE STUDY

(Issued July 12, 2021)

Greenville-Lincoln 1-1: Referring to the hydraulic modeling performed by Pare Engineering for the Providence Water system, did Providence Water consider an Extended Period Simulation instead of restricting the modeling of the system to Steady State analysis? If so, why did Providence Water choose a Steady State analysis instead?

RESPONSE: An Extended Period Simulation (EPS) was not considered for this evaluation. Given the time it takes to perform the Steady State analysis for each wholesale customer for each demand scenario, it would be infeasible to perform an EPS for each wholesale customer in the timeframe of this study. Most EPS evaluations look at fluctuations in demand over a 24-hour period, usually on an hour-by-hour basis, which is equivalent to 24 individual Steady-State analyses. The current study included 21 individual analyses (7 wholesale customers x 3 demand scenarios). If EPS analyses were added to the maximum day demand and average day demand scenarios, the total number of individual analyses would increase from 21 to 357 (21 + 7 wholesale customers x 2 demand scenarios x 24 hours). Note: EPS analyses are not usually performed on peak hour demand scenarios.

It is Pare's opinion that Steady State analysis is appropriate for this study. The average day, maximum day, and peak hour Steady State scenarios capture broad trends in demand from average flows (average day demand) to extremely high flows (peak hour demand). It is Pare's opinion that Steady State analyses are a good representation of how water moves through Providence Water's system under most demand scenarios.

Prepared by: Tim Thies, P.E.

Date: 8-2-2021

Greenville-Lincoln 1-2: Referring to Providence Water's PUC Technical Session Presentation at page 9, given the availability of SCADA data, would it be feasible to run the model in real-time?

a. Are there specific SCADA date timeframes?

RESPONSE: Pare's understanding of the term "real-time" as it pertains to modeling is to simulate a specific timeframe or event in the model while that timeframe or event is happening. It is not practical to run a water system hydraulic model in "real-time". Each scenario created in the model is developed based on careful review of many input parameters, such as tank levels, pump settings, customer demand, valve status, etc. It is possible to simulate a wide variety of scenarios in the model and, if enough data is available, to create a model simulation of a specific date and time or a specific event. However, it would be nearly impossible to simulate a specific timeframe or a specific event as it is happening.

a. As provided in response to the previous request (BCWA 12-17), the following specific SCADA dates and timeframes were reviewed.

a. For the development of the hydraulic model, Pare reviewed production and consumption records for the years 2016, 2017, and 2019. The specific dates that Pare reviewed when assessing wholesale customer draw rates are:

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.

b. 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.

c. July 13, 2016 was selected because that was the single-highest water use day from 2016 through 2018.

d. 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.

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NEW COST OF SERVICE STUDY

(Issued July 12, 2021)

Greenville-Lincoln 1-3: Referring to Providence Water's PUC Technical Session Presentation at page 4, how many pipes comprise the model?

RESPONSE:

The model is comprised of 37,344 pipe segments.

Prepared by: Tim Thies, P.E,

Date: 8-2-2021

PROVIDENCE WATER SUPPLY BOARD
RIPUC DK. 4994
Greenville-Lincoln Set 1
NEW COST OF SERVICE STUDY

(Issued July 12, 2021)

Greenville-Lincoln 1-4: Referring again to Providence Water's PUC Technical Session Presentation at page 4, how fast does the model execute in a steady state on a typical desktop computer?

RESPONSE:

On a typical desktop computer, the model can execute a steady state analysis in under 2 minutes. It is important to note that the set up and post run analysis for each steady state condition requires 20 to 40 hours of engineering time.

Prepared by: Tim Thies, P.E.

Date: 8-2-2021

PROVIDENCE WATER SUPPLY BOARD
RIPUC DK. 4994
Greenville-Lincoln Set 1
NEW COST OF SERVICE STUDY

(Issued July 12, 2021)

Greenville-Lincoln 1-5: Referring to Providence Water Supply Board Tech Session Docket No. 4994, May 4, 2021 at page 24, when performing back tracing, what is the basis of flow assignment in the different arms of a split?

RESPONSE: As explained in Pare's March 4, 2021 memorandum, the basis for assigning flow in different arms of a split is as follows:

At each split, a certain percentage of the flow goes in one direction and a certain percentage goes in another direction. As the flow splits, the proportion that belongs to a wholesale customer splits proportionately. For example, if a pipe has a total flow rate of 100 gpm and splits into two pipes of 70 gpm and 30 gpm, the wholesale customers demand would split 70% and 30% accordingly. If the wholesale customer's draw rate is 50 gpm, one path would account for 70% or 35 gpm and the other would account for 30% or 15 gpm.

Prepared by: Tim Thies, P.E.

Date: 8-2-2021

PROVIDENCE WATER SUPPLY BOARD
RIPUC DK. 4994
Greenville-Lincoln Set 1
NEW COST OF SERVICE STUDY

(Issued July 12, 2021)

Greenville-Lincoln 1-6: Referring again to Providence Water Supply Board Tech Session Docket No. 4994, May 4, 2021 at page 24, in the process of back tracing, is the intent of the iterative approach, as it is described, to allocate the draw volume for each wholesale customer back to the treatment plant (source of supply) while establishing a unique path along the pipe network that is traversed by that volume?

RESPONSE: Yes

Prepared by: Tim Thies, P.E.

Date: 8-2-2021

PROVIDENCE WATER SUPPLY BOARD
RIPUC DK. 4994
Greenville-Lincoln Set 1
NEW COST OF SERVICE STUDY

(Issued July 12, 2021)

Greenville-Lincoln 1-7: Referring to Providence Water Supply Board Tech Session Docket No. 4994, May 4, 2021 at page 25, how is Providence Water calculating the portion of flow attributable to each wholesale customer?

a. Is the data being calculated hydraulically?

RESPONSE:

a. Hydraulic steady state analysis was conducted for each wholesale customer utilizing: (1) average day, (2) maximum day and (3) peak hour demand scenarios. An iterative approach was then used to assign flow within each pipe segment to the wholesale customers (and retail customers) at each of the 3 demand scenarios

Prepared by: Tim Thies, P.E.

Date: 8-2-2021

PROVIDENCE WATER SUPPLY BOARD
RIPUC DK. 4994
Greenville-Lincoln Set 1
NEW COST OF SERVICE STUDY

(Issued July 12, 2021)

Greenville-Lincoln 1-8: Referring to Providence Water's PUC Technical Session Presentation at page 13, would it be possible to see the wholesale customer draw rate data charted and in Excel? This is requested for each wholesale customer.

RESPONSE: Wholesale customer draw rates were provided in excel in response to the data request BCWA 13-2. A copy of the excel file provided for that response is attached.

Prepared by: Tim Thies, P.E.

Date: 8-2-2021

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	6.4
EP	3.74	9.3	6.36	9.3	8.97	9.3
GREENVILLE	0.91	1.68	1.54	2.7	2.18	2.7
KCWA	5.16	6.8	8.77	8.5	12.38	11.8
LWC	2.23	3.12	3.8	4.56	5.36	4.56
SMITHFIELD	0.88	1.35	1.5	2	2.11	2
WARWICK NATICK	8.33	8.71	14.16	14.16	20	20.2
WARWICK PETTACONSETT						

PROVIDENCE WATER SUPPLY BOARD
RIPUC DK. 4994
Greenville-Lincoln Set 1
NEW COST OF SERVICE STUDY

(Issued July 12, 2021)

Greenville-Lincoln 1-9: Referring to Providence Water Supply Board Tech Session Docket No. 4994, May 4, 2021 at page 29, how are the retail customers handled in the inch-mile analysis?

RESPONSE: As part of the response to data request BCWA 13-1(e), Pare was requested to add a row in Table 1 (from the March 4, 2021 memorandum) for Retail customers. Pare was also requested to add a column for Retail customers in Tables 2-4. The updated tables were provided in response to that request. Those updated tables are attached and depict the inch-mile analysis for the Retail customers.

Prepared by: Tim Thies, P.E.

Date: 8-2-2021

GWD-LWD 1-9 Table 1

PROVIDENCE WATER

WHOLESALE EVAL

SUMMARY															
WHOLESALER	ADD (gpm)	ADD (MGD)	Total Inch Miles	Wholesale Inch Miles	% Total Inch Miles	MDD (gpm)	MDD (MGD)	Total Inch Miles	Wholesale Inch Miles	% Total Inch Miles	PH DEMAND (gpm)	PH (MGD)	Total Inch Miles	Wholesale Inch Miles	% Total Inch Miles
BCWA	2229.17	3.21	1998.96	284.01	14%	3843.7	5.53	1966.07	341.53	17%	4444.44	6.40	1994.12	327.32	16%
EP	6458.33	9.30	1410.01	357.58	25%	6458.33	9.30	871.96	251.42	29%	6458.33	9.30	1410.01	241.73	17%
GREENVILLE	1166.67	1.68	833.22	114.54	14%	1875.00	2.70	873.11	111.66	13%	1875.00	2.70	822.80	55.09	7%
KCWA	4722.22	6.80	134.18	29.10	22%	5902.78	8.5	134.18	24.67	18%	8194.44	11.80	134.18	30.38	23%
LWC	2166.67	3.12	2206.48	304.87	14%	3166.67	4.56	1099.91	239.36	22%	3166.67	4.56	2178.07	137.96	6%
SMITHFIELD	937.50	1.35	2147.02	134.65	6%	1388.89	2.00	3135.85	187.91	6%	1388.89	2.00	2068.97	199.48	10%
WARWICK NATICK	4134.26	5.95	1033.33	184.90	18%	6857.80	9.88	1002.87	208.03	21%	9166.67	13.20	1033.33	252.97	24%
WARWICK PETTACONSETT	1916.67	2.76				2978.40	4.29				4861.11	7.00			
RETAIL	22229.17	32.01	10736.75	9363.51	87%	41576.39	59.87	10736.65	9444.48	88%	58577.36	84.35	10737.46	9528.54	89%

GWD-LWD 1-9 Table 2

AVERAGE DAY DEMAND										
		Providence	Retail	BCWA	EP	Greenville	KCWA	LWC	Smithfield	Warwick
Total	Inch Miles	10773.47	9363.51	284.01	357.88	114.54	29.10	304.87	134.65	184.90
	Miles	1024.32	983.13	8.67	3.89	5.35	0.37	15.77	4.19	2.96
	Pipe Segments	37344	37321	461	73	347	7	932	564	85
102"	Inch Miles	525.69	210.62	33.60	234.99	0	0	18.61	12.06	15.81
	Miles	5.15	2.06	0.33	2.30	0	0	0.18	0.12	0.16
	Pipe Segments	22	22	22	22	0	0	22	22	4
90"	Inch Miles	406.02	323.12	14.01	7.69	9.65	0.25	16.05	10.48	24.78
	Miles	4.51	3.59	0.16	0.09	0.11	0.003	0.18	0.12	0.28
	Pipe Segments	4	4	4	4	4	4	4	4	4
78"	Inch Miles	345.05	100.48	15.61	109.13	0	28.85	8.64	5.63	76.70
	Miles	4.42	1.29	0.20	1.40	0	0.37	0.11	0.07	0.98
	Pipe Segments	23	23	19	19	0	5	19	19	19
66"	Inch Miles	106.04	70.88	7.99	4.17	0.001	0	5.42	3.55	14.02
	Miles	1.61	1.07	0.12	0.06	0.00002	0	0.08	0.05	0.21
	Pipe Segments	14	14	11	8	1	0	10	10	10
60"	Inch Miles	263.97	222.15	0.91	1.57	8.62	0	18.30	11.07	1.34
	Miles	4.40	3.70	0.02	0.03	0.14	0	0.31	0.18	0.02
	Pipe Segments	50	50	14	12	30	0	47	47	8
48"	Inch Miles	154.81	91.65	2.93	0.04	1.01	0	35.70	23.37	0.12
	Miles	3.23	1.91	0.06	0.00	0.02	0	0.74	0.49	0.003
	Pipe Segments	51	51	7	3	6	0	39	39	3
42"	Inch Miles	205.59	124.91	1.64	0	0.01	0	20.73	13.46	44.84
	Miles	4.90	2.97	0.04	0	0.0003	0	0.49	0.32	1.07
	Pipe Segments	72	70	35	0	2	0	44	44	16
36"	Inch Miles	68.69	51.74	12.52	0.02	0.05	0	1.84	2.10	0.42
	Miles	1.91	1.44	0.35	0.001	0.002	0	0.05	0.06	0.01
	Pipe Segments	61	60	42	2	3	0	11	17	4
30"	Inch Miles	507.75	302.26	170.45	0	0.13	0	16.86	11.33	6.72
	Miles	16.93	10.08	5.68	0	0.004	0	0.56	0.38	0.22
	Pipe Segments	298	282	133	0	3	0	13	24	14
24"	Inch Miles	647.27	498.84	13.98	0.09	79.60	0	32.19	22.42	0.14
	Miles	26.97	20.79	0.58	0.004	3.32	0	1.34	0.93	0.006
	Pipe Segments	583	582	30	1	103	0	66	92	3
20"	Inch Miles	163.65	158.31	0.53	0	0.14	0	4.66	0.004	0
	Miles	8.18	7.92	0.03	0	0.01	0	0.23	0.0002	0
	Pipe Segments	197	197	20	0	2	0	4	1	0
16"	Inch Miles	713.98	657.53	1.23	0	0.52	0	46.16	8.54	0
	Miles	44.62	41.10	0.08	0	0.03	0	2.88	0.53	0
	Pipe Segments	1352	1351	20	0	6	0	83	107	0
12"	Inch Miles	1162.12	1104.36	2.54	0.04	3.44	0	42.11	9.62	0
	Miles	96.84	92.03	0.21	0.00	0.29	0	3.51	0.80	0
	Pipe Segments	3684	3682	27	2	50	0	200	123	0
10"	Inch Miles	12.29	12.29	0	0	0	0	0	0	0
	Miles	1.23	1.23	0	0	0	0	0	0	0
	Pipe Segments	71	71	0	0	0	0	0	0	0
8"	Inch Miles	2785.82	2740.71	4.70	0	11.25	0	28.17	1.00	0
	Miles	348.23	342.59	0.59	0	1.41	0	3.52	0.13	0
	Pipe Segments	11422	11422	65	0	131	0	271	12	0
6"	Inch Miles	2703.15	2692.21	1.38	0	0.12	0	9.43	0.01	0
	Miles	450.52	448.70	0.23	0	0.02	0	1.57	0.002	0
	Pipe Segments	19338	19338	12	0	6	0	99	3	0
<6"	Inch Miles	1.59	1.59	0	0	0	0	0	0	0
	Miles	0.67	0.67	0	0	0	0	0	0	0
	Pipe Segments	102	102	0	0	0	0	0	0	0

MAX DAY DEMAND										
		Providence	Retail	BCWA	EP	Greenville	KCWA	LWC	Smithfield	Warwick
Total	Inch Miles	10773.47	9444.48	341.53	251.42	111.66	24.67	239.36	152.33	208.03
	Miles	1024.32	986.28	9.18	2.71	4.83	0.32	13.07	4.72	3.22
	Pipe Segments	37344	37318	380	47	371	7	751	740	70
102"	Inch Miles	525.69	272.32	50.90	171.50	0	0	0	13.88	17.09
	Miles	5.15	2.67	0.50	1.68	0	0	0	0	0.17
	Pipe Segments	22	22	22	22	0	0	0	22	4
90"	Inch Miles	406.02	300.60	20.43	0.20	14.57	0.18	23.11	12.07	34.86
	Miles	4.51	3.34	0.23	0.00	0.16	0.002	0.26	0.13	0.39
	Pipe Segments	4	4	4	2	4	2	4	4	4
78"	Inch Miles	345.05	127.81	23.40	78.83	0	24.49	0	6.48	84.04
	Miles	4.42	1.64	0.30	1.01	0	0.31	0	0.08	1.08
	Pipe Segments	23	23	19	19	0	5	0	19	19
66"	Inch Miles	106.04	67.19	12.85	0	0.16	0	0.19	4.09	21.56
	Miles	1.61	1.02	0.19	0	0.002	0	0.003	0.06	0.33
	Pipe Segments	14	14	11	0	2	0	1	10	10
60"	Inch Miles	263.97	206.30	0.35	0.90	12.58	0	31.03	12.74	0.06
	Miles	4.40	3.44	0.01	0.02	0.21	0	0.52	0.21	0.001
	Pipe Segments	50	50	6	4	27	0	37	47	2
48"	Inch Miles	154.81	95.53	3.43	0	2.88	0	26.07	26.90	0
	Miles	3.23	1.99	0.07	0	0.06	0	0.54	0.56	0
	Pipe Segments	51	51	4	0	9	0	39	84	0
42"	Inch Miles	205.59	137.74	8.77	0	0.02	0	0.03	15.50	43.54
	Miles	4.90	3.28	0.21	0	0.0005	0	0.001	0.37	1.04
	Pipe Segments	72	70	35	0	2	0	2	46	16
36"	Inch Miles	68.69	46.95	17.55	0	0.10	0	1.74	1.99	0.36
	Miles	1.91	1.30	0.49	0	0.003	0	0.05	0.06	0.01
	Pipe Segments	61	59	40	0	2	0	12	28	2
30"	Inch Miles	507.75	288.44	186.04	0	0.07	0	14.95	11.73	6.52
	Miles	16.93	9.61	6.201333333	0	0.002	0	0.50	0.39	0.22
	Pipe Segments	298	283	133	0	1	0	13	31	13
24"	Inch Miles	647.27	514.44	11.96	0	66.97	0	28.86	25.04	0
	Miles	26.97	21.43	0.50	0	2.79	0	1.20	1.04	0
	Pipe Segments	583	583	30	0	109	0	68	200	0
20"	Inch Miles	163.65	158.34	0.56	0	0.11	0	4.63	0.00	0
	Miles	8.18	7.92	0.03	0	0.01	0	0.23	0.0002	0
	Pipe Segments	197	197	20	0	1	0	4	3	0
16"	Inch Miles	713.98	660.84	1.34	0	0.64	0	41.37	9.79	0
	Miles	44.62	41.30	0.08375	0	0.04	0	2.59	0.61	0
	Pipe Segments	1352	1349	20	0	16	0	76	108	0
12"	Inch Miles	1162.12	1108.62	3.22	0	3.81	0	35.54	10.93	0
	Miles	96.84	92.38	0.27	0	0.32	0	2.96	0.91	0
	Pipe Segments	3684	3681	25	0	54	0	190	123	0
10"	Inch Miles	12.29	12.29	0	0	0	0	0	0	0
	Miles	1.23	1.23	0	0	0	0	0	0	0
	Pipe Segments	71	71	0	0	0	0	0	0	0
8"	Inch Miles	2785.82	2748.86	0.48	0	9.2	0	26.13	1.15	0
	Miles	348.23	343.61	0.06	0	1.15	0	3.27	0	0
	Pipe Segments	11422	11422	8	0	129	0	243	12	0
6"	Inch Miles	2703.15	2696.63	0.25	0	0.54	0	5.71	0.02	0
	Miles	450.52	449.44	0.04	0	0.09	0	0.95	0	0
	Pipe Segments	19338	19338	3	0	17	0	62	3	0
<6"	Inch Miles	1.59	1.59	0	0	0	0	0	0	0
	Miles	0.67	0.67	0	0	0	0	0	0	0
	Pipe Segments	102	102	0	0	0	0	0	0	0

PEAK HOUR										
		Providence	Retail	BCWA	EP	Greenville	KCWA	LWC	Smithfield	Warwick
Total	Inch Miles	10773.47	9528.54	327.32	241.73	55.09	30.38	137.97	199.48	252.97
	Miles	1024.32	991.50	8.56	2.60	2.80	0.39	8.45	6.19	3.83
	Pipe Segm	37344	37321	401	73	307	7	888	510	85
102"	Inch Miles	525.69	258.72	57.75	166.71	0	0	3.03	18.08	21.40
	Miles	5.15	2.54	0.57	1.63	0	0	0.03	0.18	0.21
	Pipe Segm	22	22	22	22	0	0	22	22	4
90"	Inch Miles	406.02	311.90	18.46	3.31	1.70	0.25	7.13	15.72	47.55
	Miles	4.51	3.47	0.21	0.04	0.02	0.003	0.08	0.17	0.53
	Pipe Segm	4	4	4	4	4	2	4	4	4
78"	Inch Miles	345.05	109.31	23.64	69.10	0	30.13	1.24	8.44	103.18
	Miles	4.42	1.40	0.30	0.89	0	0.39	0.02	0.11	1.32
	Pipe Segm	23	23	19	19	0	5	19	19	19
66"	Inch Miles	106.04	65.08	9.29	1.44	0.12	0	1.00	5.32	23.79
	Miles	1.61	0.99	0.14	0.02	0.002	0	0.02	0.08	0.36
	Pipe Segm	14	14	11	8	3	0	10	10	10
60"	Inch Miles	263.97	232.13	1.35	1.05	1.71	0	8.25	16.6	2.87
	Miles	4.40	3.87	0.02	0.02	0.03	0	0.14	0.28	0.05
	Pipe Segm	50	50	14	12	30	0	47	47	8
48"	Inch Miles	154.81	107.70	2.77	0.01	0.84	0	8.25	35.04	0.2
	Miles	3.23	2.24	0.06	0.0003	0.02	0	0.17	0.73	0.004
	Pipe Segm	51	51	7	3	6	0	39	39	3
42"	Inch Miles	205.59	122.28	12.62	0	0.003	0	4.15	20.19	46.35
	Miles	4.90	2.91	0.30	0	0.0001	0	0.10	0.48	1.10
	Pipe Segm	72	70	35	0	2	0	47	44	16
36"	Inch Miles	68.69	48.97	15.66	0.01	0.01	0	0.80	2.74	0.51
	Miles	1.91	1.36	0.44	0.0003	0.0003	0	0.02	0.076	0.01
	Pipe Segm	61	59	42	2	2	0	14	15	4
30"	Inch Miles	507.75	297.87	171.63	0	0.04	0	15.42	15.86	6.93
	Miles	16.93	9.93	5.72	0	0.001	0	0.51	0.53	0.23
	Pipe Segm	298	283	134	0	1	0	28	16	14
24"	Inch Miles	647.27	547.47	8.82	0.06	42.98	0	14.91	32.83	0.19
	Miles	26.97	22.81	0.37	0.00	1.79	0	0.62	1.37	0.008
	Pipe Segm	583	583	33	1	106	0	73	52	3
20"	Inch Miles	163.65	158.60	0.42	0	0.07	0	4.55	0.006	0
	Miles	8.18	7.93	0.02	0	0.004	0	0.23	0.00	0
	Pipe Segm	197	197	20	0	2	0	4	1	0
16"	Inch Miles	713.98	675.45	1.12	0	0.12	0	24.53	12.76	0
	Miles	44.62	42.22	0.07	0	0.008	0	1.53	0.80	0
	Pipe Segm	1352	1348	20	0	10	0	113	103	0
12"	Inch Miles	1162.12	1122.79	3.13	0.03	0.53	0	21.27	14.36	0
	Miles	96.84	93.57	0.26	0.002	0.04	0	1.77	1.20	0
	Pipe Segm	3684	3684	25	2	9	0	156	123	0
10"	Inch Miles	12.29	12.29	0	0	0	0	0	0	0
	Miles	1.23	1.23	0	0	0	0	0	0	0
	Pipe Segm	71	71	0	0	0	0	0	0	0
8"	Inch Miles	2785.82	2760.61	0.47	0	6.67	0	16.569	1.50	0
	Miles	348.23	345.08	0.06	0	0.83	0	2.07	0.19	0
	Pipe Segm	11422	11422	12	0	121	0	225	12	0
6"	Inch Miles	2703.15	2695.77	0.19	0	0.30	0	6.87	0.02	0
	Miles	450.52	449.29	0.03	0	0.05	0	1.15	0.003	0
	Pipe Segm	19338	19338	3	0	11	0	87	3	0
<6"	Inch Miles	1.59	1.59	0	0	0	0	0	0	0
	Miles	0.67	0.67	0	0	0	0	0	0	0
	Pipe Segm	102	102	0	0	0	0	0	0	0

Greenville-Lincoln 1-10: Did Providence Water produce a table like the one on page 17 of its PUC Technical Session Presentation for each wholesale customer?

a. Is the flow in column G of this table calculated by the model on a steady state basis?
b. Does Providence Water have similar tables for retail customers? If so, please produce copies of these tables.
c. Is the percentage value in column O of this table derived from the back tracing analysis?

RESPONSE: Yes, the table provided on page 17 of the PUC Technical Session Presentation was produced for each wholesale customer.

a. Yes, the flow in column G is calculated by the model on a steady state basis.
b. No, a similar table was not produced for retail customers. The inch-mile analysis for retail customers was calculated based subtraction of the wholesale customers from the total inch-miles in the system.
c. Yes, the value in column O is derived from the back tracing analysis.

PROVIDENCE WATER SUPPLY BOARD
RIPUC DK. 4994
Greenville-Lincoln Set 1
NEW COST OF SERVICE STUDY

(Issued July 12, 2021)

Greenville-Lincoln 1-11: Referring to Providence Water's PUC Technical Session Presentation at page 17, is there a separate table each for ADD, MDD, and PH?

a. If so, please produce a copy of each table.

RESPONSE: Yes, a separate table was prepared for each ADD, MDD, and PH, and for each wholesale customer (21 tables total). A copy of each table was provided, in excel format, in response to data request BCWA 13-1. A copy of the excel file is attached as "Wholesale Eval Summary v8".

Prepared by: Tim Thies, P.E.

Date: 8-2-2021

PROVIDENCE WATER SUPPLY BOARD
RIPUC DK. 4994
Greenville-Lincoln Set 1
NEW COST OF SERVICE STUDY

(Issued July 12, 2021)

Greenville-Lincoln 1-12: The % Total Inch Miles columns on the Summary of Inch-Mile Analysis on page 19 of Providence Water's PUC Technical Session Presentation total out to be 113%, 126% and 103% respectively. Please explain why the % Total Inch Miles summation is more than 100%.

RESPONSE: The Total Inch Miles columns in the summary table are not intended to be added together. The percentage noted for one wholesale customer has no direct relationship to the percentage noted for another wholesale customer. The "percentage" refers to the percent that each wholesale customer utilizes of the total inch-miles that they touch as their water passes through the Providence Water system. For example, BCWA's water flows through pipes that have a total inch-mile quantity of 1998.96 inch-miles during an average day demand scenario. However, BCWA is not the only customer to utilize that specific set of pipes. Based on how much of the water in those pipes is BCWA's water, BCWA utilizes only 284.01 inch-miles out of the total 1998.96 inch-miles, or approximately 14 percent of that set of pipes. The fact that each of those three columns add up to something close to 100% is a coincidence.

Prepared by: Tim Thies, P.E.

Date: 8-2-2021

PROVIDENCE WATER SUPPLY BOARD
RIPUC DK. 4994
Greenville-Lincoln Set 1
NEW COST OF SERVICE STUDY

(Issued July 12, 2021)

Greenville-Lincoln 1-13: Does the term "PH Demand" on page 19 of Providence Water's PUC Technical Session Presentation refer to Draw Rate in all cases?

RESPONSE: "PH Demand" stands for Peak Hour Demand which is based on a calculated draw rate for each wholesale customer.

Prepared by: Tim Thies, P.E.

Date: 8-2-2021

PROVIDENCE WATER SUPPLY BOARD
RIPUC DK. 4994
Greenville-Lincoln Set 1
NEW COST OF SERVICE STUDY

(Issued July 12, 2021)

Greenville-Lincoln 1-14: Referring to Providence Water Supple Board Technical Session Presentation, how will future Providence Water infrastructure upgrades impact the rate analysis?

Response:

Future infrastructure upgrades would be factored into the allocation of capital costs using net book value, consistent with the current approach. To the extent that an upgrade changes the manner in which service is delivered to a specific customer class, the approach may need to be modified.

Prepared by: Harold Smith

7/16/2021

Greenville-Lincoln 1-15: Referring to Providence Water's inch-mile/backtracing analysis, how many instances did the <1% draw rate occur?

a. If the <1% occurs frequently, does the cumulative flow have a bigger impact?

b. If this is now the model for rate increases/ COSS, will a new rate study/COSS be performed every year to account for changes in infrastructure and demands?

c. If not, then how can wholesalers expect that their bill is accurate year by year?

Response: The number of instances where "<1%" occurred varied for each wholesale customer and for each demand scenario. Some customers, such as KCWA, had no instances of "<1%", while other customers, such as Lincoln and Greenville had a dozen or more instances of "<1%".

a. It's Pare's opinion that the "<1%" occurrence has a very minor impact on the inch-mile analysis, even for wholesale customers to whom it occurred relatively frequently. The reason the impact is minor is that these occurrences typically happened in relatively small diameter pipes segments (12 inches or less) with short lengths. In the inch-mile analysis, pipe segments with small diameters and short lengths have a very small impact on the total inch-mile analysis. For example, Providence Water's system has approximately 14 miles of 102", 90", and 78" diameter pipe, collectively. These three sizes account for approximately 1,276 inch-miles in the system. For comparison, Providence also has approximately 97 miles of 12-inch pipe that accounts for approximately 1,162 inch-miles of pipe in the system. While the larger diameter pipe is only a fraction of the length of the 12-inch pipe, it accounts for more inch-miles than the 12-inch diameter pipe. The combination of small diameter and short length results in very few inch-miles. Therefore, excluding these occurrences from the analysis has a very minor impact on the overall study.

b. No.

c. The cost of service study used to determine wholesale rates is always a "point in time" determination. That said, it is unlikely that the infrastructure and demands used in the cost of service study would fluctuate enough from year to year to result in materially different allocations to wholesale customers. Providence Water's current approach, of filing a full rate case approximately every 3 years is reasonable. While rates calculated every 3 years will not be identical to rates calculated every year, they are not likely to be materially different.