

May 1, 2018

Don Greeley  
Director  
Department of Water Management  
City of Durham  
101 City Hall Plaza  
Durham, NC 27701

Dear Mr. Greeley

Raftelis Financial Consultants, Inc. (Raftelis) has completed an evaluation to develop cost-justified water and wastewater system development fees for consideration by the City of Durham, North Carolina (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 wastewater utilities in North Carolina.

## **Background**

System development fees are one-time charges assessed to new water and/or wastewater customers for their use of system capacity and serve as an equitable method by which to recover up-front system capacity costs from those using the capacity. North Carolina General Statute 162A Article 8 (“Article 8”) provides for the uniform authority to implement system development fees for public water and wastewater systems in North Carolina, and was recently passed by the North Carolina General Assembly and signed into law on July 20, 2017. According to the statute, system development fees must be adopted in accordance with the conditions and limitations of the Article 8, and those fees in effect as of October 1, 2017 must conform to the requirements set forth in the Article no later than July 1, 2018. In addition, the system development fees must also 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 10 years, nor more than 20 years.

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

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

#### Capacity Buy-In Approach

The Capacity Buy-In Methodology is most appropriate in cases where the existing system assets provide adequate capacity to provide service to new customers. This approach calculates a fee based upon the proportional cost of each user's share of existing plant capacity. The cost of the facilities is based on fixed assets records and usually includes escalation of the depreciated value of those assets to current dollars.

#### Incremental Cost Approach

The second method used to calculate water and wastewater system development fees is the Incremental Cost (or Marginal Cost) Methodology. This method focuses on the cost of adding additional facilities to serve new customers. It is most appropriate 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 10-year planning period.

#### Combined Approach

A combined approach, which is a combination of the Buy-In and Incremental Cost approaches, can be used when the existing assets provide some capacity to accommodate new customers, but where the capital improvement plan also identifies significant capital investment to add additional infrastructure to address future growth and capacity needs.

### **Summary of Results**

To perform the System Development Fee calculation, Raftelis requested and was provided with the following data from City staff:

- Water and wastewater fixed asset records;
- Outstanding utility debt and associated debt service;
- Contributed capital and grants;
- Capacity in water and wastewater systems;
- Daily water production data;
- Wastewater treatment plant flow data; and
- Water and wastewater billing data.

The Buy-In Approach was chosen as the method to calculate the system development fees for the City, since in general, the City's existing water and wastewater treatment facilities have adequate capacity to accommodate the anticipated growth in the near term. The City is currently in the process of expanding its Brown Water Treatment Plant (WTP). However, at this time, since the project is under construction, the capacity that will be provided from that expansion is not available. For this reason, the value of the Brown WTP construction in progress assets and the related capacity that is to be provided from the expansion have not been included in the calculation. It should be noted that 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.

Using the Buy-In approach, Raftelis calculated the estimated cost, or investment in, the current capacity available to provide utility services to existing and new customers. This analysis was based on a review of fixed asset records and other information as of June 30, 2017. The depreciated value of the assets was first adjusted to reflect an estimated replacement cost to determine the "replacement cost new less depreciation" (RCNLD) value for the assets. The asset values were escalated using the Handy Whitman Index of Public Utility Construction Costs (for the South Atlantic Region).

The RCNLD value of the water assets includes water supply, treatment, storage, transmission and distribution facilities and land, but excludes small equipment, meters and vehicles. The RCNLD value of the wastewater assets includes wastewater treatment, collection system facilities, disposal facilities and land, but excludes small equipment and vehicles.

Results of the asset escalation by asset category are shown in Exhibits 1 and 2.

**Exhibit 1: RCNLD of Existing Water Assets**

<b>Existing Water Assets</b>	
<b>Asset Category</b>	<b>RCNLD</b>
Treatment Plant	\$ 119,008,184
Water Distribution Systems	248,263,061
Land	10,242,181
<b>Total: Existing Water Assets</b>	<b>\$ 377,513,426</b>

**Exhibit 2: RCNLD of Existing Wastewater Assets**

<b>Existing Wastewater Assets</b>	
<b>Asset Category</b>	<b>RCNLD</b>
Treatment Plant	\$ 171,657,101
Sewer Collection Systems	440,488,991
Pumping Equipment	28,762,368
Land	18,635,709
<b>Total: Existing Wastewater Assets</b>	<b>\$ 659,544,169</b>

Several adjustments were then made to the estimated water and wastewater RCNLD values in accordance with Article 8, which included adjustments for contributed assets and grants and outstanding debt principal as described below.

Contributed Assets and Grants

The listing of fixed assets provided was reviewed to identify assets that were contributed or paid for by developers or funded with grants. Although the City must depreciate these assets, they were subtracted from the RCNLD value, as they do not represent an investment in system capacity made by the City.

Outstanding Debt Service Credit

Utilities often borrow funds to construct assets, and revenues from retail rates and charges can be used to make the payments on these borrowed funds. Per the City's Bond Order, which secures its outstanding revenue bonds, the City can include monies from Capital Facilities Fees as revenue for the purpose of calculating debt service coverage. As a result, it may be reasonable for the City not to exclude outstanding principal on existing debt in its calculation of Capital Facilities Fees, since these revenues can be used to pay for existing debt service. The reason outstanding debt service principal is often excluded is to provide assurance that new customers are not being double charged for these assets, once through the Capital Facilities Fees and again

through retail rates and charges. However, for the purpose of the calculation of Capital Facilities fees, as documented in this report, the outstanding principal on existing debt service has been excluded. The City may wish to re-examine the appropriateness of this credit in future calculations.

The RCNLD values for water and wastewater assets with the adjustments as described above are shown in Exhibits 3 and 4 below.

**Exhibit 3: Calculation of Water Assets for Capital Facilities Fee Calculation**

<b>Adjustments to Water Assets</b>	
<b>Total Water Assets</b>	<b>\$ 377,513,426</b>
<b>Plus:</b>	
Construction Work in Progress*	\$ 40,332,590
<b>Less:</b>	
Contributed Capital/Grants	<u>\$ (193,025,096)</u>
<b>Total: Net Water Assets</b>	<b>\$ 224,820,920</b>
<b>Less:</b>	
Outstanding Principal Debt	<u>\$ (38,057,170)</u>
<b>Water Assets for Capital Facilities Fee Calculation</b>	<b>\$ 186,763,750</b>

\*Excludes Brown WTP

**Exhibit 4: Calculation of Wastewater Assets for Capital Facilities Fee Calculation**

<b>Adjustments to Wastewater Assets</b>	
<b>Total Wastewater Assets</b>	<b>\$ 659,544,169</b>
<b>Plus:</b>	
Construction Work in Progress	\$ 16,302,148
<b>Less:</b>	
Contributed Capital/Grants	<u>\$ (331,139,341)</u>
<b>Total: Net Wastewater Assets</b>	<b>\$ 344,706,976</b>
<b>Less:</b>	
Outstanding Principal Debt	<u>\$ (35,648,376)</u>
<b>Wastewater Assets for Capital Facilities Fee Calculation</b>	<b>\$ 309,058,600</b>

The adjusted RCNLD values for water and wastewater were then converted to a unit cost of capacity by dividing the RCNLD value by a basic unit of measure of cost per gallon per day (GPD) for water and wastewater capacity, as shown in Exhibit 5.

	Water	Waste water
Adjusted RCNLD	\$186,763,750	\$309,058,600
Total Capacity [MGD]	52.0	40.0
<b>Cost per GPD</b>	<b>\$3.59</b>	<b>\$7.73</b>

**Exhibit 5: Cost per GPD of Core Utility Assets**

This measure becomes the basic building block, or starting point, for determining the maximum cost-justified level of the water and wastewater Capital Facilities Fees. Fees for different types of customers are based on this cost of capacity multiplied by the amount of capacity needed to serve each type or class of customer.

The next step is to define the level of demand associated with a typical residential customer often referred to as an Equivalent Residential Unit, or ERU. To calculate the water Capital Facilities Fees, a demand of 240 gallons per day was used and adjusted to account for peak day water use and water loss for the City’s customers. The peak day water use factor (1.36) was based on historical average-day and maximum day water production data. The water loss factor (1.09), which was provided by City staff, was based on information from the City’s historical water audits. For water, one ERU of peak day capacity was defined to be 355.78 GPD as shown in Exhibit 6 ( $240 \times 1.36 \times 1.09 = 355.78$  gpd). For wastewater, a demand of 240 gallons per day was also used and adjusted to account for infiltration and inflow. The adjustment for infiltration and inflow (I&I) was based on a historical comparison of wastewater treatment plant flows and wastewater billed flows. Thus, one ERU of capacity was defined to be 261.60 gallons per day as shown in Exhibit 6 ( $240 \times 1.09 = 261.60$ ).

**Exhibit 6: Water and Wastewater Equivalent Residential Unit**

	Water - gallons per day per ERU	Wastewater – gallons per day per ERU
GPD per ERU	240	240
System Peaking Factor	1.36	n/a
Infiltration and Inflow (I&I)	n/a	1.09
Loss Factor (Leakage)	1.09	n/a
<b>Equivalent Residential Unit</b>	<b>355.78</b>	<b>261.60</b>

### Assessment Methodology

The analysis provides a maximum cost-justified level of Capital Facilities Fees that can be assessed by the City. For residential customers, the calculation of the Capital Facilities Fee is based on the cost per GPD multiplied times the number of gallons per day required to serve each ERU, as shown below in Exhibit 7.

### Exhibit 7: Capital Facilities Fee Calculation for Water and Wastewater Systems

<b>Capital Facilities Fee Calculation</b>	
<b>Water Calculation</b>	
<b>Cost per GPD</b>	<b>\$3.59</b>
GPD per EDU	355.78
<b>Maximum Capital Facilities Fee for 5/8" meter *</b>	<b>\$ 1,277</b>
<b>Wastewater Calculation</b>	
<b>Cost per GPD</b>	<b>\$7.73</b>
GPD per EDU	261.60
<b>Maximum Capital Facilities Fee for 5/8" meter *</b>	<b>\$ 2,022</b>

\*Rounded to the nearest dollar

For non-residential customers (or customers with larger meters), the fees for the smallest residential meter can be used and then scaled up by the flow ratios for each meter size, as specified in the AWWA M-1 Manual<sup>1</sup>, the results of which are shown in Exhibit 8. This method provides a straightforward approach that is simple to administer and reasonably equitable for most new customers. Exhibit 8 shows the resulting maximum cost-justified Capital Facilities Fees by meter size for meters ranging from 5/8 inches to 12 inches. For these calculations, the Capital Facilities Fees have been rounded to the nearest dollar.

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<sup>1</sup> See the AWWA M-1 Manual – Appendix B- Equivalent Meter Ratios; pp.386

**Exhibit 8: Calculated Maximum Capital Facilities Fees for Water and Wastewater Customers**

Meter Size	Calculated Water Fee	Existing Water Fee	Calculated Wastewater Fee	Existing Wastewater Fee	Calculated Combined Fee	Existing Combined Fee
5/8"	\$1,277	\$1,870	\$2,022	\$1,130	\$3,299	\$3,000
1"	\$3,193	\$4,670	\$5,055	\$2,830	\$8,248	\$7,500
1.5"	\$6,385	\$9,340	\$10,110	\$5,660	\$16,495	\$15,000
2"	\$10,216	\$14,940	\$16,176	\$9,060	\$26,392	\$24,000
3"	\$20,432	\$28,193	\$30,330	\$16,923	\$50,762	\$45,116
4"	\$31,925	\$63,339	\$50,550	\$45,726	\$82,475	\$109,065
6"	\$63,850	\$126,414	\$101,100	\$91,452	\$164,950	\$217,866
8"	\$102,160	\$221,028	\$161,760	\$160,041	\$263,920	\$381,069
10"	\$268,170	\$347,178	\$232,530	\$251,493	\$500,700	\$598,671
12"	\$338,405	gpd*	\$434,730	gpd*	\$773,135	

\*Assessed per estimated gpd.

The City may elect to charge a cost per GPD that is less than the maximum cost-justified charge documented in this report. If the City elects to charge a fee that is less, all customers must be treated equally, meaning the same reduced cost per GPD must be used for all customers.

We appreciate the opportunity to assist the City of Durham with this important engagement. Should you have questions, please do not hesitate to contact me at (704) 373-1199.

Sincerely,

RAFTELIS FINANCIAL CONSULTANTS, INC.



Bart Kreps  
Vice President