

January 19, 2022

Mr. Whit Wheeler
Interim Public Utilities Director
City of Raleigh Public Utilities Department
One Exchange Plaza
219 Fayetteville Street Mall
Raleigh NC 27601

RE: Calculation of Water and Sewer Capital Facilities Fees for FY 2023

Dear Mr. Wheeler:

Raftelis Financial Consultants, Inc. (“Raftelis”) has completed an evaluation to develop the maximum cost-justified water and sewer system development fees for fiscal year (“FY”) 2023 for consideration by the City of Raleigh (City). This letter documents the results of the analysis, which is based on an approach for establishing system development fees set forth in North Carolina General Statute 162A Article 8 – “System Development Fees.” As one of the largest and most respected utility financial, rate, management, and operational consulting firms in the U.S., and having prepared system development fee calculations for utilities in North Carolina and across the U.S. since 1993, Raftelis is qualified to perform system development fee calculations for water and sewer utilities in North Carolina.

Background

System development fees are one-time charges assessed to new water and/or sewer customers, or developers or builders, to recover a proportional share of capital costs incurred to provide service availability and capacity for new customers. North Carolina General Statute 162A Article 8 (“Article 8”) provides for the uniform authority to implement system development fees for public water and sewer systems in North Carolina and was passed by the North Carolina General Assembly and signed into law on July 20, 2017, and subsequently revised by House Bill (“HB”) 826, HB 873 and HB 344. According to the statute, system development fees must be adopted in accordance with the conditions and limitations of Article 8, and be prepared by a financial professional or licensed professional engineer, qualified by experience and training or education, who, according to the Article, shall:

- Document in reasonable detail the facts and data used in the analysis and their sufficiency and reliability.
- Employ generally accepted accounting, engineering, and planning methodologies, including the buy-in, incremental cost or marginal cost, and combined cost approaches for each service, setting forth appropriate analysis to the consideration and selection of an approach appropriate to the circumstances and adapted as necessary to satisfy all requirements of the Article.

- Document and demonstrate the reliable application of the methodologies to the facts and data, including all reasoning, analysis, and interim calculations underlying each identifiable component of the system development fee and the aggregate thereof.
- Identify all assumptions and limiting conditions affecting the analysis and demonstrate that they do not materially undermine the reliability of conclusions reached.
- Calculate a final system development fee per service unit of new development and include an equivalency or conversion table for use in determining the fees applicable for various categories of demand.
- Consider a planning horizon of not less than 5 years, nor more than 20 years.
- Use the gallons per day per service unit that the local governmental unit applies to its water or sewer system engineering or planning purposes for water or sewer, as appropriate, in calculating the system development fee.

This letter report documents the results of the calculation of water and sewer system development fees for FY 2023 in accordance with these requirements.

Article 8 references three methodologies that can be used to calculate system development fees which include the buy-in method, the incremental cost method, and the combined cost method. A description of each of these methods follows:

Buy-In Method:

Under the Buy-In Method, a system development fee is calculated based on the proportional cost of each user's share of existing system capacity. This approach is typically used when existing facilities are able to provide adequate capacity to accommodate future growth. The cost of capacity is derived by dividing the estimated value of existing facilities by the current capacity provided by existing facilities. Certain adjustments to the value of existing facilities are made for developer contributed assets, grant funds, and the amount of outstanding debt.

Incremental Cost Method:

Under the Incremental Cost (or Marginal Cost) Method, a system development fee is calculated based on a new customer's proportional share of the incremental future cost of system capacity. This approach is typically used when existing facilities do not have adequate capacity to provide service to new customers, and the cost for new capacity can be tied to an approved capital improvement plan (CIP) that covers at least a 5-year planning period. The cost of capacity is calculated by dividing the total cost of growth-related capital investments by the additional capacity provided as a result of the investments.

Combined Method:

Under the Combined Method, a system development fee is calculated based on the blended value of both the existing and expanded system capacity. As such, it is a combination of the Buy-In and Incremental Cost methods. This method is typically used when existing facilities provide adequate capacity to accommodate a portion of the capacity needs of new customers, but where significant investment in new facilities to address a portion of the capacity needs of future growth is also

anticipated, or where some capacity is available in parts of the existing system, but incremental capacity will be needed for other parts of the system to serve new customers at some point in the future.

The Buy-In method was used to calculate the water and sewer system development fees for the City, since in general, the City's existing water and sewer treatment facilities have adequate capacity to accommodate the anticipated future growth over the near term. The following steps were completed to calculate the fees under the Buy-In Method:

1. The replacement value of existing system facilities was calculated, and adjustments were made to derive a net replacement value estimate in accordance with Article 8. Adjustments to the calculated replacement value included deducting accumulated depreciation, developer/grant funded contributions, and outstanding debt.
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 unit ("ERU") was defined as the smallest service unit of new development.
4. The system development fee for one service unit of development was calculated by multiplying the cost per unit of system capacity by the capacity associated with one ERU, as defined below.
5. The calculated system development fee for one ERU was scaled for different categories of demand. Meter capacity ratios were used to scale system development fees from a base meter size from the smallest unit of new development (one ERU) to different categories of demand, defined by different customer meter sizes.

The City has chosen to refer to these system development fees as Capital Facilities Fees, and as such, the remainder of this report will use this terminology.

Capital Facilities Fee Calculation

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

A listing of fixed assets was provided by the City from their accounting system, as of June 30, 2020, and was reviewed by Raftelis. Next, Raftelis estimated the replacement value of existing assets. The depreciated value of the assets was escalated to reflect an estimated replacement cost, or "replacement cost new less depreciation" (RCNLD). The asset values were escalated using the Handy Whitman Index of Public Utility Construction Costs (for the South Atlantic Region).

Article 8 defines allowable assets to include the following types, as provided in Section 201:

"A water supply, treatment, storage, or distribution facility, or a wastewater collection, treatment, or disposal facility providing a general benefit to the area that facility serves and is owned or operated, or to be owned and operated, by a local governmental unit. This shall include facilities for the reuse or reclamation of water and any land associated with the facility."

The method used to calculate capital facilities fees for the City included system facility assets that satisfy this definition. Small equipment, meters, vehicles, and administrative and miscellaneous buildings were excluded from the calculation. System facility assets also include accounting for water and sewer facilities that are in service, but not yet booked to fixed assets due to an internal lag in recording of completed projects. The estimated RCNLD values for water and sewer system assets allowable under Article 8 are provided in Table 1 and Table 2, respectively.

Table 1. Water System Value (RCNLD)

Description	RCNLD Value
Buildings	\$86,112,110
Equipment	6,789,330
Improvements	41,097,705
Land	43,192,755
Water Systems	756,598,077
Less:	
Admin and Misc. Buildings	(16,611,045)
Meters ¹	(25,407,627)
Equipment	(6,789,330)
Total	\$884,981,975

Table 2. Sewer System Value (RCNLD)

Description	RCNLD Value
Buildings	\$155,923,788
Equipment	5,287,328
Improvements	113,433,402
Land	65,384,816
Sewer Systems	822,688,018
Less:	
Admin and Misc. Buildings	(24,175,564)
Meters ¹	(25,407,627)
Equipment	(5,287,328)
Total	\$1,107,846,834

As shown in Table 1, the RCNLD value of the water system was estimated to be approximately \$884,981,975. As shown in Table 2, the RCNLD value of the sewer system was estimated to be approximately \$1,107,846,834. Several additional adjustments were made to the estimated water

¹ Meters were allocated equally in the fixed assets to water and sewer, and as such were deducted equally from water and sewer. The net effect is that there are no meter costs included in the system values for water or sewer.

and sewer system RCNLD values in accordance with Article 8, which included adjustments for contributed assets (developer/grant funded), and outstanding debt principal, as described below.

Contributed and Grant Funded Assets

The listing of fixed assets was reviewed to identify assets that were contributed or paid for by developers or funded by grants, and these assets were subtracted from the RCNLD value, as they do not represent an investment in system capacity by the City. In addition, the City has annexed many areas in and around its service area, and as a result, constructed many lines to serve these areas. The City has charged assessments to the customers that are the recipients of water and sewer service resulting from these annexations to help with the cost of the construction of these lines. Because these lines are paid for through a specific fee designed to recover the costs of these specific lines, and similar to both the developer contributed capital and the grant funded assets, these assets are not paid for by the City, the costs for these lines have been included as contributed assets. The total RCNLD value of contributed and grant funded water and sewer system assets was estimated to be \$155,831,286 and \$160,776,253 respectively.

Debt Credit:

A credit was applied to the RCNLD value to reflect that a portion of the outstanding debt associated with system facilities may be repaid with water and sewer monthly user charges. The amount of the credit was calculated by estimating the amount of existing outstanding debt attributable to both the water and sewer systems. The City's outstanding debt is comprised of Revenue Bonds, State Revolving Loans, and Equipment COP Loans for both the water and sewer systems. As of June 30, 2020, the total outstanding debt principal was \$717,062,076, of which \$318,435,286 is related to the water system and \$398,626,790 is related to the sewer system.

The resulting adjustments to the water and sewer RCNLD values for contributed and grant funded assets and outstanding debt principal are shown in Table 3.

Table 3. Calculation of Net Water and Sewer System Value

Description	Amount
Water System:	
System Facilities RCNLD	\$884,981,975
Less: Contributed/Grant Funded Assets	(155,831,286)
Less: Credit for Outstanding Debt ²	<u>(318,435,286)</u>
Net System Value (RCNLD)	\$410,715,403
Sewer System:	
System Facilities RCNLD	\$1,107,846,834
Less: Contributed/Grant Funded Contributed Assets	(160,776,253)
Less: Credit for Outstanding Debt ³	<u>(398,626,790)</u>
Net System Value (RCNLD)	\$548,443,791

Step 2 – Calculate the Unit Cost of System Capacity

The cost per unit of system capacity was calculated by dividing the adjusted RCNLD values (derived in Step 1) by the water and sewer system treatment capacities. The total treatment capacity of the water system is currently 102.0 million gallons per day (“MGD”). Therefore, the cost per unit of system capacity for the water system was calculated to be \$4.03 per gallon, per day ($\$410,715,403 \div 102.0 \text{ MGD}$). The total treatment capacity of the sewer system is 80.2 MGD. Therefore, the cost per unit of system capacity for the sewer system was calculated to be \$6.84 per gallon, per day ($\$548,443,791 \div 80.2 \text{ MGD}$).

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

The next step is to define the level of demand associated with the smallest meter size (5/8 inch) set to be consistent with the planning demands associated with a typical, or average, residential customer, referred to as an Equivalent Residential Unit or ERU. For water and sewer planning, the City uses 250 gallons per day (“GPD”) of water and sewer capacity for each residential unit and adjusts the 250 GPD to reflect water peaking and water loss, and sewer inflow and infiltration.⁴ For water, one ERU of peak day capacity is defined to be 359.10 GPD. For sewer, one ERU is defined to be 325.00 GPD. The calculation of both the water and sewer GPD per ERU is shown in Table 4, below:

² Represents all outstanding water debt principal as of June 30, 2020.

³ Represents all outstanding sewer debt principal as of June 30, 2020.

⁴ Water peaking factor is used to account for the maximum water usage on a single day that is expected within the year. The water system must have the capacity to meet this maximum day requirement. The peaking factor is calculated as the maximum day usage divided by the average day usage for the year.

Table 4. Water and Sewer Demand per ERU

	Water	Sewer
Gallons per day per RU	250	250
System Peaking Factor	1.33	n/a
Inflation and Inflow (I&I)	n/a	1.30
Water Loss Factor	1.08	n/a
GPD per ERU	359.10	325.00

Additional information in support of each of these factors or assumptions is provided below.

System Peaking Factor – The system peaking factor has a 3-year average of 1.33 as the ratio between maximum day production and average day production at the water treatment plants as shown in Table 5 below.

Table 5. System Peaking Factor

Year	Max Day MGD	Average Day MGD	System Peaking Factor
2018	63.40	49.34	1.29
2019	69.19	49.06	1.41
2020	67.40	51.43	1.31
3-Year Average			1.33

Water Loss Factor - The water loss factor includes unaccounted for water losses (e.g. leaks, slow meters, theft, etc.), and water losses that are accounted for but not billed (e.g. line flushing, fire protection, etc.). Based on the City’s annual water audit, this factor is determined to be 1.087, shown in Table 6.

Table 6. Water Loss Factor

Year	Water Loss %
2018	10.3%
2019	7.9%
2020	7.8%
3-Year Average	8.7%

Inflow/Infiltration Factor - This factor (3-year average of 1.30) represents the proportion of flows being returned to the water reclamation plants that is attributable to inflow and infiltration (I&I) that occurs in the wastewater collection system, shown in Table 7.

Table 7. Inflow/Infiltration Factor

Year	Total Water Produced (MGD)	Total Treated Sewer (MGD)	I&I Factor
2018	38.45	50.80	1.32
2019	39.43	50.58	1.28
2020	39.18	51.10	1.30
3-Year Average			1.30

Step 4 – Calculate the Capital Facilities Fee for One ERU

The capital facilities fee for one ERU was calculated by multiplying the unit cost of capacity from Step 2 by the capacity associated with one ERU from Step 3. The calculations are provided in Table 8.

Table 8. Calculation of Water and Sewer Capital Facilities Fees for Base Meter Size

Description	Amount
Water System:	
Net System Value	\$410,715,403
System Capacity (MGD)	102.0
Unit Cost of Capacity (\$ / gallon per day)	\$4.03
Capacity Required for 1 ERU (gallons per day)	359.10
Capital Facilities Fee (5/8-inch meter)	\$1,447
Sewer System:	
Net System Value	\$548,443,791
System Capacity (MGD)	80.2
Unit Cost of Capacity (\$ / gallon, per day)	\$6.84
Capacity Required for 1 ERU (gallons per day)	325.00
Capital Facilities Fee (5/8-inch meter)	\$2,223

Step 5 – Scale the Capital Facilities Fees for Various Categories of Demand

The capital facilities fees for various categories of demand were scaled using water meter capacity ratios. The scaling factors were based on rated meter capacities for each meter size, as published by the American Water Works Association in *Principles of Water Rates, Fees, and Charges*.⁵ The meter scaling factors are shown in Table 9.

⁵ Manual of Water Supply Practices (M1), Principles of Water Rates, Fees, and Charges, American Water Works Association, 7th Edition, Table VII.2-5 on p. 338.

Table 9. Scaling Factors by Meter Size

Meter Size	Meter Scaling Factor
5/8"	1.0
3/4"	1.5
1"	2.5
1-1/2"	5.0
2"	8.0
3"	16.0
4"	25.0
6"	50.0
8"	80.0
10"	210.0
12"	265.0

The capital facilities fees for various meter sizes were calculated by multiplying the capital facilities fee for one ERU by the meter scaling factors shown in Table 9. The resulting water and sewer capital facilities fees for all meter sizes are shown in Table 10.

Table 10. Water and Sewer Capital Facilities Fees by Meter Size for Single-Family Customers, Multi-Family Customers with Master Meters, and Non-Residential Customers

Meter Size	Water Fee	Sewer Fee	\$ Difference from FY 18 Water Fee	\$ Difference from FY 18 Sewer Fee
5/8"	\$1,447	\$2,223	\$74	(\$299)
3/4"	\$2,171	\$3,335	\$111	(\$449)
1"	\$3,618	\$5,558	\$185	(\$748)
1-1/2"	\$7,235	\$11,115	\$370	(\$1,495)
2"	\$11,576	\$17,784	\$592	(\$2,392)
3"	\$23,152	\$35,568	\$1,184	(\$4,784)
4"	\$36,175	\$55,575	\$1,850	(\$7,475)
6"	\$72,350	\$111,150	\$3,700	(\$14,950)
8"	\$115,760	\$177,840	\$5,920	(\$23,920)
10"	\$303,870	\$466,830	\$15,540	(\$62,790)
12"	\$383,455	\$589,095	\$19,610	(\$79,235)

The water and sewer capital facilities fees shown in Table 10 represent the cost justified level of capital facilities fees that can be assessed by the City, as stated in Article 8. If the City chooses to assess fees that are less than those shown in the table, the adjusted fee amounts should still reflect the scaling factors by meter size, as shown in Table 9.

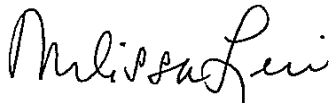
Mr. Whit Wheeler
City of Raleigh Public Utilities Department

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We appreciate the opportunity to assist the City with the calculation of its water and sewer capital facilities fees. Should you have questions or need any additional information, please do not hesitate to contact me at 704-936-4441.

Very truly yours,

RAFTELIS FINANCIAL CONSULTANTS, INC.

A handwritten signature in black ink that reads "Melissa Levin". The signature is written in a cursive, flowing style.

Melissa Levin
Vice President