

**COST- JUSTIFIED WATER AND WASTEWATER
SYSTEM DEVELOPMENT FEES REPORT**

UPDATED OCTOBER 2018

South Granville Water and Sewer Authority

GRANVILLE COUNTY, NC



CONSULTING ENGINEERS
CARY, NORTH CAROLINA

**COST- JUSTIFIED WATER AND WASTEWATER
SYSTEM DEVELOPMENT FEES REPORT**

UPDATED OCTOBER 2018

South Granville Water and Sewer Authority

GRANVILLE COUNTY, NC

Andy Lovingood, PE, Vice President
James Bourey, Director of Management Services
Dale R. Schepers, Management Services Analyst



1915 Evans Road
Cary, NC 27513
919-378-9111

Firm License No.: C-0459

OCTOBER 2018
PROJECT NO. 18.01916

TABLE OF CONTENTS

EXECUTIVE SUMMARY and PURPOSE STATEMENT.....1 & 2

1.0 APPROACH..... 3

2.0 METHODOLOGY 4

3.0 CALCULATION of SYSTEM DEVELOPMENT FEES 5

4.0 SERVICE UNIT CALCULATIONS: EQUIVALENT RESIDENTIAL UNITS..... 132

**5.0 APPLICATION of SYSTEM DEVELOPMENT FEES
and SERVICE UNIT EQUIVALENCY 13**

6.0 CONCLUSION..... 14

TABLES

Table 3.1.1 – SGWASA Water and Sewer System Available Capacity 5

Table 3.2.1 – Water System Cost per GPD..... 6

Table 3.2.2 – Sewer System Cost per GPD..... 7

Tables 3.3.1, 3.3.2 – Cost per GPD for Incremental (Future)
Water Assets Providing Capacity 8

Tables 3.3.3, 3.3.4, 3.3.5, 3.3.6, 3.3.7 – Cost per GPD for Incremental (Future)
Sewer Assets Providing Capacity 9-11

Table 4.0.1 – Cost-Justified System Development Fees:
Equivalent Residential Unit Water and Sewer 12

APPENDICES

House Bill 436
NC Administrative Code 15A NCAC 18C .0409
NC Administrative Code 15A NCAC 02T .0114
Revenue Credit: Outstanding Debt Principal
SGWASA Capacity Related CIP FY2019
RS Means Historical Cost Index

REFERENCED LINKS

<http://www.cityofcreedmoor.org/home/showdocument?id=884>
http://www.sgwasa.org/uploads/1/0/4/7/104797467/sgwasa_2018_retreat_document.pdf

EXECUTIVE SUMMARY and PURPOSE STATEMENT

Executive Summary:

The North Carolina General Assembly passed House Bill 436 in July 2017, amending Chapter 162A of the General Statutes by adding “Article 8, System Development Fees.” This amendment was enacted as “An Act to Provide for Uniform Authority to Implement System Development Fees for Public Water and Sewer Systems in North Carolina and to Clarify the Applicable Statute of Limitations” which requires compliance with designated calculation methodology by July 1, 2018.

South Granville Water and Sewer Authority (SGWASA) completed a System Development Fee Study in accordance with HB436, adopting the study June 12, 2018, and established a fee schedule based on an Equivalent Residential Unit (ERU) for water and wastewater that was calculated to be \$2,782.

Subsequent to the June 2018 adoption of the System Development Fee Study and Fee Schedule, SGWASA identified several capacity-related capital improvements that are necessary to support projected new development and significant enough in cost to justify an update to the System Development Fee (SDF) study and fee schedule. The result is a maximum cost-justified SDF of \$5,548, based on an Equivalent Residential Unit (ERU) for water and wastewater.

The fee for other types of development can be calculated by applying the calculated cost of capacity per gallon of flow per day to the water and wastewater demands for various uses as defined by NC Administrative Code 15A NCAC 18C .0409 and 15A NCAC 02T .0114 using the following table:

SGWASA System Development Fees: Cost per Gallon per Day Calculation		
Item	Cost-Justified System Development Fee Calculation	Cost of Capacity \$/ GPD
1	Water System	\$ 5.24
2	Sewer System	\$ 9.59

Purpose Statement:

This report documents the results of the approach, methodology and calculations for revising system development fees in accordance with North Carolina General Statute 162A, Article 8 “System Development Fees”. Through House Bill 436 (HB 436), the General Assembly of North Carolina established a uniform approach and associated methodology required for local governmental units to calculate and implement System Development Fees (SDF) for public water and sewer systems. The SDF must be determined by a qualified engineer or financial professional using industry standard practices. A copy of HB 436 is included in the appendix.

SGWASA retained McGill Associates (McGill) to review and make recommendations for revisions as necessary to water and sewer SDF, previously conformed to HB 436 in June 2018. The approach, methodology and calculations are based on American Water Works Association (AWWA) Manual of Water Supply Practices – M1, Principles of Water Rates, Fees, and Charges, Seventh Edition.

McGill Associates is qualified in engineering disciplines and financial analysis and has the expertise and experience to determine system development fees. The firm has a long history of working with cities, towns, counties and special districts to provide professional advice on the setting of fees, the development of water and wastewater master plans and capital improvement programs, and the development of asset management plans.

SGWASA has made significant investments in water and sewer capital assets that provide capacity that is, and will be available for new development, and desires to use System Development Fees to recover a portion of the costs associated with providing capacity.

The overall result of this effort will be establishing the maximum cost-justified System Development Fees allowable under HB 436. SGWASA may elect to implement fees of lesser value; however, any adjustment must be calculated on a cost per unit volume basis, meaning the same cost per gallon adjustment must be applied equally to all customers.

This report does not constitute a recommendation of any SDF amount. The SGWASA Board has full authority to charge any amount, up to the maximum, provided it is applied to the relative demands of new development proportionally.

System Development Fees are defined as a charge imposed on each new customer or development that generally offsets the incremental cost of replacing existing and/or constructing new capital assets to provide capacity that will continue to meet the demands placed on the system by each new customer or development. Since water and sewer system capacity must exceed customer demands without exception, the major infrastructure components providing this capacity, such as water treatment plants, reservoirs, wells, pump stations, wastewater treatment plants, etc., must be planned and constructed well in advance, and in large enough increments to keep pace with anticipated demand on the available system capacity.

AWWA methodology cites legal consideration for determining SDF. A Rational Nexus, or reasonable relationship, must be established between the fee charged and the cost associated with providing capacity to new customers. The Rational Nexus Test consists of three elements and will be addressed by 1) a review of available planning documents to verify general alignment between capacity demands driven by projected development patterns and planned capital improvements that will be needed to create the required capacity; 2) a determination of the proportionate share of costs to be borne by new development through appropriate methodology and calculation and 3) establishing a reasonable apportionment of the cost to new development in relation to the benefits the new development will reasonably receive through appropriate methodology and calculations.

The first element of the Rational Nexus Test was determined to be favorable based on a review of recently developed and updated project costs for capacity-related capital improvements for the water and sewer systems. New projects include a Northern Sewer Interceptor, Southern Sewer Interceptor, Northside Pump Station System and East Middleton Pump Station System. An updated project cost was provided for the Water Treatment Plant Upgrades Project. These projects support capacity needs presented in the SGWASA 2018 Retreat Material packet (dated January 31, 2018) and the Creedmoor City Plan 2030. Therefore, general alignment between future capacity demands and capital planning is continuing to be developed and demonstrates a reasonable relationship between capacity needs and capital planning as required. A copy of the Capacity Related CIP FY2019 and links to the 2018 Retreat Materials and Creedmoor City Plan 2030 are included in Appendix A.

The remaining elements of the Rational Nexus Test; 2) determining proportionate share of costs to be borne by new development and 3) establishing a reasonable cost to new development in relation to the benefits received by the new development will be determined through appropriate methodology and calculations in the following sections.

Three methods for calculating SDF meet the definition of HB 436 and will satisfy the Rational Nexus Test:

Buy-In Method

The Buy-In Method is used where existing system capacity is available to provide service to new development. New customers essentially “buy” their proportionate share of system capacity from the current customer base (“system owners”) at the current cost or value of the existing facilities. HB 436 requires appropriate adjustments to be made to the replacement cost such as “debt credits, grants, and other generally accepted valuation adjustments.”

Incremental Cost Method

The Incremental Cost (or Marginal Cost) Method is used to assign new development the incremental cost of capital assets required for future system capacity expansion(s). This method should include supporting details identifying construction costs, scheduling, financing, funding source(s), etc., tied to a capital improvements plan, utilities master plan, and/or other approved planning document(s) that cover a planning horizon of 10 to 20 years. HB 436 requires a revenue credit to be applied “against the projected aggregate cost of water or sewer capital improvements.”

Combined Method

The Combined Approach is a combination of the Buy-In and Incremental Cost Methods, and is used where existing assets provide some system capacity to accommodate new development, and applicable capital plan(s) also identify significant capital investment proposed to add infrastructure required to address future growth and capacity needs.

3.0

CALCULATION of SYSTEM DEVELOPMENT FEES

The **Combined Method** is the appropriate approach to calculating SGWASA’s system development fees because of the combination of existing system capacity and planned future capacity expansion through capital improvements. Existing system capacity is available, although limited in some areas, to provide service to new customers in the near term and will be expanded to accommodate growth projected for the long-term. Future capacity-related projects are included in the CIP and others will be added following the conclusion of the current engineering efforts to determine the scope and cost of future capacity-related needs. Therefore, calculating SDF will require the combined method.

3.1 Existing System Capacity Availability

Water and Sewer system design capacities are determined using average day demands and incorporate appropriate peaking factors that will adequately address maximum flow conditions that occur during high water use conditions and wet weather flows for the sewer system. Using historical data, the average day flows for the water and sewer systems indicate available system capacities as follows:

Table 3.1.1 – SGWASA Water and Sewer System Available Capacity

SGWASA Water and Sewer System Available Capacity				
Item	System Capacity - Million Gallons Per Day (MGD)	Design Capacity	Average Day	Available Capacity
1	Water System	7.5	2.69	4.81
2	Sewer System	5.5	1.67	3.83
Design Standards applicable to capacity are based on average day conditions.				
Capacities shown are at Water and Sewer Treatment Plants.				
Distribution and Collection capacities are divided among several acquired systems and may be more limited in available capacity.				

3.2 Buy-In Calculation - After demonstrating capacity is available, the value per gallon is calculated to determine the cost per gallon that will be applied to reimburse existing customers for constructing and maintaining available capacity in advance.

The preferred AWWA valuation approach is “replacement cost new less depreciation” (RCNLD). This approach is based on the premise that System Development Fees should reflect the value of providing any given amount of new capacity at the cost of constructing the assets at the time the new customer is connected. This fairly compensates existing customers for carrying the costs of

constructing and maintaining capacity built into the system in advance of when the new customers connect.

Replacement cost in the RCNLD calculation used the RS Means Historical Cost Index. RS Means has been publishing a construction cost index for over 70 years, collecting data from all facets of the industry to accurately track costs directly related to building and construction. This allows the present value (replacement cost new) of capital construction projects to be calculated on data provided by a very reliable, long-time industry leader. Depreciation assigned by the fixed asset inventory uses the straight-line method, typically based on a 10 to 50-year assignment of useful life, to represent a general decline in value over time.

Replacement Cost New (RCN) is therefore determined by applying the RS Means index to the original cost, then deducting the accumulated depreciation to reach RCNLD. The RS Means Historical Cost Index used for this calculation is included in Appendix A.

Assets included in the buy-in valuation are those that provide the available capacity of the system, are “owned” by the ratepayers, and therefore provide a benefit to all customers. Typically, these assets are water supply, treatment, pump stations, storage and mains; wastewater treatment plant, lift stations and sewers. Assets contributed by or paid for by developers are deducted from the calculation since these costs were not “paid” by the existing customers. Non-capacity related assets such as vehicles, computers and software are also excluded from the calculation.

Table 3.2.1 – Water System Cost per GPD of Existing Utility Assets Providing Available Capacity

SGWASA Water System Development Fee Buy-In Valuation				
Item	System Asset Description	RCNLD	Excluded	Amount Eligible
Water System Assets				
W1	Land	\$ 22,017	\$ -	\$ 22,017
W2	Water Treatment Plant	\$ 1,721,744	\$ -	\$ 1,721,744
W3	Water Main Infrastructure	\$ 15,806,488	\$ 209,834	\$ 15,596,654
W4	Vehicles	\$ 64,130	\$ 62,899	\$ 1,231
W5	Equipment	\$ 35,516	\$ 35,516	\$ -
Subtotal - Water System Assets		\$ 17,649,895	\$ 308,248	\$ 17,341,647
Less Revenue Credit: Outstanding Debt Principal				\$ (9,626,813)
Equals: Net Water System Value				\$ 7,714,834
Divide by: Water System Capacity (MGD)				7.50
Equals: Unit Valuation of Water System (\$/MGD)				\$ 1,028,645
Divide by: 1,000,000 gallons (\$/GPD)				\$ 1.03

Table 3.2.2 – Sewer System Cost per GPD of Existing Utility Assets Providing Available Capacity

SGWASA Sewer System Development Fee Buy-In Valuation				
Item	System Asset Description	RCNLD	Excluded	Amount Eligible
Sewer System Assets				
S1	Land	\$ 22,017	\$ -	\$ 22,017
S2	Sewer Treatment	\$ 29,475,136	\$ -	\$ 29,475,136
S3	Sewer Main Infrastructure	\$ 15,211,250	\$ 349,040	\$ 14,862,210
S4	Vehicles	\$ 170,269	\$ 170,269	\$ -
S5	Equipment	\$ 118,334	\$ 118,334	\$ -
Subtotal - Sewer System Assets		\$ 44,997,006	\$ 637,643	\$ 44,359,363
Less Revenue Credit: Outstanding Debt Principal				\$ (32,687,954)
Equals: Net Sewer System Value				\$ 11,671,409
Divide by: Sewer System Capacity (MGD)				5.50
Equals: Unit Valuation of Sewer System (\$/MGD)				\$ 2,122,074
Divide by: 1,000,000 gallons (\$/GPD)				\$ 2.12

3.3 Incremental Cost Calculation - Value of future capacity to be available to new customers through capital construction projects considered in the Capital Improvements Plan or similar master planning document.

Assigning value to future capacity-related assets requires a determination of cost in present-day dollars and a clearly defined capacity that the assets will provide. Engineers typically assign project costs and capacity needs developed through a conceptual design process, and adjust costs to the scheduled year of construction in the CIP. Present-day value can therefore be obtained using the same assumptions for inflation and then applied to the incremental cost calculation.

Tables 3.3.1 – 3.3.2 Cost per GPD for Incremental (Future) Water Assets Providing Capacity

3.3.1

SGWASA Water System Capacity-Related Component Incremental Valuation				
CIP Item	System Asset Description	Cost	Capacity Related %	SDF Component Valuation
	Water System Assets			
	WTP Upgrades	\$ 11,605,500	64%	\$ 7,427,520
<u>Valuation Adjustments and Calculation of Cost-Justified Fee</u>				
	Less Remaining Asset Value			\$ (459,163)
	Less Revenue Credit: 25% project cost per HB436			\$ (1,856,880)
	Equals: Unit Valuation - Preserving Existing Capacity			\$ 5,111,477
	Divided by: Additional Capacity (MGD)			4.80
	Equals: Adjusted Valuation			\$ 1,064,891
	Divided by: 1,000,000 gallons (\$/GPD)			\$ 1.06

WTP Upgrades include capital improvements required to sustain the system’s total capacity. Since 64% of total capacity is currently available for new development, this same percentage applies to the cost that is attributable to capacity that will continue be available for new development.

3.3.2

SGWASA Water System Capacity-Related Component Incremental Valuation				
CIP Item	System Asset Description	Cost	Capacity Related %	SDF Component Valuation
	Water System Assets			
WI 2	Water Storage Tank 500,000 gallons	\$ 2,100,000	100%	\$ 2,100,000
<u>Valuation Adjustments and Calculation of Cost-Justified Fee</u>				
	Less Revenue Credit: 25% project cost per HB436			\$ (525,000)
	Equals: Unit Valuation - Additional Capacity			\$ 1,575,000
	Divided by: Additional Capacity (MGD)			0.50
	Equals: Adjusted Valuation			\$ 3,150,000
	Divided by: 1,000,000 gallons (\$/GPD)			\$ 3.15

Direction given by Exective Director 4/11/2018 to include this critical capacity-related project as incremental CIP.

Tables 3.3.3 – 3.3.7 Cost per GPD for Incremental (Future) Sewer Assets Providing Capacity

Scope and associated costs for incremental sewer system capital improvements presented in the following tables are detailed in the I-85 Sanitary Sewer Study Update to SGWASA Board, September 11, 2018. The Engineer (CJT) provided capacity associated with each project under separate communication.

3.3.3

SGWASA Sewer System Capacity-Related Component Incremental Valuation				
CIP Item	System Asset Description	Cost	Capacity Related %	SDF Component Valuation
	Water System Assets			
	Northern Interceptor	\$ 9,554,443	100%	\$ 9,554,443
<u>Valuation Adjustments and Calculation of Cost-Justified Fee</u>				
	Less Remaining Asset Value			\$ -
	Less Revenue Credit: 25% project cost per HB436			\$ (2,388,611)
	Equals: Unit Valuation - Additional Capacity			\$ 7,165,832
	Divided by: Additional Capacity (MGD)			6.32
	Equals: Adjusted Valuation			\$ 1,133,834
	Divided by: 1,000,000 gallons (\$/GPD)			\$ 1.13

3.3.4

SGWASA Sewer System Capacity-Related Component Incremental Valuation				
CIP Item	System Asset Description	Cost	Capacity Related %	SDF Component Valuation
	Water System Assets			
	Southern Interceptor	\$ 7,651,175	100%	\$ 7,651,175
<u>Valuation Adjustments and Calculation of Cost-Justified Fee</u>				
	Less Remaining Asset Value			\$ -
	Less Revenue Credit: 25% project cost per HB436			\$ (1,912,794)
	Equals: Unit Valuation - Additional Capacity			\$ 5,738,381
	Divided by: Additional Capacity (MGD)			6.32
	Equals: Adjusted Valuation			\$ 907,972
	Divided by: 1,000,000 gallons (\$/GPD)			\$ 0.91

3.3.5

SGWASA Sewer System Capacity-Related Component Incremental Valuation				
CIP Item	System Asset Description	Cost	Capacity Related %	SDF Component Valuation
	Water System Assets			
	Northside Pump Station, Force Main, Gravity Sewer	\$ 11,546,148	100%	\$ 11,546,148
<u>Valuation Adjustments and Calculation of Cost-Justified Fee</u>				
	Less Remaining Asset Value			\$ -
	Less Revenue Credit: 25% project cost per HB436			\$ (2,886,537)
	Equals: Unit Valuation - Additional Capacity			\$ 8,659,611
	Divided by: Additional Capacity (MGD)			3.75
	Equals: Adjusted Valuation			\$ 2,309,230
	Divided by: 1,000,000 gallons (\$/GPD)			\$ 2.31

3.3.6

SGWASA Sewer System Capacity-Related Component Incremental Valuation				
CIP Item	System Asset Description	Cost	Capacity Related %	SDF Component Valuation
	Water System Assets			
	East Middleton Pump Station, Force Main, Gravity Sewer	\$ 10,127,981	100%	\$ 10,127,981
<u>Valuation Adjustments and Calculation of Cost-Justified Fee</u>				
	Less Remaining Asset Value			\$ -
	Less Revenue Credit: 25% project cost per HB436			\$ (2,531,995)
	Equals: Unit Valuation - Additional Capacity			\$ 7,595,986
	Divided by: Additional Capacity (MGD)			2.50
	Equals: Adjusted Valuation			\$ 3,038,394
	Divided by: 1,000,000 gallons (\$/GPD)			\$ 3.04

3.3.7

SGWASA Sewer System Capacity-Related Component Incremental Valuation				
CIP Item	System Asset Description	Cost	Capacity Related %	SDF Component Valuation
	Water System Assets			
	I-85 Sanitary Sewer Study	\$ 589,465	100%	\$ 589,465
<u>Valuation Adjustments and Calculation of Cost-Justified Fee</u>				
	Less Remaining Asset Value			\$ -
	Less Revenue Credit: 25% project cost per HB436			\$ (147,366)
	Equals: Unit Valuation - Additional Capacity			\$ 442,099
	Divided by: Additional Capacity (MGD)			5.50
	Equals: Adjusted Valuation			\$ 80,382
	Divided by: 1,000,000 gallons (\$/GPD)			\$ 0.08

3.4 Valuation Adjustments – The above system valuations include applicable credit adjustments for revenues anticipated from existing user charges, donated infrastructure and grants.

HB 436 requires revenue credits to be applied to debt that is issued to construct water and sewer system assets that provide capacity for potential customers, and are repaid by retail water rates and charges. To ensure that repayment for this debt is not collected twice from new customers; once through the SDF and again through retail rates and charges, the remaining outstanding debt principal amount is required to be applied as a credit against the projected aggregate cost of the capital improvements in the SDF calculation.

Contributed capital provided by new development, that exceeds the development's proportionate share of connecting facilities, shall also be credited. Contributed capital is identified as part of fixed asset review and included in the summary of ineligible assets in the above calculation.

3.5 Cost per Unit Volume – Dollar valued that can be applied uniformly to all potential customer.

This measure becomes the starting point for determining the maximum cost-justified water and sewer system development fee. 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.

4.0 SERVICE UNIT CALCULATIONS: EQUIVALENT RESIDENTIAL UNITS

HB 436 requires SDF calculations to be applied to various categories of customer demands based on service units or Equivalent Residential Units (ERU). ERU is defined as the water and sewer capacities required to serve the most typical user type, which is a three-bedroom single-family dwelling. North Carolina Division of Water Resources (DWR) design standards for constructing water and sewer systems, NC Administrative Code 15A NCAC 18C .0409 and 15A NCAC 02T .0114 respectively, establish daily flow requirements based this type of service connection. ERU can therefore be defined as 400 gallons per day for water and 360 gallons per day for sewer.

Table 4.0.1 – Cost-Justified System Development Fees: Equivalent Residential Unit Water and Sewer

SGWASA System Development Fees: Equivalent Residential Unit Calculation				
Item	Cost-Justified System Development Fee Calculation	Cost of Capacity \$/ GPD	Customer Demand GPD	Cost per Unit Capacity
1	Water System	\$ 5.24	400	\$ 2,096
2	Sewer System	\$ 9.59	360	\$ 3,452
	Total ERU			\$ 5,548

5.0 APPLICATION of SYSTEM DEVELOPMENT FEES and SERVICE UNIT EQUIVALENCY

NC Administrative Code 15A NCAC 18C .0409 and 15A NCAC 02T .0114, shown below, further define other service connection types and the associated water system demands sewer system flows on a per gallon per day basis. Therefore, these tables serve as an equivalency or conversion for use in determining applicable SDF for various categories of demand.

McGill Associates has updated the calculated costs for water and wastewater capacity on a per gallon per day basis for the SGWASA. This calculation was performed using the Combined Method to account for SGWASA's existing and future capacity to provide water and sewer demands for developments. This calculation resulted in a development fee ceiling of \$5,548 for an Equivalent Residential Unit (ERU). ERU is defined as the water and sewer capacities required to serve the most typical user type, which is a three-bedroom single-family dwelling. The fee for other types of development can be calculated by applying the calculated cost of capacity per gallon of flow per day to the water and wastewater demands for various uses as defined by NC Administrative Code 15A NCAC 18C .0409 and 15A NCAC 02T .0114.

Using NC Administrative Code 15A NCAC 18C .0409 and 15A NCAC 02T .0114 ensures that the same standard used to plan, design, construct and finance capital assets is applied as the same cost recovery basis to be applied to new development.

House Bill 436
NC Administrative Code 15A NCAC 18C .0409
NC Administrative Code 15A NCAC 02T .0114
Revenue Credit: Outstanding Debt Principal
SGWASA Capacity Related CIP FY2019
RS Means Historical Cost Index