

March 6, 2018

Mr. Cesar Correa
City Administrator
City of Locust
186 Ray Kennedy Drive
Locust, NC 28097

Dear Mr. Correa:

Raftelis has completed its assignment to develop a cost-justified wastewater system development fee for consideration by the City of Locust (“City”). This letter documents the results of the analysis which is based on a cost justified approach for establishing system development fees as set forth in North Carolina general statute 162A Article 8 “System Development Fees”.

Raftelis is a financial professional firm that has provided rate and financial consulting to public water and wastewater utilities since 1993, has edited or contributed content for the Seventh Edition of the American Water Works Association “Principles of Water Rates, Fees and Charges M-1 Manual” (AWWA M-1 Manual), and has calculated system development fees for utilities in North Carolina and across the country since 1993 using generally accepted methodologies as provided in the AWWA M-1 Manual and other water/sewer industry publications. Raftelis is qualified to perform system development fee calculations for water and wastewater utilities in North Carolina.

Background

System development fees are defined as one-time charges assessed to new water and wastewater customers, or developers and builders, to recover a proportional share of capital costs incurred to provide service availability and capacity for new utility customers. Typically, the cost basis for setting system development fees is based on the major system components, or core system assets, that are necessary to serve, and that provide benefit to, all customers. These components typically include reservoirs, water treatment plants, storage tanks, major water transmission lines, wastewater treatment plants, pumping stations, and major wastewater interceptors.

Raftelis recommends that system development fees should be consistent with the common legal standard in setting system development fees in the water and wastewater industry – the Rational Nexus Test. The Rational Nexus test requires that: 1) the need for capacity is a result of new development; 2) the costs are identified to accommodate new development; and 3) the appropriate

apportionment of that cost to new development is in relation to the benefit the new development reasonably receives¹.

There are three approaches, as described below, for calculating water and wastewater system development fees that are recognized in the industry as cost-justified² (that meet the requirement of the Rational Nexus standard), and as set forth in North Carolina general statute 162A Article 8 “System Development Fees”.

Buy-In Approach

The Capacity Buy-In Approach calculates a system development fee based upon the proportional cost of each user’s share of existing system capacity, and is most appropriate in cases where the existing system assets provide adequate capacity to provide service to new customers. The cost of the facilities is based on fixed assets records and can include escalation of the depreciated value of those assets to current dollars, or “replacement costs” as identified in the general statute. The general statute also identifies adjustments to be made to the replacement cost such as “debt credits, grants, and other generally accepted valuation adjustments.”

Incremental Cost Approach

The Incremental Cost (or Marginal Cost) Approach calculates a system development fee based upon a new customer’s proportional share of the incremental future cost of system capacity. This approach 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. Per the general statute, a revenue credit must be applied “against the projected aggregate cost of water or sewer capital improvements.”

Combined Approach

The Combined Approach is a combination of the Buy-In and Incremental Cost approaches, and is appropriate to 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.

Calculation of System Development Fees

Raftelis requested and was provided with the following data from City staff to complete the system development fee calculation:

¹ See the AWWA M-1 7th Edition Manual –System Development Charges, Chapter VII.2; pp.324.

² See the AWWA M-1 Manual –System Development Charges, Chapter VII.2; pp.329-330.

-) Wastewater fixed asset data;
-) Outstanding utility debt and associated debt service;
-) Construction work in progress (“CWIP”)
-) Contributed capital;
-) Capacity in sewer system;
-) Inflow and infiltration data;
-) Daily sewer flow for the past two calendar years; and
-) History of system development fees collected.

The Capacity Buy-In Approach was chosen as the method to calculate the system development fee. While the City has identified some future wastewater projects that will expand capacity, the projects were not part of an approved capital improvement plan as of the date of this report.

Using the Capacity 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 sewer assets includes wastewater sewer lines and other assets but excludes small equipment and vehicles.

Several adjustments were then made to the RCNLD value, which were as follows:

-) *Subtraction of contributed assets* - Assets contributed by or paid for by developers were deducted from the calculation since these costs were not “paid” by the existing customers. It should be noted that all assets grant funded were also excluded.
-) *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. To ensure that new customers are not being double charged for these assets, once through the system development fee and again through retail rates and charges, the proportion of the outstanding debt principal amount that is anticipated to be paid for through retail rates and charges was deducted from the system development fee calculation. This proportional amount was estimated by comparing the historical annual amount of revenues collected from system development fees with the respective annual amount of principal payments. Since the City applies revenues from system development fees to offset outstanding debt service, the amount of the debt credit was calculated as the principal amount of outstanding debt less the proportion of the principal amount estimated to be paid for with system development fee revenues. (The historic level of revenues collected has exceeded the annual principal debt).

The adjusted RCNLD value was then converted to a unit cost of capacity by dividing the RCNLD value by the total estimated capacity of the sewer system (GPD), as shown in Exhibit 1. The City does not own any reserved capacity in the Oakboro Wastewater Treatment Plant. Therefore, the capacity of the City's collection system was estimated by the peak daily sewer flow over the past two calendar years, which was approximately 600,000 gallons per day.

Exhibit 1 – Cost per GPD of Core Utility Assets

	Wastewater
Adjusted RCNLD	\$6,658,948
Total Capacity (gallons per day)	600,000
Cost per Gallon per Day	\$11.10

The calculated cost per gallon per day becomes the basic building block or starting point for determining the *maximum cost-justified level* of the wastewater system development fee.

The next step is to define the level of demand associated with a typical, or average, residential customer, often referred to as an Equivalent Residential Unit, or ERU. 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. A flow for a 3-bedroom home was assumed in this model to derive an ERU of 360 gallons per day. However, according to the master plan prepared by McGill in 2012, only 60% of the state permitted flows are used to estimate average daily sewer flows. Therefore, when calculating the wastewater system development fee, an ERU of 216 gallons per day was used and adjusted to account for inflow and infiltration (estimated by comparing actual wastewater flow to the Oakboro plan compared to estimated essential water use returned to the sewer system), resulting in an ERU of 245 gallons per day as shown in Exhibit 2.

Exhibit 2: Wastewater Demand per Residential ERU

	Wastewater - gallons per day per ERU
ERU Per Locust Master Plan	216
Inflow and Infiltration Factor	1.14
Adjusted ERU	245

Assessment Methodology

The analysis provides a maximum cost-justified level of system development fees that can be assessed by the City. For residential customers, the calculation of the system development fee is based on the cost per gallon per day multiplied times the number of gallons per day required to serve each ERU, as shown below in Exhibit 3.

Exhibit 3 – Calculated Maximum Residential Capacity Fee

	Wastewater
Cost per gallon per day	\$11.10
Adjusted ERU	245
Total Calculated System Development Fee	\$2,722
Existing System Development Fee	\$2,500

For non-residential customers, 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 Manual³, the results of which are shown in Exhibit 4. This method provides a straightforward approach that is simple to administer and reasonably equitable for most new customers.

³ See the AWWA M-1 Manual – Appendix B- Equivalent Meter Ratios; pp.326

Exhibit 4 shows the resulting maximum cost-justified system development fees by meter size for meters ranging from 5/8 or 3/4 inches to 12 inches. For these calculations, the system development fees have been rounded to the nearest dollar.

Exhibit 4– Calculated Maximum System Development Fees for Non-Residential Customers

Existing		Maximum Cost Justified
Meter Size	Wastewater	Wastewater
5/8" or 3/4"	\$2,500	\$2,722
1"		\$4,537
2"		\$14,518
4"		\$45,368
6"		\$90,735
8"		\$145,176
10"		\$217,765
12"		\$480,897

The City may elect to charge a cost per gallon that is less than the maximum cost justified cost 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 gallon per day must be used for all customers.

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

Very truly yours,
RAFTELIS



Elaine Conti, Senior Manager

Appendix

Supporting Schedules From the System Development Fee Model

City of Locust
Supporting Schedule 1 –Sewer Assets

Asset #	Asset Description	Date in Service	Book Cost	Book End Depr	Book Net Book Value	RCNLD
2	WATER & SEWER LINES (10 f	7/1/00	\$ 7,344,835	\$ 2,717,589	\$ 4,627,246	\$ 10,290,879
4	SEWER LINES PHASE III	6/30/06	\$ 3,200,895	\$ 704,197	\$ 2,496,698	\$ 4,210,938
6	ENGINEERING FEES - Harry	6/30/02	\$ 175,000	\$ 52,500	\$ 122,500	\$ 253,091
7	SEWER LINE - PHASE IV	6/30/06	\$ 75,890	\$ 16,696	\$ 59,194	\$ 99,837
8	SEWER LINE EXTENSIONS	9/29/03	\$ 10,046	\$ 2,763	\$ 7,284	\$ 15,103
9	SEWER LINE EXTENSIONS	4/8/04	\$ 9,162	\$ 2,428	\$ 6,734	\$ 13,564
10	SEWER LINES - PHASE IV	6/30/06	\$ 161,835	\$ 35,604	\$ 126,231	\$ 212,902
11	SEWER LINE EXTENSIONS	6/30/05	\$ 4,674	\$ 1,122	\$ 3,552	\$ 6,372
12	SEWER LINE - PHASE IV	6/30/06	\$ 130,691	\$ 28,752	\$ 101,939	\$ 171,931
13	SEWER LINES - PHASE III	6/30/06	\$ 37,042	\$ 8,149	\$ 28,893	\$ 48,730
14	SEWER LINE EXTENSIONS	6/30/06	\$ 7,663	\$ 1,686	\$ 5,977	\$ 10,081
15	Sewer Line Extensions - Phase IV	6/30/07	\$ 8,391	\$ 1,678	\$ 6,713	\$ 10,266
16	Vacuum Pump RC0630	3/6/09	\$ 18,930	\$ 15,775	\$ 3,155	\$ 4,201
17	Cornell Pump	3/11/09	\$ 11,753	\$ 8,904	\$ 2,849	\$ 3,794
18	Chicago Tube & Iron Project	6/1/09	\$ 371,826	\$ 60,112	\$ 311,714	\$ 415,044
19	UPT Sewer Project	11/1/08	\$ 346,592	\$ 60,076	\$ 286,516	\$ 431,301
20	Rebuilt of Sewer Pump	10/15/09	\$ 6,051	\$ 4,690	\$ 1,361	\$ 2,109
21	Bojangles Sewer Project	10/15/09	\$ 161,378	\$ 25,014	\$ 136,364	\$ 173,532
22	Villages of Redbridge	9/1/09	\$ 552,000	\$ 86,480	\$ 465,520	\$ 592,404
24	Construction - King Heights Sewer	7/1/14	\$ 43,650	\$ 2,619	\$ 41,031	\$ 44,932
25	Construction - Clear Water, Inc.	7/1/14	\$ 2,111	\$ 127	\$ 1,984	\$ 2,173
26	Construction - Covalen	6/14/13	\$ 1,900	\$ 114	\$ 1,786	\$ 2,036
27	Sherwood Pk/Kings Heights Sewer	6/30/14	\$ 922,472	\$ 55,348	\$ 867,123	\$ 929,061
28	1/3 Cost Trailer RS Braswell Inv #1	9/30/16	\$ 4,512	\$ 677	\$ 3,835	\$ 3,984
29	1/4 Cost Bobcat RSBraswell Inv # K	10/20/16	\$ 6,416	\$ 855	\$ 5,561	\$ 5,776
30	1/3 Cost Mini Excavator RSBraswell	1/13/17	\$ 7,890	\$ 789	\$ 7,101	\$ 7,101
31	Buffer Tank	3/15/17	\$ 9,258	\$ 309	\$ 8,949	\$ 8,949
32	Sanitary Sewer Analysis North Sewer	2/10/17	\$ 15,624	\$ -	\$ 15,624	\$ 15,624
Grand Total			\$ 13,702,039	\$ 3,948,603	\$ 9,753,436	\$ 17,985,715

Supporting Schedule 2 – Sewer Assets Eligible for Inclusion in System Development Fee Calculation, Less Contributed Capital and Other Assets

	Buy-In Approach
Calculation Using the System Buy-In Approach	
Fixed Assets for Wastewater Collection System	
	RCNLD (1)
Wastewater Lines	\$ 15,090,604
Other Wastewater assets	\$ 2,895,112
Less: contributed lines (2)	\$ (11,309,906)
Less: Vehicles, Equipment, Computer (3)	\$ (16,861)
Subtotal: Fixed Assets	\$ 6,658,948
Adjustments:	
Less: Outstanding Principal (4)	\$ -
Net System Assets	\$ 6,658,948.09
Existing System Capacity (in GPD) (5)	600,000
Cost per GPD (system)	\$ 11.10
Daily ERU (in GPD) (6)	216
I&I Factor (7)	114%
Adjusted ERU (GPD)	245
Calculated System Development Fee per ERU	\$ 2,722
Current System Development Fee per ERU	\$ 2,500

- (1) The net book value as of June 30, 2017 is escalated to today's dollars to calculate the replacement cost new less depreciation (RCNLD) value.
- (2) All assets that were contributed/donated by developers (or grant funded) has to be removed.
- (3) Equipment, vehicles, and small computer systems are removed.
- (4) Outstanding principal paid through user rates/charges is subtracted from the analysis.
- (5) The Town of Locust does not reserve any capacity in the Oakboro Wastewater Treatment Plant. The assumed capacity in the collection system is based on the maximum daily flow delivered to the Oakboro Wastewater Treatment Plant over the last two calendar years, which was approximately 600,000 gallons per day. It should be noted the average daily flow is approximately 166,000 gallons per day.
- (6) For calculating the capacity fee for a typical residential customer or ERU, the flow for a 3-bedroom home was assumed. Per NCAC 02T.0114, flow rate is 120 gallons per day per bedroom. The 3-bedroom home was used to derive an ERU of 360 gallons per day. However, according to the master plan (prepared in 2012 by McGill), only 60% of the state permitted flows are used to estimate average daily sewer flows.
- (7) I&I factor was estimated by comparing actual wastewater flow to the Oakboro plant compared to estimated essential water use returned to the sewer system.

Supporting Schedule 3 – Removal of Contributed Capital

Asset #	Description	Asset Description	RCNLD
2	Wastewater	WATER & SEWER LINES (10 f	\$ 10,290,878.80
6	Wastewater	ENGINEERING FEES - Harry	\$ 253,091.33
21	Wastewater	Bojangles Sewer Project	\$ 173,531.83
22	Wastewater	Villages of Redbridge	\$ 592,403.61
Grand Total			\$ (11,309,905.57)

Supporting Schedule 4 – Debt Service Adjustment

Outstanding Principal Adjusted from System Development Fee		Debt Covered by Capacity Fee
Average Revenues From SDFs over past two years	\$ 276,250.00	137%
Average Principal paid over last two years	\$ 201,542.20	
		Outstanding Debt Principal to be Covered by User Rates/Charges
Total Percentage of Debt to be Covered by User Rates/Charges	0%	\$ -
Outstanding Debt Principal	\$ 1,632,582.02	

Supporting Schedule 5 – Estimated Inflow and Infiltration Factor

	Estimated billable Water Flow (indoor only)	Actual Wastewater Flow	Estimated I&I Factor
Sample Month: Decemeber (FY 2017)	4,788,796	5,437,701	1.14

Supporting Schedule 6 – Daily peak and average sewer flows

Month	Max Monthly Flow (in GPD)	Daily Average (in GPD)
January, 2016	302,369	181,231
February, 2016	353,729	192,318
March, 2016	177,332	150,948
April, 2016	162,600	150,221
May, 2016	324,148	164,045
June, 2016	156,600	143,682
July, 2016	176,519	144,379
August, 2016	177,094	145,936
September, 2016	259,594	162,371
October, 2016	527,704	170,279
November, 2016	174,419	154,363
December, 2016	221,341	160,186
January, 2017	514,942	201,779
February, 2017	217,513	165,981
March, 2017	189,719	161,380
April, 2017	594,023	185,137
May, 2017	332,594	187,586
June, 2017	265,619	168,360
July, 2017	167,866	158,198
August, 2017	239,447	164,149
September, 2017	209,597	166,146
October, 2017	213,888	164,785
MAX FLOW	594,023	
AVERAGE FLOW		165,612