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<b>Subject</b>	<b>Review of Monthly Capacity Charges</b>	<b>Project Name</b>	Petersburg, VA Rate Study Update and Cost of Service Analysis
<b>Attention</b>	Roland Kooch/Davenport and Company, LLC	<b>Project No.</b>	708194CH
<b>From</b>	Keith Bishton		
<b>Date</b>	March 4, 2019		
<b>Copies to</b>	Mike Matichich/Jacobs, RT Taylor/Davenport and Company, LLC		

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### Purpose

The purpose of this memorandum is to document our review of the City of Petersburg's (the City) current capacity charge. In particular, the City expressed concern that residential customers with a meter greater than 5/8 inch are paying more than residential customers with 5/8 inch meter, based on feedback to City staff from some customers. In other words, should all residential properties pay the same monthly capacity charge regardless of meter size?

### Key Results

The following is a summary of three options for addressing the capacity charge issue stated in the aforementioned purpose. Table 1 summarizes the resulting monthly capacity charges by option by meter size and compares the three options to the current capacity charge. The options have been structured to be revenue neutral; that is, all three options would produce the same estimated \$2.2 Million that is generated by the current capacity charge structure.

#### Option 1 – Capacity Charge Is the Same for All Meter Sizes and Customer Types

- Avoids different charges for residential properties with different meter sizes, but does not address the cost of installation, readiness to serve, and capacity demand based on meter size.
- Residential customer with a 5/8 inch or 3/4 inch meter pays \$6.76 more per month than they are currently paying.
- Residential customer with a 1 inch meter pays \$6.52 less per month than they are currently paying.
- It is common for utilities to have a uniform rate structure; however it does result in shifting costs to smaller meter sizes.

#### Option 2 – Capacity Charges Based on Meter Capacity Factors Assuming a 5/8 Inch Meter

- Realigns the capacity charge based on meter capacity but does not address different charges for residential properties with different meter sizes, unless City verifies and/or replaces meter greater than 5/8 inches.
- Residential customer with a 5/8 inch meter pays \$0.01 less per month compared to what they are currently paying.
- Residential customer with a 3/4 inch meter pays \$4.41 more per month compared to what they are currently paying.
- Residential customer with a 1 inch meter pays \$0.04 less per month compared to what they are currently paying.

- Would provide most equitable solution if the City initiates a project to verify and replace residential meters. If a meter greater than 5/8 inch is required, justification will be available for higher monthly charge.

**Option 3 – Hybrid Approach Assuming 5/8, 3/4, And 1 Inch Meters Pay the Same**

- Avoids different charges for most of the properties, but does not address different charges for residential properties with different meter sizes
- Residential customer with a 5/8 inch meter pays \$3.64 more per month than they are currently paying.
- Residential customer with a 3/4 inch meter pays \$3.64 more per month than they are currently paying.
- Residential customer with a 1 inch meter pays \$9.64 less per month than they are currently paying.

Table 1. Capacity Charge by Meter Size by Option

Meter Size	Current Petersburg Monthly Capacity Charge*	Option 1- Uniform	Option 2- Capacity Factors	Option 3- Hybrid
5/8 inch	\$8.84	\$15.60	\$8.83	\$12.48
3/4 inch	\$8.84	\$15.60	\$13.25	\$12.48
1 inch	\$22.12	\$15.60	\$22.08	\$12.48
1-1/2 inch	\$38.67	\$15.60	\$44.15	\$37.44
2 inch	\$70.68	\$15.60	\$70.64	\$59.91
3 inch	\$141.34	\$15.60	\$132.45	\$112.32
4 inch	\$220.86	\$15.60	\$220.76	\$187.21
6 inch	\$441.76	\$15.60	\$441.51	\$374.41
8 inch	\$883.52	\$15.60	\$706.42	\$599.06
10 inch	\$1,369.44	\$15.60	\$1,015.48	\$861.15

\* based on Rates and Fees as of July 1, 2017

**Recommendations and Conclusions**

- Charging residential customers with a 1 inch meter the same amount as a 5/8 inch meter, but not doing the same for commercial and industrial customers could be considered an instance of rate discrimination that could result in a legal challenge. The City should consult with City Attorney regarding legal ramifications.
- Option 2 is recommended. However, this option does not address different charges for residential (as well as commercial and industrial) properties with different meter sizes. The City may want to initiate a project to verify and replace residential meters with meters of an appropriate capacity for residential usage. If a meter greater than 5/8 inch is required, justification will be available for higher monthly charge.
- If the City is not able to verify and replace residential meters with meters of an appropriate capacity for residential use, Option 1 provides the best option to avoid different charges for residential (as well as commercial and industrial) properties with different meter sizes. This is especially true since most customers are residential with 5/8 inch meters. The only caveat is to confirm capacity charge revenues are maintained at sufficient levels compared with the volume charge.

- Option 3 is not recommended because it does not address the inter- and intra-class subsidy and would result in an unfair and inequitable rate structure. For example, there residential properties with meter sizes greater than 1 inch.

**Detailed Analysis**

Based on billing data collected as of October 2018, Table 2 provides a cross tabulation of the number of customers by meter size and account type (i.e., residential, commercial, and industrial). There are 8,874 residential customers with 5/8 inch or 3/4 inch meters and based on rates as of July 1, 2017 pay \$8.84 per month. Whereas, there are 2,181 residential customers with a 1 inch meter that pay \$22.12 per month, or \$13.28 more per month compared to residential customers with a 5/8 inch meter.

Table 2. Number of Active Account Customers by Meter Size by Account Type

Meter Size (inches)	Count	Percent of Total	Residential	Commercial	Industrial	Multifamily
5/8 inch	8,588	72.7%	8,017	510	4	57
3/4 inch	210	1.8%	175	31	1	3
1 inch	2,426	20.5%	2,037	347	3	39
1-1/2 inch	228	1.9%	79	100	4	45
2 inch	291	2.5%	78	170	0	43
3 inch	22	0.2%	5	15	0	2
4 inch	21	0.2%	3	10	4	4
6 inch	19	0.2%	3	12	3	1
8 inch	2	0.02%	1	0	0	1
10 inch	4	0.03%	0	0	4	0
<b>Total</b>	<b>11,811</b>	<b>100%</b>	<b>10,398</b>	<b>1,195</b>	<b>23</b>	<b>195</b>

Source: billing data provided by City October 2018.

The most common meter size for residential customers is 5/8 inch. However, depending on development patterns and other circumstances, it is possible for 3/4 or 1 inch meters to be used. Based on information presented in Table 1, approximately 2,600 (23 percent) residential customers have a meter that is greater 5/8 inch. There are several questions to address, including the following:

- Have the meters been field verified?  
Based on discussion with City, accounts with Rate Code 20 have been verified.
- Why does the residential property have a meter greater than 5/8 inch?  
Unknown. A more detailed review of zoning and land use could help identify a reason.
- Do zoning and development regulations require the residential property to have meter greater than 5/8 inch?

Unknown. A more detailed review of zoning and land use could help identify particular requirements

- Can the meter be changed out with a 5/8 inch meter?

The City does not have project to change out meters. However, a customer can pay for meter change out.

When considering a fair and equitable rate structure, development of a rate schedule for a monthly capacity charge that recognizes meter size is typically based on meter capacity (i.e., gallons per minute). Developing a rate structure that recognizes meter size helps design rates that recover cost associated with different size meters. In particular, the cost of installation, readiness to serve, and capacity demand. Each size meter has a capacity rating in terms of the amount of water that delivered. Table 3 summarizes meter capacity by meter size. A 5/8 inch meter has a rate capacity of 20 gpm, whereas a 1 inch meter has a rated capacity of 50 gpm. These meter capacities are often used to develop factors for rate setting purposes. Table 3 also summarizes factors based on 5/8 inch meter compared to factors based on the City current rate structure. In addition, factors based on the City's current schedule of capacity charges is summarized, in which there are notable differences. For example, the charge for 3/4 and 1 inch meters is the same, while factors based on meter capacity would results in a rate differential.

Table 3. Meter Capacity by Meter Size

Meter Size	Meter Capacity (gpm)*	Factor based on 5/8" Meter	Petersburg Factor based Current Rate Structure**
5/8 inch	20	1.00	1.00
3/4 inch	30	1.50	2.50
1 inch	50	2.50	2.50
1-1/2 inch	100	5.00	4.37
2 inch	160	8.00	8.00
3 inch	300	15.00	15.99
4 inch	500	25.00	24.98
6 inch	1,000	50.00	49.97
8 inch	1,600	80.00	99.95
10 inch	2,300	115.00	154.91

\*AWWA MANUAL M6

\*\*Current Rates and Fees as of July 1, 2017

The factors presented in Table 3 can be used to evaluate options for addressing equity and fairness of the City's capacity charge rate schedule. A starting point is to evaluate capacity charge revenues based on the rate schedule as of July 1, 2017 (current rates). This establishes the baseline conditions and other options that are evaluated will target the same revenue level to remain revenue neutral. Table 4 summarizes the estimated capacity charge revenues based on the number of customers by meter size. Options to consider are summarized in Table 5, along with advantages and disadvantages of each option.

Table 4. Estimated Capacity Charge Revenue based on Rates as of July 1, 2017

Meter Size	Petersburg Monthly Capacity Charge*	Current Factor* based on 5/8" Meter	Number of Accounts	Estimated Capacity Charge Revenue
5/8 inch	\$8.84	1.00	8,588	\$911,015
3/4 inch	\$8.84	1.00	210	\$22,277
1 inch	\$22.12	2.50	2,426	\$643,957
1-1/2 inch	\$38.67	4.37	228	\$105,801
2 inch	\$70.68	8.00	291	\$246,815
3 inch	\$141.34	15.99	22	\$37,314
4 inch	\$220.86	24.98	21	\$55,657
6 inch	\$441.76	49.97	19	\$100,721
8 inch	\$883.52	99.95	2	\$21,204
10 inch	\$1,369.44	154.91	4	\$65,733
			<b>11,811</b>	<b>\$2,210,494</b>

\* based on Rates and Fees as of July 1, 2017

Table 5. Options for Addressing Fairness and Equity of Capacity Charge

Option	Advantages	Disadvantages
1. Capacity Charge is the same for all meter sizes and customer types	Avoids different charges for residential properties with different meter sizes	Does not address cost of installation, readiness to serve, and capacity demand based on meter size. Shifts costs to smaller meter sizes
2. Capacity Charges based on meter capacity factors assuming on 5/8 inch meter	Realigns the capacity charge based on meter capacity.	Does not address different charges for residential properties with different meter sizes, unless City verifies and/or replaces meter greater than 5/8 inches.
3. Hybrid approach assuming 5/8, 3/4, and 1 Inch Meters Pay the Same	Avoids different charges for most of the properties.	Does not address different charges for residential properties with different meter sizes

Table 6 summarizes both the monthly capacity charge and estimated revenues by meter size if the City adopted a uniform flat rate for all meter sizes. As noted in Table 5, this avoids the issue of different charges for residential properties with different meter sizes. However, it results in shifting the costs to smaller meter sizes.

Table 6. Option 1, Capacity Charge Is the Same for All Meter Sizes and Customer Types

Meter Size	Petersburg Monthly Capacity Charge	Factor	Number of Accounts	Estimated Capacity Charge Revenue
5/8 inch	\$15.60	1.00	8,588	\$1,607,292
3/4 inch	\$15.60	1.00	210	\$39,303
1 inch	\$15.60	1.00	2,426	\$454,039
1-1/2 inch	\$15.60	1.00	228	\$42,671
2 inch	\$15.60	1.00	291	\$54,462
3 inch	\$15.60	1.00	22	\$4,117
4 inch	\$15.60	1.00	21	\$3,930
6 inch	\$15.60	1.00	19	\$3,556
8 inch	\$15.60	1.00	2	\$374
10 inch	\$15.60	1.00	4	\$749
			<b>11,811</b>	<b>\$2,210,494</b>

Table 7 summarizes the monthly capacity charge and estimate revenues by meter size if the City adopted a schedule of capacity charges based on AWWA meter capacity factors assuming 5/8 inch meter. As noted in Table 5, this realigns the capacity charge based on AWWA meter capacity factors. However, does not address different charges for residential properties with different meter sizes, unless City verifies and/or replaces meter greater than 5/8 inches.

Table 7. Option 2, Capacity Charges Based on Meter Capacity Factors Assuming 5/8 inch Meter

Meter Size	Petersburg Monthly Capacity Charge	Factor*	Number of Accounts	Estimated Capacity Charge Revenue
5/8 inch	\$8.83	1.00	8,588	\$910,010
3/4 inch	\$13.25	1.50	210	\$33,378
1 inch	\$22.08	2.50	2,426	\$642,666
1-1/2 inch	\$44.15	5.00	228	\$120,798
2 inch	\$70.64	8.00	291	\$246,682
3 inch	\$132.45	15.00	22	\$34,968
4 inch	\$220.76	25.00	21	\$55,631
6 inch	\$441.51	50.00	19	\$100,665
8 inch	\$706.42	80.00	2	\$16,954
10 inch	\$1,015.48	115.00	4	\$48,743
			<b>11,811</b>	<b>\$2,210,494</b>

\* AWWA MANUAL M6

Table 8 summarizes the monthly capacity charge and estimate revenues by meter size if the City adopted a hybrid schedule of capacity charges assuming 5/8, 3/4, and 1 Inch meters pay the same. As noted in Table 5 this avoids different charges for most of the properties. However, does not address different charges for residential properties with different meter sizes.

Table 8. Hybrid approach assuming 5/8, 3/4, and 1 Inch Meters Pay the Same

Meter Size	Petersburg Monthly Capacity Charge	Factor*	Number of Accounts	Estimated Capacity Charge Revenue
5/8 inch	\$12.48	1.00	8,588	\$1,286,178
3/4 inch	\$12.48	1.00	210	\$31,451
1 inch	\$12.48	1.00	2,426	\$363,329
1-1/2 inch	\$37.44	3.00	228	\$102,439
2 inch	\$59.91	4.80	291	\$209,191
3 inch	\$112.32	9.00	22	\$29,653
4 inch	\$187.21	15.00	21	\$47,176
6 inch	\$374.41	30.00	19	\$85,366
8 inch	\$599.06	48.00	2	\$14,377
10 inch	\$861.15	69.00	4	\$41,335
			<b>11,811</b>	<b>\$2,210,494</b>

\* Factors for meter sizes greater than 1 inch are based on average capacity for meter sizes 1 inch and less. For example, the factor for 1-1/2 inch meter is 33 gpm / 100 gpm (see Table 3).

### Assumptions

- Options 1 -3 are revenue neutral, that is, they result in the same amount of revenue.
- Developing a schedule of capacity charges based on meter capacity factors is fair and equitable based on cost of service principals and guidance provided by AWWA.