

TOWN OF  
**Holden Beach, NC**

**Calculation of Water and Sewer System  
Development Fees for FY2022**

Draft Report / February 4, 2021

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Heather Finnell  
Town of Holden Beach, NC  
110 Rothschild Street  
Holden Beach, NC 28462

RE: Calculation of Water and Sewer System Development Fees for FY 2022 – DRAFT REPORT

Dear Ms. Finnell:

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”) 2022 for consideration by the Town of Holden Beach (Town). 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 wastewater 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 HB 826 and HB 873. 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.

This letter report documents the results of the calculation of water and sewer system development fees for FY 2022 in accordance with these requirements.

Article 8 references three methodologies that could 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 Method:

Under the Capacity 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 Capacity 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.

For the Town, the Buy-in method was used to calculate the sewer system development fees, and the Combined method was used to calculate the water system development fees. The following steps were completed to calculate the fees:

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. Growth related capital improvements project costs were determined and included in the total system value calculation for the water system.
3. 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.
4. The amount of capacity associated with a service unit of new development was estimated. For the Town, the unit of new development utilized was one bedroom, with an equivalent residential unit ("ERU") defined as a 3 bedroom house.
5. 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 bedroom, as defined below.
6. The calculated system development fee for one ERU was scaled appropriately based on units of system capacity as discussed below.

## System Development Fee Calculation

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

A listing of fixed assets provided by the Town from their accounting system, as of June 30, 2020, was reviewed, and each individual asset was categorized into one of the categories shown in Table 1. General assets, such as land that were not directly attributable to either the water or sewer system, were assumed to be shared equally between the water and sewer systems.

**Table 1. Fixed Asset Categories by System**

<b>Water System</b>	<b>Sewer System</b>
Treatment/Transmission	Treatment/Transmission
Distribution	Collection
	Vehicles

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, including for reuse or reclamation of water, owned or operated, or to be owned and operated, by a local government unit and land associated with such facility.”*

The method used to calculate system development fees for the Town included system facility assets that satisfy this definition, which means that equipment, computers, meters, and vehicles were removed from the calculation. The estimated RCNLD values for water and sewer system assets allowable under Article 8 are provided in Tables 2 and 3, respectively.

**Table 2. Water System Value (RCNLD)**

Description	RCNLD Value
Treatment/ Transmission	\$505,890
Distribution	3,835,174
<b>Total</b>	<b>\$4,341,064</b>

**Table 3. Sewer System Value (RCNLD)**

Description	RCNLD Value
Treatment/ Transmission	\$15,694,327
Collection	15,855,786
<b>Total</b>	<b>\$31,550,113</b>

As shown in Table 2, the RCNLD value of the water system was estimated to be approximately \$4.3 million, and, as shown in Table 3, the RCNLD value of the sewer system was estimated to be approximately \$31.5 million. Additional adjustments were made to the estimated water and sewer system RCNLD values in accordance with Article 8, which included a portion of outstanding debt, as described below.

Construction Work in Progress

Construction work in progress represents projects that were in the process of being completed but not yet booked to fixed assets. The Town identified two projects under construction, and these were included in the total sewer system value above, as both of these projects were completed, and the assets were in service, just not booked yet.

Capital Improvements Projects (CIP):

The water system CIP included a growth-related project, specifically, the construction of Water Tower Two, for a total estimated cost of \$1.75 million. Since the combined method was chosen for the water system, the water tower project is included in the water system total asset base, bringing the total of the water system value to \$6,091,064.

Debt Credit:

A credit was applied to the total asset 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 first estimating the amount of existing outstanding debt attributable to both the water and sewer systems.

On the water system, the Town does not currently have any outstanding debt, but it is anticipated they will use proceeds from loans to fund the water tower project. As such, a revenue credit was calculated, assuming a 10-year loan, at 2.5%. Estimated annual payments were projected, and a total net present value was calculated at \$1,337,966.

The Town’s outstanding sewer debt is comprised of the portion of Brunswick County’s wastewater treatment plant debt. As of June 30, 2020, the total outstanding debt principal was approximately \$7,451,003.

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

**Table 4. Calculation of Net Water and Sewer System Value**

Description	Amount
<u>Water System:</u>	
System Facilities RCNLD	\$4,341,064
Plus: CIP	+1,750,000
Less: Revenue Credit	<u>-1,337,966</u>
Net System Value (RCNLD)	\$4,753,098
<u>Sewer System:</u>	
System Facilities RCNLD	\$31,550,113
Less: Credit for Outstanding Debt	<u>-7,451,003</u>
Net System Value (RCNLD)	\$24,099,110

*Step 2 – Calculate the Unit Cost of System Capacity*

The cost per unit of system capacity was calculated by dividing the adjusted RCNLD system values (derived in Step 1) by the water and sewer system treatment capacities. The total treatment capacity of the water system is currently 0.6 million gallons per day (“MGD”). Therefore, the cost per unit of system capacity for the water system was calculated to be \$7.92 per gallon per day ( $\$4,753,098 \div 0.6 \text{ MGD}$ ). The total treatment capacity of the sewer system is 1 MGD. Therefore, the cost per unit of system capacity for the sewer system was calculated to be \$24.10 per gallon per day ( $\$24,099,110 \div 1 \text{ MGD}$ ).

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

The smallest service unit of new development was defined as one bedroom. The Town sends their water for treatment to Brunswick County, and owns a portion of the Brunswick County Wastewater Treatment Plant through a capacity share agreement. Since they do not have additional treatment capacity, the Brunswick County system development fee model assumptions were utilized to determine the consumption corresponding to one bedroom per day.

The level of demand associated with a typical residential customer is often estimated using wastewater design flow rates as specified by the North Carolina Administrative Code Title 15A (Department of Environment and Natural Resources) Subchapter 2T, which states that the sewage from dwelling units is 120 gallons per day per bedroom. Brunswick County has received a flow reduction from NCDEQ for residential usage of 70 gpd/bedroom. Because this usage represents average use, a peaking factor (based on historic water production data) is applied to derive the adjusted ERU for the water system, and an inflow and infiltration factor (based on historic data) is applied to derive an adjusted ERU for the wastewater system.

The Town, like Brunswick County, has chosen to assess its system development fee for its customers based on the number of bedrooms.

According to the Brunswick County calculations, based on the 70 gallons per bedroom per day and 1.73 peaking factor for water, for one bedroom, the adjusted consumption is 121 gallons per day. For the sewer system, for one bedroom, based on the 70 gallons per bedroom per day and the assumption of 33% I&I factor, the adjusted consumption is 93 gallons per day. Table 4 below summarizes the gallons per day and adjusted ERU calculations for the first 4 bedrooms.

**Table 5. Calculation of Water and Sewer System Development Fees for One Bedroom**

Number of Bedrooms	GPD	Peaking Factor	Adjusted ERU for Water System	Inflow & Infiltration Factor	Adjusted ERU for Wastewater System
2	70	1.73	121	1.33	93
2	140	1.73	242	1.33	186
3	210	1.73	362	1.33	279
4	280	1.73	483	1.33	372

*Step 4 – Calculate the System Development Fee for One Bedroom*

The system development fee for one bedroom was calculated by multiplying the unit cost of capacity from Step 2 by the capacity associated with one bedroom from Step 3. The calculations are provided in Table 6.

**Table 6. Calculation of Water and Sewer System Development Fees for One Bedroom**

Description	Amount
<b>Water System:</b>	
Net System Value	\$4,753,098
System Capacity (MGD)	0.6
Unit Cost of Capacity (\$ / gallon per day)	\$7.92
Capacity Required for 1 Bedroom (gallons per day)	121
System Development Fee (One Bedroom)	\$959.33
<b>Sewer System:</b>	
Net System Value	\$24,009,110
System Capacity (MGD)	1
Unit Cost of Capacity (\$ / gallon, per day)	\$24.10
Capacity Required for 1 Bedroom (gallons per day)	93
System Development Fee (One Bedroom)	\$2,241

*Step 5 – Scale the System Development Fees for Various Categories of Demand*

The system development fees for various bedroom sizes were calculated by multiplying the system development fee for one bedroom by the number of bedrooms. The resulting water and sewer system development fees for up to 4 bedrooms are shown in Table 7.

**Table 7. Water and Sewer System Development Fees by Bedroom**

Bedroom Size	Water Fee	Sewer Fee	Total Fee
1 Bedroom	\$960	\$2,240	\$3,200
2 Bedrooms	\$1,920	\$4,480	\$6,400
3 Bedrooms	\$2,880	\$6,720	\$9,600
4 Bedrooms	\$3,840	\$8,960	\$12,800

For commercial customers, the Town uses the permitted flow specified by the North Carolina Administrative Code Title 15A for non-residential customers. For the Town, the average number of bedrooms for a typical residential home is 3 bedrooms. The adjusted ERU for a 3-bedroom home is 362 gallons per day for water and 279 gallons per day for wastewater. These adjusted ERUs will be used to calculate a commercial customer’s system development fee, so that the fee complies with Section 162A-205 (6) of the General Statute that specifies the need for “an equivalency or conversion table for use in determining the fees applicable for various categories of demand.”

For example, assume a commercial customer’s flow using the North Carolina Administrative Code Title 15A results in estimated flow of 1,000 gallons per day. The calculation for the commercial customer would be as follows:

**Table 8. Water and Sewer System Development Fees by Bedroom**

	Water	Sewer
A. Estimated Flow	1,000 gallons per day	
B. 3-bedroom ERU (GPD)	362	279
C. Number of Residential ERUs (A/B)	2.76	3.58
D. Residential SDF for 3-bedroom house	\$2,880	\$6,720
<b>Equals Commercial SDF (C*D)</b>	<b>\$7,949</b>	<b>\$24,058</b>

The water and sewer system development fees shown in Table 9 represent the maximum cost justified level of system development fees that can be assessed by the Town, as stated in Article 8. If the Town chooses to assess fees that are less than those shown in the table, all customers must be treated equally, meaning the same reduced cost per gallon per day must be used for all customers.

**Table 9. Maximum Cos Justified System Development Fees**

Bedroom Size	Water Fee	Sewer Fee	Total Fee
1 Bedroom	\$960	\$2,240	\$3,200
2 Bedrooms	\$1,920	\$4,480	\$6,400
3 Bedrooms	\$2,880	\$6,720	\$9,600
4 Bedrooms	\$3,840	\$8,960	\$12,800
Commercial – Relative to 3-bedroom ERU	\$2,880	\$6,720	\$9,600

We appreciate the opportunity to assist the Town with the calculation of its water and sewer system development 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.



Melissa Levin  
Vice President



Mihaela Coopersmith  
Senior Consultant

**Schedule 1: Calculation of Water System Development Fee**

**Water System Development Fee Calculation**

Methodology	Combined	
Functional Component	Total	
Net Plant Value	\$	4,341,064
Donated & Contributed Assets		
CIP	\$	1,750,000
<b>Total System Value</b>	<b>\$</b>	<b>6,091,064</b>

**Credits:**

Revenue Credit (required combined/incremental)	\$	(1,337,966)
Donated & Contributed Assets	\$	-
Grants	\$	-
No Outstanding Principal	\$	-
<b>Net System Value</b>	<b>\$</b>	<b>4,753,098</b>

**Capacity**

Million Gallons Per Day (MGD)	0.60
Calculated Cost Per GPD	\$ 7.92

**Cost Per Bedroom Calculation**

Number of Bedrooms	Adjusted ERU	Fee
1	121	\$ 959.33
2	242	\$ 1,918.67
3	363	\$ 2,878.00
4	484	\$ 3,837.33

**Schedule 2: Calculation of Sewer System Development Fee**

**Sewer System Development Fee Calculation**

Methodology	Buy-In
Functional Component	Total
Net Plant Value	\$ 31,550,113
Donated & Contributed Assets	
CIP	\$ -
<b>Total System Value</b>	<b>\$ 31,550,113</b>
<b>Credits:</b>	
Outstanding principal	\$ (7,451,003)
Donated & Contributed Assets	-
Grants	-
Additional Credit to meet 25% Req	-
Net System Value	<b>\$ 24,099,110</b>
<b>Capacity</b>	
Million Gallons Per Day (MGD)	1.00
Calculated Cost Per GPD	\$ 24.10

**Cost Per Bedroom Calculation**

Number of Bedrooms	Adjusted ERU	SDF
1	93	\$ 2,241.22
2	186	\$ 4,482.43
3	279	\$ 6,723.65
4	372	\$ 8,964.87

**Schedule 3: Summary of Current and Proposed System Development Fees**

		Current	Proposed	Difference	Difference
		Fee	Fee	\$	%
<b>Water System Development Fee</b>					
Cost Per Bedroom		\$ 100	\$ 960	\$ 860	860%
Cost Per 2 Bedrooms	2	\$ 200	\$ 1,920	\$ 1,720	860%
Cost Per ERU (3 Bedrooms)	3	\$ 300	\$ 2,880	\$ 2,580	860%
Cost per 4 Bedrooms	4	\$ 400	\$ 3,840	\$ 3,440	860%
<b>Sewer System Development Fee</b>					
Cost Per Bedroom		\$ 2,700	\$ 2,240	\$ (460)	-17%
Cost Per 2 Bedrooms	2	\$ 5,400	\$ 4,480	\$ (920)	-17%
Cost Per ERU (3 Bedrooms)	3	\$ 8,100	\$ 6,720	\$ (1,380)	-17%
Cost per 4 Bedrooms	4	\$ 10,800	\$ 8,960	\$ (1,840)	-17%
<b>Total System Development Fee</b>					
Cost Per Bedroom		\$ 2,800	\$ 3,200	\$ 400	14%
Cost Per 2 Bedrooms	2	\$ 5,600	\$ 6,400	\$ 800	14%
Cost Per ERU (3 Bedrooms)	3	\$ 8,400	\$ 9,600	\$ 1,200	14%
Cost per 4 Bedrooms	4	\$ 11,200	\$ 12,800	\$ 1,600	14%