

November 12, 2018

Julie Peters, Controller
Capital Region Water
212 Locust Street, Suite 500
Harrisburg, PA 17101

RE: Water and Sewer Tapping Fees

Dear Ms. Peters:

Raftelis Financial Consultants, Inc. (“Raftelis”) has completed an evaluation to develop cost-justified water and sewer tapping fees for consideration by Capital Region Water (“CRW”). This letter documents the results of the analysis, which was based on the approach for establishing tapping fees set forth within Section 5607 of Title 53 of the Pennsylvania Consolidated Statutes (“PCS”). As one of the largest and most respected utility financial, rate, management, and operational consulting firms in the U.S., and having prepared similar fee calculations for utilities across the U.S. since 1993, Raftelis is qualified to perform tapping fee calculations for CRW.

Background

Tapping fees are one-time fees charged to property owners who desire to connect to the water or sewer system. The fees are intended to recover a portion of the capacity-related facilities, including, but not limited to, source of supply, treatment, pumping, transmission, trunk, interceptor and outfall mains, storage, sludge treatment or disposal, interconnection or other general system facilities.¹ CRW has not historically charged new customers a tapping fee, therefore, there are no existing water or sewer tapping fees to compare with the calculated fees summarized in this memorandum. Tapping fees differ from CRW’s connection fees, which serve to recover labor and other costs incurred by CRW to physically connect the service line to the street main.

Calculation Methodology

According to the PCS, the tapping fee cannot exceed an amount based on some or all of the following components:

- I. Capacity Part. The Capacity Part includes the cost of capacity-related facilities that provide existing service, excluding contributions and grant funded assets. These costs are required to be based on historical cost trended to current cost using published cost indexes or upon the historical cost, plus interest and other financing fees paid on debt financing such

¹ Title 53, Section 5607 of the Pennsylvania Consolidated Statutes.

facilities. If historical costs are not ascertainable, the costs may be based on an engineer's reasonable estimate of replacement cost. Outstanding debt related to the facilities is required to be subtracted from the base cost. The cost of facilities to be constructed or acquired may be included in the Capacity Part if the additional capacity to be provided by the facilities is included in the unit cost of capacity calculation.

- II. Distribution or Collection Part. This includes the cost of distribution or collection facilities required to provide service, such as mains, hydrants, and pumping stations, excluding contributions and grant funded assets. The costs are required to be based on historical cost trended to current cost using published cost indexes or upon the historical cost, plus interest and other financing fees paid on debt financing such facilities. If historical costs are not ascertainable, the costs may be based on an engineer's reasonable estimate of replacement cost. Outstanding debt related to the facilities is required to be subtracted from the base cost.
- III. Special Purpose Part. This includes special purpose facilities that are applicable only to a particular group of customers or for serving a particular purpose or a specific area based upon the cost of the facilities, including, but not limited to, booster pump stations, fire service facilities, water or sewer mains, pumping stations, and industrial wastewater treatment facilities. The costs are required to be based on historical cost trended to current cost using published cost indexes or upon the historical cost, plus interest and other financing fees paid on debt financing such facilities. If historical costs are not ascertainable, the costs may be based on an engineer's reasonable estimate of replacement cost. Outstanding debt related to the facilities is required to be subtracted from the base cost.
- IV. Reimbursement Part. The reimbursement part is only applicable to the users of certain specific facilities when a fee required to be collected from such users will be reimbursed to the person at whose expense the facilities were constructed.

As stated in the PCS, the tapping fee may not include:

- a. The same cost in more than one part of the tapping fee.
- b. The cost of expanding, replacing, or upgrading facilities serving only existing customers in order to meet stricter efficiency, environmental, regulatory, or safety standards, or to provide better service to or meet the needs of existing customers.
- c. Maintenance and operational expenses.

Based on the PCS, the following steps were completed to calculate tapping fees for CRW's water and sewer systems:

1. The replacement value of existing system facilities was calculated and adjustments were made for outstanding debt in accordance with the PCS to derive the net replacement value.

2. The unit cost of system capacity was estimated by dividing the net replacement value of existing system facilities by the current capacity of the system.
3. The amount of capacity associated with a service unit of new development was estimated. One equivalent residential dwelling unit (“EDU”) was defined as the smallest service unit of new development.
4. The tapping fee for one service unit of new development was calculated by multiplying the cost per unit of system capacity by the demand associated with one EDU.
5. The calculated tapping fee for one EDU was scaled for different categories of demand. For water, meter capacity ratios were used to scale tapping fees from one EDU to different categories of demand, as defined by the various customer meter sizes. For sewer, residential properties were assigned one EDU, while all non-residential properties were assigned one or more EDUs based on the estimated capacity needs of the property.

Tapping Fee Calculation

Step 1 – Estimate the Replacement Value of System Facilities and Apply Adjustments

A listing of water and sewer system fixed assets was provided by CRW, which included assets in service as of December 31, 2016. Each individual asset was reviewed based on its description to determine if the asset met the requirements for inclusion in the tapping fee calculation, according to Section 5607 of Title 53 of the PCS. If the asset was deemed to be allowable, it was included in the computation of the replacement value of system facilities, if not, it was excluded. In general, excluded assets included those related to administrative, maintenance and storage buildings, capitalized professional fees unrelated to the construction of allowable infrastructure, minor land improvements, meter equipment, office equipment and furnishings, operations and maintenance equipment, and vehicles and other motorized equipment.

Next, the replacement value of allowable assets was estimated. Each asset’s original cost, as included in the fixed asset listing, was escalated to current year (2018) dollars based on the year the asset was purchased and the corresponding escalation factor for that year. Escalation factors for each year were developed using the Engineering News Record’s Construction Cost Index (“ENR CCI”), which provides an annual index value representing the relative change in construction related costs for each year from 1908 through 2018 (as of March 2018). Using the ENR’s CCI to estimate an asset’s current replacement cost is an industry-accepted method by which to value system facilities.

The replacement cost new (“RCN”) value for CRW’s water and sewer assets that were allowable under the PCS are summarized in Table 1 and 2. As shown in Table 1, the RCN value of allowable water assets was estimated to be approximately \$215.2 million, and as shown in Table 2, the RCN value of allowable sewer assets was estimated to be approximately \$638.4 million. These replacement value totals include both the Capacity Part and the Distribution or Collection Part, as defined in the PCS.

**Table 1. Water System Replacement Value
for Capacity and Distribution-Related Water Assets**

Description	RCN Value
Prior Capital Additions	\$113,592,635
Building and Structure	55,686,541
Mains and Accessories	34,191,056
Construction and Improvements	11,624,780
Fixed Inventory	56,267
Plant Equipment	<u>54,069</u>
Total	\$215,205,348

RCN = Replacement cost new

**Table 2. Sewer System Replacement Value
for Capacity and Collection-Related Sewer Assets**

Description	RCN Value
Infrastructure	\$295,141,114
Building and Structures	217,681,877
Plant Equipment	113,601,682
Mains and Accessories	8,542,158
Construction in Progress	<u>3,433,842</u>
Total	\$638,400,673

RCN = Replacement cost new

An adjustment was made to the estimated water and sewer system RCN values in accordance with Section 5607 of Title 53 of the PCS, which requires outstanding debt to be subtracted from the RCN value of allowable system assets. This is described in more detail below. In addition, the PCS also requires an adjustment for contributed assets or those funded with grant monies, as these assets do not represent an investment in system capacity by CRW. Based on existing records available at the time of this report, no assets were identified by CRW as being contributed or funded with grants; therefore, no adjustments were made to the facility costs for contributions or grants.

Outstanding Debt Adjustment:

An adjustment for outstanding debt was applied to the RCN value per the PCS requirements. This is typically done to reflect that the portion of asset costs that were financed with debt will be repaid with revenues from water and sewer user charges. This adjustment prevents charging customers twice for the cost of the assets, once when paying the tapping fee, and then again when paying user charges. As of December 31, 2016, CRW's existing outstanding water system debt was comprised of three separate issues of Revenue Bonds and a General Obligation note with the Pennsylvania Infrastructure Investment Authority ("PENNVEST"). CRW's existing outstanding sewer system debt was comprised of a Revenue Bond issue and three separate Revenue Notes. A listing of the water and sewer system outstanding debt by debt type is shown in Table 3.

Table 3. Summary of Water and Sewer System Outstanding Debt

Description	FY 2016 Outstanding Balance
Water System:	
2008 Water Revenue Bonds	\$65,720,000
2015 Water System Improvement, General Obligation Note	4,775,039
2016 Water Revenue Refunding Bonds, Series A	49,735,000
2016 Water Revenue Refunding Bonds, Series B	<u>2,440,000</u>
Total	\$122,670,039
Sewer System:	
1998 Sewer Revenue Note, Series B	\$72,244
2009 Sewer Revenue Note	1,230,063
2014 Sewer Revenue Bonds, Series B	29,660,000
2014 Sewer Revenue Note, Series C	<u>19,949,934</u>
Total	\$50,912,241

The resulting adjustments to the water and sewer RCN values for outstanding debt and the resulting net water and sewer system RCN values are shown in Table 4.

Table 4. Calculation of Net Water and Sewer RCN Value

Description	Amount
Water System:	
Allowable System Facilities RCN	\$215,205,348
Less: Credit for Outstanding Debt	<u>-122,670,039</u>
Net System RCN	\$92,535,309
Sewer System:	
Allowable System Facilities RCN	\$638,400,673
Less: Credit for Outstanding Debt	<u>-50,912,241</u>
Net System RCN	\$587,488,432

RCN = Replacement cost new

As shown in Table 4, the net RCN value for the allowable water system assets was approximately \$92.5 million, and the net RCN value for the allowable sewer system assets was approximately \$587.5 million.

Step 2 – Calculate the Unit Cost of System Capacity

The cost per unit of system capacity was calculated by dividing the net system values (derived in Step 1) by the water and sewer system design capacities. The design capacity of CRW’s Robert E. Young Water Services Center Treatment Facility is currently 20 million gallons per day (“MGD”). Therefore, the cost per unit of system capacity for the water system was calculated to be \$4.63 per gallon per day (\$92,535,309 ÷ 20.0 MGD). The hydraulic design capacity of CRW’s Advanced

Wastewater Treatment Facility is currently 45 MGD. Therefore, the cost per unit of system capacity for the sewer system was calculated to be \$13.06 per gallon per day ($\$587,488,432 \div 45.0$ MGD).

Step 3 – Estimate the Amount of Capacity Per Service Unit of New Development

The smallest service unit of new development was defined as one equivalent domestic unit (“EDU”). The amount of capacity required for a new unit of residential development was identified based on the requirements of Section 5607 of Title 53 of the PCS, which states the following:

“Except as otherwise provided for the calculation of a special purpose part, the design capacity required by a new residential customer used in calculating sewer or water tapping fees shall not exceed an amount established by multiplying 65 gallons per capita per day for water capacity, 90 gallons per capita per day for sewer capacity times the average number of persons per household as established by the most recent census data provided by the United States Census Bureau.”

The appropriate number of persons per household used to derive the capacity per EDU was estimated based on the requirements of Section 5607 of Title 53 of the PCS, which states the following:

“If an authority service area is entirely within a municipal boundary for which there is corresponding census data specifying the average number of persons per household, issued by the United States Census Bureau, the average shall be used. If an authority service area is not entirely within a municipal boundary but is entirely within a county or other geographic area within Pennsylvania for which the United States Census Bureau has provided the average number of persons per household, then that average for the county or geographic area shall be used.”

CRW’s water system serves retail customers in the City of Harrisburg, the Borough of Penbrook, and parts of various outlying municipalities, including the Townships of Susquehanna and Lower Paxton. Therefore, as the water system’s service area extends across several municipal boundaries, each of which are within Dauphin County, the average number of persons per household within Dauphin County was used in the calculation. According to data provided by the U.S. Census Bureau, there was, on average, 2.4 persons per household in Dauphin County, Pennsylvania.²

CRW’s sewer system serves retail customers in the City of Harrisburg, but also serves a number of municipal customers on a wholesale basis, located outside the City, which include Susquehanna Township, Susquehanna Township Authority, Lower Paxton Township, Lower Paxton Township Authority, Swatara Township, Swatara Township Authority, Paxtang Borough, Penbrook Borough, Steelton Borough, and the Steelton Borough Authority. However, CRW has elected not to assess tapping fees to wholesale customers for new connections within their communities at this time. Therefore, the number of persons per household within the City of Harrisburg was used in the calculation. According to data provided by the U.S. Census Bureau, the average number of persons per household within the City of Harrisburg was 2.4.³

² U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates, Dauphin County.

³ U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates, City of Harrisburg.

The calculation of the amount of capacity demanded per unit of new residential development for both the water system and the sewer system is shown in Table 5.

Table 5. Calculation of Capacity Demanded per Unit of New Residential Development

Description	Amount
Water System:	
Per Capita Demand (GPD)	65.0
Persons per Household – Dauphin County	2.4
New Residential Customer Demand (GPD)	156.0
Sewer System:	
Per Capita Demand (GPD)	90.0
Persons per Household – Harrisburg	2.4
New Residential Customer Demand (GPD)	216.0

GPD = Gallons per day

As shown in Table 5, the level of demand per unit of new residential development, or one EDU, related to the water and sewer systems was 156 gallons per day (“GPD”) and 216 GPD, respectively.

Step 4 – Calculate the Tapping Fee per Unit of New Residential Development

The water and sewer tapping fee for one EDU was calculated by multiplying the unit cost of capacity from Step 2 by the capacity associated with one unit of new development from Step 3. This calculation is provided for both the water and sewer systems in Table 6.

Table 6. Calculation of Water and Sewer System Tapping Fees per EDU

Description	Amount
Water System:	
Net System Value	\$92,535,309
System Capacity (MGD)	20.0
Unit Cost of Capacity (\$ per GPD)	\$4.63
Capacity Required for 1 EDU (GPD)	156.0
Tapping Fee (per EDU)	\$722
Sewer System:	
Net System Value	\$587,488,432
System Capacity (MGD)	45.0
Unit Cost of Capacity (\$ per GPD)	\$13.06
Capacity Required for 1 EDU (GPD)	216.0
Tapping Fee (per EDU)	\$2,820

MGD = Million gallons per day, GPD = Gallons per day, EDU = Equivalent dwelling unit

As shown in Table 6, the water tapping fee was calculated to be \$722 per EDU, while the sewer tapping fee was calculated to be \$2,820 per EDU.

Step 5 – Scaling the Tapping Fee for Various Categories of Demand

The water tapping fees were scaled for various categories of water demand using water meter capacity ratios. The ratios were based on manufacturer rated meter capacities for each meter size, for the meter types typically installed by CRW. The rated meter capacities and resulting meter scaling factors are shown in Table 7.

Table 7. Rated Meter Capacities and Demand Scaling Factors by Meter Size

Meter Size	Rated Meter Capacity (GPM)	Calculated Scaling Factor
5/8" iPERL	25	1.0
3/4" iPERL	35	1.4
1" iPERL	55	2.2
1-1/2" OMNI	200	8.0
2" OMNI	200	8.0
3" OMNI	500	20
4" OMNI	1,000	40
6" OMNI	2,000	80
8" OMNI	2,700	108
10" OMNI	4,000	160
12"	5,300	212

GPM = Gallons per minute

The water tapping fees for various meter sizes were calculated by multiplying the tapping fee for one EDU by the calculated demand scaling factors shown in Table 7. One EDU was defined to be equal to the capacity associated with a 5/8-inch meter. The resulting water tapping fees for each meter size are shown in Table 8. The existing (FY 2018) connection fee charged by CRW to physically connect a new customer's service line to the street main is also included in Table 8, and this fee is added to the calculated tapping fee to show the total fees for a customer to connect to the water system.

Table 8. Calculated Water Tapping Fees and Existing (FY 2018) Connection Fees by Meter Size

Meter Size	Calculated Water Tapping Fee	Existing Water Connection Fee	Total
5/8" iPERL	\$721.78	\$0	\$721.78
3/4" iPERL	\$1,010	\$250	\$1,260
1" iPERL	\$1,588	\$300	\$1,888
1-1/2" OMNI	\$5,774	\$350	\$6,124
2" OMNI	\$5,774	\$400	\$6,174
3" OMNI	\$14,436	\$500	\$14,936
4" OMNI	\$28,871	\$600	\$29,471
6" OMNI	\$57,742	\$700	\$58,442
8" OMNI	\$77,952	\$800	\$78,752
10" OMNI	\$115,484	\$900	\$116,384
12"	\$153,016	\$1,000	\$154,016
<u>Private Fire Line:</u>			
2"	\$5,774	\$400	\$6,174
3"	\$14,436	\$500	\$14,936
4"	\$28,871	\$600	\$29,471
6"	\$57,742	\$700	\$58,442
8"	\$77,952	\$800	\$78,752
10"	\$115,484	\$900	\$116,384
12"	\$153,016	\$1,000	\$154,016
14"	\$153,016	\$1,000	\$154,016

The sewer tapping fees were scaled for various categories of demand using water meter capacity ratios. The ratios were based on manufacturer rated meter capacities for each meter size, for the meter types typically installed by CRW.

The sewer tapping fee for residential customers is \$2,820, corresponding to the customer demand associated with one service unit of new development, or EDU. It is recommended that the tapping fee for all non-residential sewer customers be calculated based on CRW's anticipated daily capacity associated with each new non-residential customer connecting to the sewer system. For example, if a new customer connecting to the sewer system is anticipated to have a demand of 1,000 gallons per day, then the sewer tapping fee would be calculated as shown in Table 9.

Table 9. Example Calculation of Non-Residential Sewer Tapping Fee

Description	Amount
<u>Step 1: Calculate # of EDU's:</u>	
Capacity associated with one EDU	216 GPD
Capacity demanded by non-RES customer	1,000 GPD
Number of EDU's (1,000 GPD ÷ 216 GPD)	4.6
<u>Step 2: Calculate Taping Fee:</u>	
Cost per EDU	\$2,820
Number of EDU's	4.6
Sewer tapping fee (\$2,820 × 4.6)	\$12,972

GPD = gallons per day.

In regard to assessing tapping fees to multifamily units (e.g., apartments or condos), the PCS states:

“An authority may use lower design capacity requirements and impose lower tapping fees for multifamily residential dwellings than imposed on other types of residential customers.”

Therefore, CRW may elect to assign multifamily units less than one EDU, as the capacity demanded by these units may be less than the amount demanded by a typical service unit of new residential development. For example, based on a review of customer data pertaining to multifamily and single-family residential units within CRW’s service area, it may be concluded that the average multifamily unit’s capacity demands are approximately 80 percent of an average single-family unit. If this is the case, then the water and sewer tapping fee for a new apartment unit could be calculated as follows, as shown in Table 10. It should be noted that the fees calculated in the table serve only as an example. CRW should thoroughly analyze the difference in capacity demands between apartment and typical residential dwellings before adjusting tapping fees for these units. Until such an analysis can be completed, it’s recommended that apartment units be assigned one EDU.

Table 10. Example Calculation of Multifamily Water and Sewer Tapping Fee

Description	Water Fee Calculation	Sewer Fee Calculation
Capacity Demanded by SF Unit	156.0 GPD	216.0 GPD
MF Capacity Demanded Adj. Factor	80%	80%
Capacity Demanded by MF Unit	124.8 GPD	172.8 GPD
Unit Cost of Capacity (\$ per GPD)	\$4.63	\$13.06
Tapping Fee per MF Unit	\$578	\$2,257

Summary

The calculated water tapping fees shown in Table 8 and the sewer tapping fee per EDU represent the cost justified level of tapping fees that were calculated for CRW according to Section 5607 of Title 53 of the PCS. If CRW chooses to assess fees that are less than those calculated, it is recommended that the adjusted water fee amounts still reflect the scaling factors by meter size, as shown in Table 7. Furthermore, if CRW elects to make adjustments to the tapping fees assessed to multifamily units, it should conduct a thorough evaluation of the capacity demands of multifamily and single-family units in its service area to justify the difference in the tapping fees assessed to these dwelling units.

We appreciate the opportunity to assist CRW with the calculation of its water and sewer tapping fees. Should you have questions or need any additional information, please do not hesitate to contact me at 518-391-8944.

Very truly yours,

RAFTELIS FINANCIAL CONSULTANTS, INC.



John M. Mastracchio, P.E., CFA
Vice President