

CITY OF GREENSBORO



Water & Wastewater System Development Fee Study

May 2018



May 17, 2018

Ms. Kristine Williams, Assistant Director
Department of Water Resources
City of Greensboro
PO Box 1170
Greensboro, NC 27402-1170

Subject: Water and Wastewater System Development Fee Study

Dear Ms. Williams,

WILLDAN FINANCIAL SERVICES (“Willdan”) is pleased to submit to the City of Greensboro, North Carolina (the "City") the Water and Wastewater System Development Fee Study report (the "Report") for your consideration. We have completed the analyses for the review and development of water and wastewater system development fees and have summarized the results herein.

	GENERAL
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System development fees (“SDF” or “SDFs”) and other comparable charges are often referred to by a number of different terms including impact fees, capacity fees, system expansion fees, availability fees, connection fees, capacity reservation charges, facility fees, capital connection charges or other such terminology. In general, an SDF is a one-time charge implemented to recover (in whole or part) the costs associated with capital investments made by a utility system to make service available to future users of the system. Such capital costs generally include the construction of facilities as well as engineering, surveys, land, financing, legal and administrative costs. It has become common practice for water and wastewater utility systems to implement SDF (or other similar charges) in order to establish a supplemental source of funding for future capital projects. This practice helps to mitigate the need for existing customers to pay for system expansions entirely through increased user rates.

	CRITERIA FOR SYSTEM DEVELOPMENT FEES
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The purpose of a SDF is to assign, to the extent practical, growth-related capital costs to those customers responsible for such additional costs. To the extent that new population growth imposes identifiable additional capital costs to municipal services, equity and prudent financial practice necessitate the assignment of such costs to those customers or system users responsible for the additional costs rather than the existing user base. Generally, this practice has been labeled as “growth paying for growth” without placing the full cost burden on existing users.



It is important to note that an SDF is different than an assessment or tax. A special assessment is predicated upon an estimated increment in value to the property assessed by virtue of the improvement being constructed in the vicinity of the property. Further, the assessment must be directly and reasonably related to the benefit of which the property receives. SDFs are not directly related to the value of the improvement to the property but rather to the usage of the facilities required by the property. Until the property is put to use (i.e., developed), there is no burden placed upon the servicing facilities and the land use may be entirely unrelated to the value of the assessment basis of the underlying land. With respect to a comparison to taxes, SDFs are distinguishable primarily in the direct relationship between the amount charged and the measurable quantity of public facilities required. In the case of taxation, there is no requirement that the payment be in proportion to the quantity of public services consumed, and funds received by a municipality from taxes can be expended for any legitimate public purpose.

LEGAL CONSIDERATIONS

Court Proceedings - General

Generally, courts throughout the United States have found that capacity-related fees associated with new customer connections to utility systems are legal as long as they meet a Rational Nexus Test. In accordance with common court rulings, the rational nexus test requires that certain conditions be met in order to have a valid capacity-related fee. Typically, the court decisions have found that such fees are valid if the following standards are met:

1. The required payment should primarily benefit those who must pay it because they receive a special benefit or service as a result of improvements made with the proceeds;
2. Proceeds from the required SDF payments are dedicated solely to the capital improvement projects (i.e. proceeds are not placed in a general fund to be spent on ongoing expenses and maintenance, which characterizes a tax, but are set aside in a restricted reserve fund);
3. The revenue generated by the required payment should not exceed the cost of capital improvements to the system; and
4. The required payments are imposed uniformly and equitably on all new customers based on their anticipated usage (i.e. a relationship between the fees paid and the benefits received).

In general, most courts have found that it is reasonable for utility systems to take steps to ensure that there are adequate funds for capital projects, and to set aside collected fees in a special account for that purpose. Additionally, new customers are treated alike in that all must pay a fee based on anticipated usage and/or potential demand. Finally, courts have reasoned that it is rational for a utility system to prepare to pay for future capital projects and, while imposing a capacity-related



fee may not be the only way to raise such funds, it is a reasonable and legitimate method of accruing funds.

Court Proceedings – North Carolina

In 1990, a precedent was set in the State of North Carolina in a decision by the United States Court of Appeals, Fourth District for the case of Shell Island Investment v. Town of Wrightsville Beach North Carolina (900 F.2d 255), regarding the right of the Town of Wrightsville Beach to impose utility system impact fees to fund the expansion of the water and sewer facilities. The Court of Appeals upheld the decision of the United States District Court for the Eastern District of North Carolina that the Town of Wrightsville Beach had “authority to impose impact and tap fees under the Public Enterprise statute and that no specific enabling legislation is necessary.”

Pursuant to the ruling of the District Court and the Court of Appeals, it was concluded that “despite the absence of any express authorization in the Public Enterprise Statute for municipalities to establish or increase utility fees in order to offset future capital improvements to their sewer and water infrastructures, general authority to do so is implicit in relevant state law, limited only by the requirement that any discrimination among users be not based on arbitrary or unreasonable classifications.”

Court Proceedings – Town of Carthage Case

On April 8, 2016, in the case of Quality Built Homes, Inc. v. Town of Carthage, (766 S.E. 2d 897) the North Carolina Court of Appeals held that the Town of Carthage possessed authority to charge “impact fees” for water and sewer services. However, On August 16, 2016, the North Carolina Supreme Court reversed the North Carolina Court of Appeals’ decision and held that the Town did not possess authority to charge impact fees for water and sewer services. Although there were many different factors influencing this decision, the result generated a significant amount of confusion and concern for governmental utility systems within the State.

House Bill 436

The General Assembly of North Carolina recently enacted House Bill 436, which included a general statute under Section 1, Chapter 162A, Article 8 for the development of “System Development Fees” (herein referred to as “Chapter 162A”) that impacts all governmental entities in North Carolina who currently assess fees for the recovery of capital costs associated with new development and system growth. As defined in Chapter 162A, a system development fee is a charge or assessment for service imposed with respect to new development to fund costs of capital improvements necessitated by and attributable to such new development, to recoup costs of existing facilities which serve such new development, or a combination of those costs. Based on requirements of Chapter 162A, the calculation of the SDFs, must employ generally accepted accounting, engineering, and planning methodologies. Defined methodologies include the buy-in method, incremental or marginal cost method, and combined cost method. A brief description of each of these methods as defined in American Water Works Association Manual M1 is provided below.



- *Buy-in Method.* Based on the value of the existing system’s capacity. Under this method, new development “buys” a proportionate share of capacity at the cost (value) of the existing facilities.
- *Incremental/Marginal Cost Method.* Based on the value or cost to expand the existing system’s capacity. This method assigns to new development the incremental cost of future system expansion needed to serve new development.
- *Combined Cost Method.* Based on blended value of both the existing and expanded system capacity. This method uses a combination of the buy-in and incremental/marginal cost methods.

Chapter 162A allows a governmental unit to utilize any of the three methods described above depending on the availability of information from the governmental unit, i.e., a detailed listing of asset data (buy-in method) or a ten to twenty-year capital improvement plan (incremental method). The combined method includes both existing assets and future capital projects required to serve growth.

Chapter 162A states that an SDF shall be calculated based on a written analysis, which may constitute or be included in a capital plan, that:

1. Is prepared by a financial professional or a licensed professional engineer qualified by experience and training or education to employ generally accepted accounting, engineering, and planning methodologies to calculate system development fees for public water and sewer systems.
2. Documents in reasonable detail the facts and data used in the analysis and their sufficiency and reliability.
3. Employs generally accepted accounting, engineering, and planning methodologies, including the buy-in, incremental cost or marginal cost, and combined cost methods for each service, setting forth appropriate analysis as to the consideration and selection of a method appropriate to the circumstances and adapted as necessary to satisfy all requirements of this Article.
4. Documents and demonstrates 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.
5. Identifies all assumptions and limiting conditions affecting the analysis and demonstrates that they do not materially undermine the reliability of conclusions reached.
6. Calculates a final system development fee per service unit of new development and includes an equivalency or conversion table for use in determining the fees applicable for various categories of demand.
7. Covers a planning horizon of not less than 10 years nor more than 20 years.
8. Is adopted by resolution or ordinance of the local governmental unit in accordance with G.S. 162A-209.

Further, Chapter 162A includes certain other minimum requirements as follows:

1. A system development fee shall not exceed that calculated based on the system development fee analysis.
2. Credits must be included no matter which methodology is used. A more detailed discussion on the applicable credits will be included in later sections of this Report.



3. A construction or contribution credit shall be given with respect to new development such that the governmental unit will credit the value of costs in excess of a development's proportionate share of connecting facilities required to be oversized for the use of others outside the development.

As such, this Report is intended to address the legal requirements set forth above to develop fees in accordance with Chapter 162A.

ADOPTION AND PERIODIC REVIEW OF SDF ANALYSIS

Upon completion of the SDF analysis, Chapter 162A sets forth certain criteria regarding the adoption and periodic review of SDFs. These include the following:

1. For not less than 45 days prior to consideration for adoption of the SDF analysis, the governmental unit shall post the analysis on its website and solicit and furnish a means to submit written comments which shall be considered by the preparer for possible modifications or revisions to the analysis.
2. Following expiration of the 45 days posting period, the governing body shall conduct a public hearing prior to considering adopting the analysis with any modifications.
3. The governmental unit shall publish the SDFs in its annual budget, rate plan or ordinance. Further, the SDF analysis shall be updated at least every five years.

EXISTING CAPACITY-RELATED FEES

The City currently imposes capacity-related charges to new customers requiring water and/or wastewater utility service. The current charges are identified by the City as Capacity Use Fees. As previously addressed, the term capacity use fee is consistent with industry terminology commonly used by other utility systems for similar charges. To be consistent with the definitions provided in Chapter 162A, the capital cost recovery terminology utilized in this Report will be System Development Fees. In addition, it is uncertain as to whether Chapter 162A requires utility systems to change the name/terminology of their existing fees. As such, if the City determines that it is more administratively efficient to maintain the use of the term Capacity Use Fees, it is recommended that the City obtain a legal opinion regarding the terminology. Such legal opinion is beyond the scope of this Report.

EXISTING METER SET FEES

The City currently imposes meter set fees to new customers connecting to the water and wastewater systems. However, it is important to note that such connection-related fees are different than the SDFs developed and proposed herein. The distinguishing characteristic is that



the meter set fees are established for the purpose of recovering the costs associated with performing the customer service act of physically making a new system connection (i.e. meter, labor, equipment, vehicles, etc.) SDFs, on the other hand, are established for the purpose of recovering the major capital costs incurred in making water and wastewater utility service available to the general public. The proposed fees designed herein are intended to be in addition to the existing meter set fees. As such, it is proposed that the existing meter set fees continue to be imposed. It should be noted that, for the purpose of the Report, the existing meter set fees are assumed to recover the costs associated with these items. A review of these fees in relation to actual costs incurred is beyond the scope of this Report.

EXISTING & PROJECTED CAPITAL FACILITIES

Existing Facilities – Buy-In Method

In considering the recovery of existing asset costs under the buy-in method, the general concept is that new customers “buy” a proportionate share of system capacity at the value of the existing facilities. It is important to note that while this methodology is labeled as *buy-in*, payment of an SDF does not transfer any ownership of the assets to the customer. Rather, such payment provides access to capacity at a status equal to that of existing customers of the system.

While there are different methods that can be used to establish a value to the existing facilities, a common approach is to value the existing assets at a replacement cost amount. According to the replacement cost method, the existing system components are valued at the estimated current cost of replacing the facilities. The analysis developed herein uses an approach referred to as Replacement Cost New Less Depreciation (RCNLD). Applying the RCNLD method, the original costs are escalated to current dollars through the use of construction cost indices, and then the result is adjusted down for the accumulated depreciation, which is also adjusted by the construction cost indices. This approach results in a replacement cost valuation that reflects the remaining depreciable life of the facilities.

In performing the RCNLD analysis, the City provided a detailed listing of the current water and wastewater system facilities (the “Asset Listing”). The Asset Listing contained the original cost, the date placed in service and the accumulated depreciation for each asset. The replacement cost of each asset is estimated by using construction cost indices information contained in the Handy-Whitman Index of Public Utility Construction Costs for the South Atlantic Region. The Handy-Whitman Index calculates the cost trends for different types of utility construction, including water systems. The published indices are used by regulatory bodies, operating entities, utility systems, service companies, valuation experts and insurance companies. The Handy-Whitman Index values are widely used to trend earlier valuations and original cost records to estimate replacement cost at prices prevailing at a certain date or to the present. While many general construction cost indexes are published, the Handy-Whitman Index is used in this analysis because it is specifically tailored to the utility industry.



After the replacement cost is calculated for each individual asset item, the adjusted accumulated depreciation is deducted for each asset item. The result is the RCNLD. The asset data and applicable recoverable cost allocations are provided in **Exhibit 1** at the end of this Report. The existing capital facilities and RCNLD calculations are summarized in **Table 1**.

Description	Original Cost	Replacement Cost New	Accumulated Depreciation	RCNLD
Utility Assets:				
Business-Admin	\$ 21,944,900	\$ 21,944,903	\$ (3,886,573)	\$ 18,058,330
Customer Service-Billing	3,829,301	3,829,301	(3,740,844)	88,457
Meter Shop	114,751	216,948	(155,881)	61,067
Water Source	27,195,486	72,917,769	(31,479,197)	41,438,572
Water Treatment	105,055,447	186,488,445	(69,378,175)	117,110,270
Booster Stations-Water Tanks	21,663,752	81,202,766	(49,224,387)	31,978,379
Water Lines	133,694,114	369,550,860	(249,595,420)	119,955,440
Sewer Line	233,023,379	686,324,088	(466,101,398)	220,222,690
Sewer Lift Stations	28,843,275	45,173,163	(18,473,380)	26,699,783
Wastewater Treatment	209,125,011	446,291,899	(268,596,090)	177,695,809
Contributions to Other Governments	89,440,373	106,489,044	(15,254,967)	91,234,077
Total	\$ 873,929,788	\$ 2,020,429,186	\$(1,175,886,312)	\$ 844,542,874

For the purpose of SDF analyses, the existing assets are categorized based on the major components of **Treatment** and **Transmission**. The treatment category includes the treatment plant facilities (water and wastewater) and accompanying supply and storage facilities (water only), as well as wastewater effluent disposal facilities. The transmission/collection category consists of major water mains, water pumping facilities, sewer lift stations and collection lines. Since the localized distribution and collection facilities are generally contributed by developers or funded from other sources (i.e., assessments, direct customer payments, etc.), these facilities are not included for recovery through the SDFs. Additionally, a cost limit or threshold has been set at \$100,000 as a condition of inclusion of the asset items in the SDF calculation. The cost limit is based on the assumption that any asset item that costs less than the limit amount is not a major facility that provides a system-wide benefit. A final adjustment was made to exclude certain asset items that were identified as projects that only restored existing capacity rather than provided system upgrades or additional system capacity. The existing recoverable water and wastewater capital asset cost allocations included in the analysis are summarized in **Table 2**.



TABLE 2
SUMMARY OF EXISTING RECOVERABLE FACILITIES

Description	RCNLD Included For Recovery		
	Water	Wastewater	Total
Utility Assets:			
Business-Admin	\$ 0	\$ 0	\$ 0
Customer Service-Billing	0	0	0
Meter Shop	0	0	0
Water Source	40,158,528	0	40,158,528
Water Treatment	112,961,772	0	112,961,772
Booster Stations-Water Tanks	27,393,630	0	27,393,630
Water Lines	88,710,366	0	88,710,366
Sewer Line	0	149,972,051	149,972,051
Sewer Lift Stations	0	25,278,078	25,278,078
Wastewater Treatment	0	163,087,850	163,087,850
Contributions to Other Governments	91,234,077	0	91,234,077
Total	\$ 360,458,373	\$ 338,337,979	\$ 698,796,352

Capital Improvements Program – Incremental Cost Method

In considering the recovery of future asset costs under the incremental cost method, the general concept is to assign to new development the incremental cost of future system expansion needed to serve the new development. When using this method, Chapter 162A requires a minimum 10-year capital improvements program (“CIP”) that identifies the costs associated with new capacity and the timing of the expenditures. It is also important to consider the planned funding sources for the projects identified in the CIP. For example, projects that are funded from grants or developer contributions are excluded from the SDF calculation since these are costs that are not incurred by the utility.

The SDFs developed herein utilize the incremental cost method and therefore include future capital improvement projects and their applicable additions to system capacity. The City has adopted a CIP that provides a listing of individual projects and anticipated construction costs for fiscal years 2018 through 2027 (i.e. a 10-year CIP). The CIP is provided in **Exhibit 2**. Similar to the rationale for excluding certain existing assets from recovery through SDFs, the CIP project costs included for capital recovery in the analysis consist of only those projects associated with system-wide upgrades or expansions. As such, projects related to general maintenance (i.e. renewal and replacement of existing facilities) or localized facilities that benefit only certain customers are excluded from recovery through the SDFs. The CIP and resulting identification of assumed growth-related projects (i.e. project costs recoverable from SDFs) are provided in **Exhibit 3**. The Exhibit also provides a summary allocation of the recoverable costs between the treatment and transmission components. The projected growth-related projects and capital costs included in the analysis are summarized in **Table 3**.



**TABLE 3
SUMMARY OF CIP**

Description	Recoverable Capital	Excluded Capital	Total CIP
<u>Water Summary:</u>			
Treatment Projects	\$ 15,000,000	\$ 117,834,630	\$ 132,834,630
Transmission Projects	120,485,337	81,245,796	201,731,133
Other Projects	0	0	0
Subtotal	\$ 135,485,337	\$ 199,080,426	\$ 334,565,763
<u>Wastewater Summary:</u>			
Treatment Projects	\$ 127,759,111	\$ 0	\$ 127,759,111
Transmission Projects	66,605,000	90,472,872	157,077,872
Other Projects	0	0	0
Subtotal	\$ 194,364,111	\$ 90,472,872	\$ 284,836,983
<u>Combined Summary:</u>			
Treatment Projects	\$ 142,759,111	\$ 117,834,630	\$ 260,593,741
Transmission Projects	187,090,337	171,718,668	358,809,005
Other Projects	0	0	0
Total	\$ 329,849,448	\$ 289,553,298	\$ 619,402,746

Total Facilities – Combined Method

The analysis developed herein for calculation of the SDFs proposes the combined method. As the name implies, the combined method includes the cost/value of both the existing facilities currently providing service, as well as the planned facilities required to perpetuate or expand service. This method assumes that the utility has capacity within the existing system is sufficient to serve near-term growth, but will require additional capacity to serve future growth needs. Using this method, new customers pay an SDF that reflects the value of both existing and planned capacity. The combined system costs included for recovery are summarized in **Table 4**.



**TABLE 4
SUMMARY OF COMBINED RECOVERABLE FACILITIES**

Description	Combined Recoverable Facilities		
	Water	Wastewater	Total
Existing Facilities:			
Treatment Facilities	\$ 242,203,987	\$ 163,087,850	\$ 405,291,837
Transmission Facilities	118,254,386	175,250,129	293,504,515
Subtotal	\$ 360,458,373	\$ 338,337,979	\$ 698,796,352
Capital Improvement Program:			
Treatment Facilities	\$ 15,000,000	\$ 127,759,111	\$ 142,759,111
Transmission Facilities	120,485,337	66,605,000	187,090,337
Subtotal	\$ 135,485,337	\$ 194,364,111	\$ 329,849,448
Combined Facilities:			
Treatment Facilities	\$ 257,203,987	\$ 290,846,961	\$ 548,050,948
Transmission Facilities	238,739,723	241,855,129	480,594,852
Total	\$ 495,943,710	\$ 532,702,090	\$ 1,028,645,800

DEBT SERVICE CREDIT

It is common practice for utilities to fund major capital improvements and expansion projects with debt (i.e. bond issues). Generally, debt service payments associated with bond issues are recovered through the monthly user rates and charges applied to all system customers, as well as from other available revenue sources (including SDFs). In order to reduce the potential for new customers to pay twice for capital facilities (i.e. paying an SDF and then paying for debt service on expansion projects in their monthly user rates), the SDF analysis developed herein includes a debt service credit. This credit is equal to the outstanding principal remaining on all utility related debt. The debt credit amount is allocated between water and wastewater based on information provided by staff related to the capital projects that were funded from proceeds of each individual debt component. The debt service credit meets the requirements of Chapter 162A and is utilized in the development of the proposed SDFs as discussed in the following section. A summary of the combined recoverable capital facilities as adjusted for the debt service credit is provided in **Table 5**.



TABLE 5
SUMMARY OF NET RECOVERABLE FACILITIES

Description	Net Recoverable Facilities		
	Water	Wastewater	Total
Combined Facilities:			
Treatment Facilities	\$ 257,203,987	\$ 290,846,961	\$ 548,050,948
Transmission Facilities	238,739,723	241,855,129	480,594,852
Subtotal	\$ 495,943,710	\$ 532,702,090	\$ 1,028,645,800
Less Debt Service Principal:			
Treatment Facilities	\$ (76,924,605)	\$ (69,075,593)	\$ (146,000,198)
Transmission Facilities	(37,557,895)	(74,226,907)	(111,784,802)
Subtotal	\$ (114,482,500)	\$ (143,302,500)	\$ (257,785,000)
Net Recoverable Facilities:			
Treatment Facilities	\$ 180,279,382	\$ 221,771,368	\$ 402,050,750
Transmission Facilities	201,181,828	167,628,222	368,810,050
Net Recoverable Facilities	\$ 381,461,210	\$ 389,399,590	\$ 770,860,800

SYSTEM CAPACITIES

As previously addressed, the purpose of the SDF is to have new customers pay for their proportionate share of system capacity. This concept implies that the fee is based on a unit cost of capacity. In order to apply a fee based on the unit cost of capacity, it is necessary to identify the capacities of the facilities for which cost recovery is assigned. As such, the methodology applied herein relies upon identifying the water and wastewater treatment capacities as well as estimating the capacities of the major transmission facilities. Due to the regulatory and design requirements for water and wastewater treatment plants, the capacity of treatment facilities is generally well documented. However, the volumetric capacity of the major transmission facilities is often more difficult to determine. For this reason, in performing an analysis of this nature, the assumed capacity of the transmission facilities is commonly based on a factor of the associated treatment capacities. In developing the estimated amount of capacity for each respective category, the analysis relies on information provided by the City and included in master planning documents, as well as assumptions based on common industry standards.

Water Treatment

The City owns and operates the Townsend and Mitchell water treatment plants with a total design capacity of 54.00 MGD (million gallons per day). Additionally, the City has purchased 13.00 MGD of combined capacity in the Reidsville, Burlington, and PTRWA facilities.



While the permitted flow capacity is provided in terms of the maximum daily flow amount, the development and application of SDFs are based on average flow requirements. As such, it is necessary to convert the maximum daily flow (MDF) capacity to an estimated average daily flow (ADF) capacity. Pursuant to general industry standards and discussions with staff, it is assumed herein that the rated MDF is approximately 1.5 times the available capacity on an ADF basis. Applying this factor to the rated capacity for the water treatment plant and other water supply sources results in an average daily flow capacity of 44.67 MGD. An additional adjustment is made based on the assumed amount of unaccounted-for water (i.e. system flushing and backwashing, testing, line loss, etc.). The unaccounted-for water reduces the amount of capacity available to existing and future customers. The analysis performed herein assumes an average line-loss factor of 15.0% to adjust for the unaccounted-for water flows at the treatment plant. This final adjustment results in an assumed average daily treatment plant capacity of 37.97 MGD.

Water Transmission

Unlike the treatment facilities, the capacity information for major transmission facilities is very difficult to determine and quantify. Such transmission capacity estimates are typically not even developed in engineering documents such as master plans or Consulting Engineer's Reports. Based on discussions with staff, it is assumed that the transmission facilities are capable of providing average water flow at least equal to 2.00 times the adjusted treatment capacity, resulting in 75.94 MGD.

Wastewater Treatment

Due to the regulatory and design requirements for wastewater treatment plants, the capacity of treatment facilities is generally well documented. The wastewater treatment facilities are designed and permitted in accordance with published hydraulic standards adopted by Section 15A NCAC 02T .0114 of the North Carolina Administrative Code regulations. The City owns and operates the T.Z. Osborne wastewater treatment plant with a permitted capacity of 56.00 MGD.

Unlike the application for water, the wastewater treatment capacity is permitted at average daily flow levels. As such, it is not necessary to convert the capacity. However, as with the line loss in the water system, the wastewater system is impacted by inflow and infiltration (I&I) into the wastewater collection facilities. In essence, the impact of I&I reduces the level of capacity that is available for use by existing and future system customers. The City's existing dynamic sewer collection system model was recently expanded and updated to provide a comprehensive update of the Sanitary Sewer Master Plan. The plan, which was created in 2001, updated in 2010 and last updated in 2017, identifies sewer mains that are not adequate to convey existing and projected near-term flows and assists with prioritizing rehabilitation and replacement projects. The City's consulting engineers provided a 30% to 35% I&I range based on actual flow monitoring results. Pursuant to discussions with staff, the ADF for wastewater treatment is adjusted for an assumed I&I impact of 30.00%, resulting in an adjusted average daily capacity of 39.20 MGD.

Wastewater Transmission

Similar to the discussion provided above for the determination of water transmission capacity, it is difficult to identify the capacity of the wastewater transmission facilities. Although an exact



capacity number is difficult to determine, for the purpose of this analysis it is assumed that the wastewater trunk lines and pumping facilities are designed to provide capacity at least equal to 2.00 times the permitted plant flow (as adjusted), or 78.40 MGD.

DEVELOPMENT OF SDFs

The methodology utilized herein for developing the water and wastewater SDFs relies upon the cost of major system facilities as well as the existing and expanded system capacities to calculate an estimated cost per unit (gallon) of capacity. Based on this methodology, it is estimated that the water facility costs are \$7.40 per gallon of water capacity (combined treatment and transmission). Additionally, it is estimated that the wastewater facility costs are \$7.80 per gallon of wastewater capacity.

In developing the SDFs, the unit costs per gallon of capacity are applied to a common Level of Service (LOS) standard in order to establish the applicable fee per Equivalent Residential Unit (ERU). For purposes of applying the LOS, an ERU is representative of a single-family residential dwelling unit receiving water service from a 5/8 x 3/4-inch metered connection and discharging normal domestic-strength wastewater through a comparably sized sewer connection. Based on common industry standards for the development and application of capacity-related charges, a typical residential water connection is generally assumed to require average service availability in the range of 350 to 450 gallons per day (gpd) of system capacity. The State of North Carolina (the "State") has established flow standards for purposes of planning and engineering design. In accordance with daily water flow capacity design standards defined in the North Carolina Administrative Codes (15A NCAC 18C .0409), the level of service requirement for a residential connection is 400 gallons per day (gpd).

The City's Water Resources Department utilizes a water distribution modeling program in part to support the capital improvement program and the development review process through the identification of system (flow and pressure) capabilities and restrictions. The City recently updated its hydraulic model to include mapping available fire flow and revising the Department's Water System Master Plan. The updated Master Plan established average usage as 83 gallons per capita per day and a weighted average of 2.77 people per household, based on census data, resulting in 230 gpd per residential connection. As such, the analysis developed herein utilizes the Master Plan results and assumes that 1 ERU requires a standard level of service of 230 gpd of water system capacity.

Similar to the water system, the SDFs for wastewater are to be applied on an equivalent residential unit (ERU) basis such that 1 ERU is equal to the estimated capacity requirements for a typical single family residential connection with a 5/8-inch X 3/4-inch water meter. In accordance with wastewater flow design standards adopted by the State and defined by the North Carolina Administrative Codes (15A NCAC 02T .0114), the level of service requirement is based on 120 gallons of capacity per day per bedroom for a residential home. Based on discussions with staff, for planning and design purposes for the wastewater system, the City uses a level of service



assumption of 90% of the water LOS. Applying the City's LOS, it is assumed that 1 ERU requires a standard level of service of 207 gpd of wastewater system capacity.

Applying the average day LOS amounts to the estimated unit costs per gallon of capacity, and adjusting for the applicable debt service credits results in the proposed water and wastewater SDFs of \$1,690 and \$1,610, respectively, for a typical single-family residential connection (i.e. per ERU). The development of the proposed water and wastewater SDFs is detailed in **Exhibits 4 and 5**, respectively. A summary of the existing and proposed SDFs for a typical new residential connection is provided in **Table 6**.

Description	Fee Per ERU Existing	Fee Per ERU Calculated
<u>Combined Fees:</u>		
Water	\$ 980	\$ 1,690
Wastewater	990	1,610
Combined Fee	\$ 1,970	\$ 3,300

APPLICATION OF SDFs

For the purpose of developing SDFs, the average daily flow number is established as one equivalent residential unit (ERU). An ERU provides a standard unit of measure such that fees for connections with larger than average demand requirements can be calculated on an equivalency basis. One ERU is equal to the average anticipated flow for a single-family dwelling unit with a standard 5/8 x 3/4-inch water meter. New connections with larger water meters have the potential of placing more demand on the system (i.e. require more capacity) and are assessed ERU factors accordingly. The City's existing methodology for incrementing the capacity use fees for larger connection sizes is based on standardized demand criteria established by the American Water Works Association (AWWA) pursuant to the size of the water meter. Utilizing the AWWA demand criteria, the applicable ERU factors for larger water meters are based on the incremental increase in potential demand as compared to the standard meter size. As such, the proposed fees developed herein utilize the meter equivalency methodology currently applied by the City for its existing fees. Since wastewater flow is generally a direct function of water flow, applying the water and wastewater SDFs based upon the size of the water meter is equitable, administratively efficient and consistent with industry standards. The proposed water and wastewater SDFs for the various meter sizes are developed in **Exhibit 6** and summarized in **Table 7**.



**TABLE 7
 PROPOSED/CALCULATED SYSTEM DEVELOPMENT FEES**

Description	Meter-Based ERU Factor	Proposed/Calculated Fees by Meter Size		
		Water	Sewer	Combined
<u>Meter Size:</u>				
5/8 Inch	1.00	\$ 1,690	\$ 1,610	\$ 3,300
3/4 Inch	1.50	\$ 2,535	\$ 2,415	\$ 4,950
1.0 Inch	2.50	\$ 4,225	\$ 4,025	\$ 8,250
1.5 Inch	5.00	\$ 8,450	\$ 8,050	\$ 16,500
2.0 Inch	8.00	\$ 13,520	\$ 12,880	\$ 26,400
3.0 Inch	16.00	\$ 27,040	\$ 25,760	\$ 52,800
4.0 Inch	25.00	\$ 42,250	\$ 40,250	\$ 82,500
6.0 Inch	50.00	\$ 84,500	\$ 80,500	\$ 165,000
8.0 Inch	80.00	\$ 135,200	\$ 128,800	\$ 264,000
10.0 Inch	115.00	\$ 194,350	\$ 185,150	\$ 379,500

In situations where the application of the meter-based fees will result in the collection of fees significantly different than the potential demand requirement of a new customer requesting service, a special calculation methodology may be applied at the discretion of the City’s Department of Water Resources. For such situations, it is important for the utility to have the flexibility to utilize an ERU methodology for individual accounts based on specific capacity requirements. This alternative methodology is to apply the calculated unit costs per gallon of capacity as provided in **Exhibit 6** times the capacity requirement for the particular customer. This type of situation will be uncommon and will typically only involve larger commercial and industrial connections. It is anticipated that, in such situations, the City will require certified engineering documentation defining the capacity utilization needs for the new customer.

As another example of utilizing a flexible methodology, the City sometimes has new master-metered multi-family connections whereby multiple residential dwelling units receive service through a single, common connection. Such connections generally consist of apartment complexes, patio homes, condominiums, duplexes, triplexes, townhouses, etc. Since the usage characteristics for individual dwelling units within multi-family structures are generally consistent with those of individually metered single-family households, it is common industry practice for such connections to be represented on a per-unit basis regardless of the size of the master-metered connection. As such, consistent with the City’s existing policies, the SDFs for new multi-family connections will be applied based on the number of permitted dwelling at a factor of 0.50 ERUs per dwelling unit. The resulting number of equivalent units is then multiplied times the SDF per ERU to calculate the total fees to be collected.



COMPARISON WITH NEIGHBORING UTILITIES

In order to provide the City with additional insight regarding the development and application of the SDFs, a comparison is often included to show the level of such fees as imposed by several other utility systems in North Carolina. The comparison would typically show the capacity-related fees for a new residential water and wastewater connection that receives service (from the subject utility or other local provider) through a standard residential-sized water meter (representative of 1 ERU) calculated under the existing and proposed fees of the City, and those of the other utility systems. However, given the current timing requirements of Chapter 162A, and the fact that numerous utility systems in the State are in the process of performing fee studies comparable to the one addressed in this Report, including a neighboring utility comparison at this time will provide somewhat meaningless information. If the City would like to get a better idea of how its SDFs compare to other systems, it is suggested that such a comparison be performed after July 1, 2018. This is the deadline for meeting all of the requirements needed for utility systems to have legally supported SDFs in accordance with Chapter 162A.

GENERAL ASSUMPTIONS AND CONSIDERATIONS

In the preparation of this Report, certain information has been used and relied upon that was provided to Willdan by other entities. Such information includes, but is not limited to, audited financial statements, annual operating budgets, capital information, asset listings, cost data, system capacities, fee schedules for other utilities, and other information provided during the study. While the sources and applicable information are believed to be reliable, no independent verification of the information has been made and no assurances are offered with respect to the accuracy of the applicable information. To the extent that information used to develop the assumptions applied in the Report differs from actual results, the analyses developed herein could be impacted accordingly.

CONCLUSIONS

This study has found a need for the City to adopt a mechanism for recovering the capital costs associated with system growth and expansion. Based on the reviews, analyses and assumptions provided herein, it is concluded that:

1. The application of capital recovery fees for new system connections is becoming more common for public utility systems in North Carolina. As growth continues to impact the region, and as state and federal funding programs are reduced or eliminated, it is prudent management practice to adopt mechanisms to recover capital costs incurred by the utility for making service available to future customers.



2. Through Chapter 162A, the North Carolina legislature has found that it is prudent to require new customers to bear a portion of the costs of current capacity and future expansions their presence will demand. It should be noted that Willdan is not attempting to issue a legal opinion regarding Chapter 162A or any court proceedings leading to the enactment of Chapter 162A. The summary discussion of the bill and any prior court rulings is intended for informational purposes only. Any questions regarding the legal consideration provided herein should be directed to the City's legal counsel.
3. The SDFs developed herein are equitable and provide for reasonable recovery of the capital costs associated with providing service to new customers.
4. The SDFs proposed herein are developed in accordance with the requirements of Chapter 162A and utilize methodologies that are consistent with industry standards.
5. The proposed SDFs are based on a listing of existing system assets as provided by the City, as well as the 10-year capital improvement plan adopted by the City.
6. The water and wastewater LOS standards proposed herein for establishing an ERU basis are based on flow standards utilized by the City for system planning and design purposes and are consistent with common industry standards.
7. The City currently imposes meter set fees and other related operational charges for new customer connections. Since these other charges are intended to recover operating costs for providing incident-specific services, the SDFs developed herein will have no effect on the level or application methodology for these other connection-related fees.
8. The City's monthly user rates and charges for water and wastewater utility service include a surcharge for customers located outside the incorporated limits of the City. However, no such surcharge is proposed for purposes of applying the SDFs. The rationale for this proposal is that, while operating costs may increase for providing service outside of the City limits, the capital costs per gallon of capacity for constructing major system facilities do not typically differ based on the location of the customer.
9. The discussions developed herein utilize the terminology of "System Development Fees" to be consistent with the terminology as defined in Chapter 162A. It is anticipated that the City will utilize this same terminology for the applicable fees upon adoption and implementation.



RECOMMENDATIONS

Based on the reviews, analyses and assumptions discussed herein, as well as the resulting conclusions provided above, it is respectfully recommended that the City:

1. Adopt the proposed SDFs and application methodology as developed in this Report;
2. Enact the proposed SDFs to become effective on July 1, 2018 or other such date as determined appropriate by the City Council; and
3. Readdress the SDF study within the next 5 years, or at such times as future capital budgets are developed and additional capital costs are incurred that may result in material adjustments to the SDF as adopted.

We appreciate the opportunity to be of service to the City in this matter. In addition, we would like to thank you and the other members of the City staff for the valuable assistance and cooperation provided during the preparation of the Report. We look forward to working with you on future projects and continuing a successful professional relationship.

Respectfully Yours,

WILLDAN FINANCIAL SERVICES.

A handwritten signature in black ink that reads "Daryll B. Parker".

Daryll B. Parker
Principal

A handwritten signature in blue ink that reads "Tara L. Hollis".

Tara L. Hollis
Principal

EXHIBITS 1 - 6

SUPPORTING OUTPUT FOR THE
WATER & WASTEWATER SDF STUDY



**WATER & WASTEWATER SDF STUDY FOR THE
CITY OF GREENSBORO, NORTH CAROLINA**

Prepared by Willdan Financial Services



EXHIBIT 1
CITY OF GREENSBORO, NC
EXISTING CAPITAL COSTS RECOVERABLE FROM SYSTEM DEVELOPMENT FEES
WATER & WASTEWATER SYSTEMS

Line	Description	Original Cost	Replacement Cost New	Accumulated Depreciation	RCNLD
UTILITY ASSETS					
Total Assets by Category:					
1	Business-Admin	\$ 21,944,900	\$ 21,944,903	\$ (3,886,573)	\$ 18,058,330
2	Customer Service-Billing	3,829,301	3,829,301	(3,740,844)	88,457
3	Meter Shop	114,751	216,948	(155,881)	61,067
4	Water Source	27,195,486	72,917,769	(31,479,197)	41,438,572
5	Water Treatment	105,055,447	186,488,445	(69,378,175)	117,110,270
6	Booster Stations-Water Tanks	21,663,752	81,202,766	(49,224,387)	31,978,379
7	Water Lines	133,694,114	369,550,860	(249,595,420)	119,955,440
8	Sewer Line	233,023,379	686,324,088	(466,101,398)	220,222,690
9	Sewer Lift Stations	28,843,275	45,173,163	(18,473,380)	26,699,783
10	Wastewater Treatment	209,125,011	446,291,899	(268,596,090)	177,695,809
11	Contributions to Other Governments	89,440,373	106,489,044	(15,254,967)	91,234,077
12	Total	\$ 873,929,788	\$ 2,020,429,186	\$ (1,175,886,312)	\$ 844,542,874
Adjusted For Assumed Cost Limit and Rehab Exclusion (\$):					
13	Business-Admin	\$ 20,465,813	\$ 20,465,811	\$ (3,105,207)	\$ 17,360,604
14	Customer Service-Billing	3,719,403	3,719,402	(3,630,945)	88,457
15	Meter Shop	0	0	0	0
16	Water Source	24,412,717	65,657,709	(25,499,181)	40,158,528
17	Water Treatment	98,795,588	174,948,715	(61,986,943)	112,961,772
18	Booster Stations-Water Tanks	19,499,182	74,791,369	(47,397,739)	27,393,630
19	Water Lines	101,258,762	319,155,943	(230,445,577)	88,710,366
20	Sewer Line	166,546,995	580,875,795	(430,903,744)	149,972,051
21	Sewer Lift Stations	26,636,252	41,781,931	(16,503,853)	25,278,078
22	Wastewater Treatment	182,435,890	329,700,671	(166,612,821)	163,087,850
23	Contributions to Other Governments	89,440,373	106,489,044	(15,254,967)	91,234,077
24	Total	\$ 733,210,975	\$ 1,717,586,390	\$ (1,001,340,977)	\$ 716,245,413
Recoverable Allocation - Water (%):					
25	Business-Admin				0%
26	Customer Service-Billing				0%
27	Meter Shop				0%
28	Water Source				100%
29	Water Treatment				100%
30	Booster Stations-Water Tanks				100%
31	Water Lines				100%
32	Sewer Line				0%
33	Sewer Lift Stations				0%
34	Wastewater Treatment				0%
35	Contributions to Other Governments				100%

EXHIBIT 1
CITY OF GREENSBORO, NC
EXISTING CAPITAL COSTS RECOVERABLE FROM SYSTEM DEVELOPMENT FEES
WATER & WASTEWATER SYSTEMS

Line	Description	Original Cost	Replacement Cost New	Accumulated Depreciation	RCNLD
Recoverable Allocation - Wastewater (%):					
36	Business-Admin				0%
37	Customer Service-Billing				0%
38	Meter Shop				0%
39	Water Source				0%
40	Water Treatment				0%
41	Booster Stations-Water Tanks				0%
42	Water Lines				0%
43	Sewer Line				100%
44	Sewer Lift Stations				100%
45	Wastewater Treatment				100%
46	Contributions to Other Governments				0%
System Allocation - Water (\$):					
47	Business-Admin			\$	0
48	Customer Service-Billing				0
49	Meter Shop				0
50	Water Source				40,158,528
51	Water Treatment				112,961,772
52	Booster Stations-Water Tanks				27,393,630
53	Water Lines				88,710,366
54	Sewer Line				0
55	Sewer Lift Stations				0
56	Wastewater Treatment				0
57	Contributions to Other Governments				91,234,077
58	Total			\$	360,458,373
System Allocation - Wastewater (\$):					
59	Business-Admin			\$	0
60	Customer Service-Billing				0
61	Meter Shop				0
62	Water Source				0
63	Water Treatment				0
64	Booster Stations-Water Tanks				0
65	Water Lines				0
66	Sewer Line				149,972,051
67	Sewer Lift Stations				25,278,078
68	Wastewater Treatment				163,087,850
69	Contributions to Other Governments				0
70	Total			\$	338,337,979
71	Grand Total Recoverable Assets			\$	698,796,352

EXHIBIT 1
CITY OF GREENSBORO, NC
EXISTING CAPITAL COSTS RECOVERABLE FROM SYSTEM DEVELOPMENT FEES
WATER & WASTEWATER SYSTEMS

Line	Description	Original Cost	Replacement Cost New	Accumulated Depreciation	RCNLD
COMPONENT ALLOCATION					
Total Recoverable Water Facilities:					
72	Treatment Facilities				\$ 242,203,987
73	Transmission Facilities				118,254,386
74	Total				<u>\$ 360,458,373</u>
Total Recoverable Wastewater Facilities:					
75	Treatment Facilities				\$ 163,087,850
76	Transmission Facilities				175,250,129
77	Total				<u>\$ 338,337,979</u>
Combined Recoverable Facilities:					
78	Treatment Facilities				\$ 405,291,837
79	Transmission Facilities				293,504,515
80	Total				<u>\$ 698,796,352</u>
COMPARISON TO TOTAL					
81	Total Utility Assets				\$ 844,542,874
82	Combined Recoverable Assets				\$ 698,796,352
Difference (Assets Excluded From Recovery):					
83	Excluded From Recovery (\$)				\$ 145,746,522
84	Excluded From Recovery (%)				17.26%
DEBT SERVICE CREDIT					
85	Outstanding Debt Principal				\$ 257,785,000
Allocation Percentage:					
86	Water				44.41%
87	Wastewater				55.59%
Allocated Debt Service Credit:					
88	Water				\$ 114,482,500
89	Wastewater				143,302,500
90	Total				<u>\$ 257,785,000</u>
Component Allocation - Water:					
91	Treatment Facilities				\$ 76,924,605
92	Transmission Facilities				37,557,895
93	Total				<u>\$ 114,482,500</u>
Component Allocation - Wastewater:					
94	Treatment Facilities				\$ 69,075,593
95	Transmission Facilities				74,226,907
96	Total				<u>\$ 143,302,500</u>

EXHIBIT 2
 CITY OF GREENSBORO, NC
 SYSTEM DEVELOPMENT FEE STUDY
 CAPITAL IMPROVEMENTS PROGRAM FOR FY 2018 - FY 2027

Line	Description	Total	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Water												
1	Mitchell - Raw Water Line Rehabilitation	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
2	Lakes - Air Harbor Reservoir Cleanout and Basin Rehab	800,000	800,000	0	0	0	0	0	0	0	0	0
3	Lakes - Townsend Algae Reduction Project	1,450,000	150,000	0	1,300,000	0	0	0	0	0	0	0
4	Mitchell - Backwash Pump Replacement	1,300,000	0	1,300,000	0	0	0	0	0	0	0	0
5	Mitchell - Clearwell Replacement (1 MG)	0	0	0	0	0	0	0	0	0	0	0
6	Mitchell - High Lift Station Surge Valve Replacement	0	0	0	0	0	0	0	0	0	0	0
7	Mitchell - Lake Daniel Liner / Curtain Inspection and Roof Replacement	0	0	0	0	0	0	0	0	0	0	0
8	Mitchell - Major Electrical Improvements	0	0	0	0	0	0	0	0	0	0	0
9	Mitchell - MFP Building Structural and Sedimentation Basin Rehabilitation	0	0	0	0	0	0	0	0	0	0	0
10	Mitchell - Replace Trac Vacs	2,100,000	0	300,000	1,800,000	0	0	0	0	0	0	0
11	Mitchell - Waste Clarifier / EQ Basin Improvements	5,000,000	500,000	4,500,000	0	0	0	0	0	0	0	0
12	Reidsville - Finished Water Pump Station	2,058,000	2,058,000	0	0	0	0	0	0	0	0	0
13	Townsend - New Solids Lagoon	3,300,000	300,000	0	3,000,000	0	0	0	0	0	0	0
14	Townsend - Plant and Marina Septic System Improvements / Replacement	710,000	60,000	650,000	0	0	0	0	0	0	0	0
15	Townsend - Replace Trac Vacs	600,000	0	0	600,000	0	0	0	0	0	0	0
16	Water Assessment - Water Transmission Mains	0	0	0	0	0	0	0	0	0	0	0
17	Water Supply - Communications Master Planning	0	0	0	0	0	0	0	0	0	0	0
18	Mitchell - Major Electrical Improvements - design	670,000	670,000	0	0	0	0	0	0	0	0	0
19	Townsend - WTP Basin and Filter Improvements	17,659,134	9,329,567	8,329,567	0	0	0	0	0	0	0	0
20	Mitchell - MFP Building Structural and Sedimentation Basin Rehabilitation	4,600,000	4,600,000	0	0	0	0	0	0	0	0	0
21	Mitchell - Major Electrical Improvements	15,487,496	0	12,040,647	3,446,849	0	0	0	0	0	0	0
22	Townsend - Major Electrical and Genset - Phase II	8,700,000	0	0	1,200,000	7,500,000	0	0	0	0	0	0
23	Townsend - Replace Trac Vacs	3,400,000	0	0	0	3,400,000	0	0	0	0	0	0
24	PTRWA - Randleman Dam Treatment Plant Expansion	15,000,000	0	0	0	0	7,500,000	7,500,000	0	0	0	0
25	Lakes - Brandt Dam Flood Gate Skin and Mechanical Rehab	5,000,000	0	0	0	0	0	0	5,000,000	0	0	0
26	Townsend and Mitchell - GAC	30,000,000	0	0	0	0	0	0	15,000,000	15,000,000	0	0
27	Townsend and Mitchell - DAF	15,000,000	0	0	0	0	0	0	0	0	7,500,000	7,500,000
28	Distribution System - High Point Road Tank Property Acquisition	0	0	0	0	0	0	0	0	0	0	0
29	NCDOT - Reimbursements for New Utilities, Utility Conflicts and Encasements	0	0	0	0	0	0	0	0	0	0	0
30	NCDOT P-5204 Utility Conflicts	0	0	0	0	0	0	0	0	0	0	0
31	NCDOT R-2611 W&S Encasements and Utility Conflicts	0	0	0	0	0	0	0	0	0	0	0

EXHIBIT 2
CITY OF GREENSBORO, NC
SYSTEM DEVELOPMENT FEE STUDY
CAPITAL IMPROVEMENTS PROGRAM FOR FY 2018 - FY 2027

Line	Description	Total	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
32	NCDOT U-2524D W&S Encasements and Utility Conflicts	0	0	0	0	0	0	0	0	0	0	0
33	NCDOT U-2525C W&S Encasements and Utility Conflicts	3,750,000	0	3,750,000	0	0	0	0	0	0	0	0
34	Water - Land for Line Improvements	250,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000
35	Water and Sewer - Reedy Fork Industrial Site Development	4,528,096	0	2,261,000	0	0	2,267,096	0	0	0	0	0
36	Water and Sewer - Upsizing / Oversizing Policy	10,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
37	Water Booster Station - Groometown Road Booster Station	0	0	0	0	0	0	0	0	0	0	0
38	Water Booster Station - Jessup Grove Station Relocation to Four Farms	2,250,000	0	0	0	250,000	2,000,000	0	0	0	0	0
39	Water Booster Station - New Airpark Ct. Booster Station	1,500,000	1,500,000	0	0	0	0	0	0	0	0	0
40	Water Booster Station - New West Friendly Ave. Station	1,079,000	0	0	0	120,000	959,000	0	0	0	0	0
41	Water Line Extension - *System Expansion @ Various Locations	2,281,590	281,590	0	0	0	0	0	0	0	1,000,000	1,000,000
42	Water Line Extension (County) - Birch Creek Road Water Line Improvements I	0	0	0	0	0	0	0	0	0	0	0
43	Water Line Extension (County) - Birch Creek Road Water Line Improvements II	1,480,603	0	0	0	0	341,678	1,138,925	0	0	0	0
44	Water Line Extension (County) - Gray Wilson Rd Water Line Improvements	185,890	0	0	0	0	185,890	0	0	0	0	0
45	Water Line Extension (County) - Hicone Road Water Line Improvements	275,000	0	275,000	0	0	0	0	0	0	0	0
46	Water Line Extension (County) - Holden Road Water Line Improvements	253,115	0	0	0	0	253,115	0	0	0	0	0
47	Water Line Extension (County) - Huffine Mill Road	400,000	400,000	0	0	0	0	0	0	0	0	0
48	Water Line Extension (County) - Lees Chapel Road Part I	6,500,000	6,500,000	0	0	0	0	0	0	0	0	0
49	Water Line Extension (County) - McLeansville Rd Water Water Line Improvements Part I	0	0	0	0	0	0	0	0	0	0	0
50	Water Line Extension (County) - Mt. Hope Church Road Water Line Improvements Part	473,054	0	0	473,054	0	0	0	0	0	0	0
51	Water Line Extension (County) - Pleasant Garden Road Water Line Improvements	1,082,278	0	0	0	0	1,082,278	0	0	0	0	0
52	Water Line Extension (County) - Randleman Road / S. Elm-Eugene Street Connector	874,224	0	0	0	0	0	874,224	0	0	0	0
53	Water Line Extension (County) - Rockingham Road South Water Line	260,030	0	0	60,007	200,023	0	0	0	0	0	0
54	Water Line Extension (County) - Rudd Station Rd Water Line Improvements Part I	300,000	300,000	0	0	0	0	0	0	0	0	0
55	Water Line Extension (County) - Scotland Road Water Line Improvements	315,637	0	0	72,839	242,798	0	0	0	0	0	0
56	Water Line Extension (County) - Scott Road Water Line Improvements	560,214	0	0	129,280	430,934	0	0	0	0	0	0
57	Water Line Extension (County) - South Bunker Hill Road Water Line Improvements	122,772	0	0	0	0	122,772	0	0	0	0	0

EXHIBIT 2
CITY OF GREENSBORO, NC
SYSTEM DEVELOPMENT FEE STUDY
CAPITAL IMPROVEMENTS PROGRAM FOR FY 2018 - FY 2027

Line	Description	Total	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
58	Water Line Extension (County) - Southeast Greensboro Feeder Main Water Line Improvements Part I	1,355,029	0	0	0	312,699	1,042,330	0	0	0	0	0
59	Water Line Extension (County) - Southeast Greensboro Feeder Main Water Line Improvements Part II	2,618,067	0	0	0	0	604,169	2,013,898	0	0	0	0
60	Water Line Extension (County) - Southeast Greensboro Feeder Main Water Line Improvements Part III	3,256,887	0	0	0	0	751,589	2,505,298	0	0	0	0
61	Water Line Extension (County) - Southeast Greensboro Feeder Main Water Line Improvements Part IV	3,526,530	0	0	0	0	0	0	813,815	2,712,715	0	0
62	Water Line Extension (County) - Vandalia Road East Part I	61,935	0	0	0	14,293	47,642	0	0	0	0	0
63	Water Line Extension (PTAA) - Chimney Rock Road Water Line Improvements	255,434	0	255,434	0	0	0	0	0	0	0	0
64	Water Line Extension - Kirkman Street and Sandy Ridge Rd. Water Line Improvements	245,580	0	245,580	0	0	0	0	0	0	0	0
65	Water Line Replacement - Horsepen Creek Road Widening	0	0	0	0	0	0	0	0	0	0	0
66	Water Line Replacement - Lowdermilk / Holts Chapel	0	0	0	0	0	0	0	0	0	0	0
67	Water Line Extension - Old Battleground Ave. Extension	600,000	600,000	0	0	0	0	0	0	0	0	0
68	Water Line Extension - Vandalia Road East Water Line Improvements Part II	169,135	0	0	0	0	39,031	130,104	0	0	0	0
69	Water Line Extension - Winding Creek Drive Water Line Improvements	69,137	0	69,137	0	0	0	0	0	0	0	0
70	Allerton Place Waterline Extension	300,000	60,000	240,000	0	0	0	0	0	0	0	0
71	Water Line Extension - Soabar Property Purchase	2,500,000	2,500,000	0	0	0	0	0	0	0	0	0
72	Water line Extension (County) - Forest Oaks Loop Feed	0	0	0	0	0	0	0	0	0	0	0
73	Water Line Extension - Mitchell to Townsend WTP Feeder Main	5,224,331	0	0	0	0	0	0	0	1,205,615	4,018,716	0
74	Water line Rehab - Gate City Blvd/West Lee Street (Phase 2)	2,065,714	0	2,065,714	0	0	0	0	0	0	0	0
75	Water Line Rehab - Line Rehabilitation Program (Epoxy)	35,063,312	2,621,000	2,839,000	3,057,000	3,275,000	3,492,000	3,710,000	3,928,000	3,987,000	4,046,805	4,107,507
76	Water Line Rehab - Ryan Street Water Line Improvements	0	0	0	0	0	0	0	0	0	0	0
77	Water Line Replacement - *Substandard Water Line (Pipe Bursting) Improvement	28,503,464	1,971,000	2,189,000	2,407,000	2,625,000	2,842,000	3,060,000	3,278,000	3,327,000	3,376,905	3,427,559
78	Water Line Replacement - *Substandard Water Line (Dig & Replace) Improvement	4,243,294	500,000	2,125,000	0	0	0	118,294	0	500,000	500,000	500,000
79	Water Line Replacement - Market Street	0	0	0	0	0	0	0	0	0	0	0
80	Water Line Replacement - Cone Mills Community Neighborhood Area	3,620,439	0	0	0	0	0	0	3,620,439	0	0	0
81	Water Line Replacement - E. Wendover Ave. / E. Bessemer Ave. Business Area	721,850	0	0	0	0	166,581	555,269	0	0	0	0
82	Water Line Replacement - Phillips Ave. Neighborhood Area	633,738	0	0	0	0	0	633,738	0	0	0	0

EXHIBIT 2
 CITY OF GREENSBORO, NC
 SYSTEM DEVELOPMENT FEE STUDY
 CAPITAL IMPROVEMENTS PROGRAM FOR FY 2018 - FY 2027

Line	Description	Total	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
83	Water Line Replacement - Rosewood Neighborhood Area	1,345,500	0	0	0	310,500	1,035,000	0	0	0	0	0
84	Water Line Replacement - South Church Street Water Line Replacement	400,000	0	0	400,000	0	0	0	0	0	0	0
85	Water Line Replacement - Summit Avenue	0	0	0	0	0	0	0	0	0	0	0
86	Water Line Replacement - Westerwood Neighborhood	842,072	0	0	0	0	194,324	647,748	0	0	0	0
87	Water Line Replacement - White Oak Neighborhood Area	1,083,776	0	0	0	250,102	833,674	0	0	0	0	0
88	Water Line Replacement - East Greensboro Warehouse Area Water Line Replacement	1,011,678	0	0	0	0	1,011,678	0	0	0	0	0
89	Water Line Replacement - West Fisher Ave. Water Line Replacement	0	0	0	0	0	0	0	0	0	0	0
90	Water and Sewer Extension Reserve (WSER)	7,675,958	825,958	850,000	750,000	750,000	750,000	750,000	750,000	750,000	750,000	750,000
91	Waterline Extension Hwy 62 Feeder Main	20,000,000	0	10,000,000	10,000,000	0	0	0	0	0	0	0
92	Customer Service - Water Billing Meter Changeout	20,000,000	0	0	6,000,000	6,000,000	8,000,000	0	0	0	0	0
93	Water Line Replacement - PCCP Feeder Main Rehabilitation	0	0	0	0	0	0	0	0	0	0	0
94	Water Line Replacement - PCCP Benjamin Pkwy Feeder Water Main Replacement	0	0	0	0	0	0	0	0	0	0	0
95	Water Line Replacement - PCCP Bridgepoint Road Water Main Improvements	617,000	0	0	0	0	123,000	494,000	0	0	0	0
96	Water Line Replacement - PCCP Bryan Park Feeder Main Improvements	6,179,270	0	0	0	1,235,854	4,943,416	0	0	0	0	0
97	Water Line Replacement - PCCP Cone Mills Feeder Water Main Improvements	2,665,000	0	0	0	0	533,000	2,132,000	0	0	0	0
98	Water Line Replacement - PCCP Lake Brandt PS Raw Water Main Improvement	0	0	0	0	0	0	0	0	0	0	0
99	Water Line Replacement - PCCP Latham Park Feeder Water Main Improvements	1,560,000	0	0	0	0	0	312,000	1,248,000	0	0	0
100	Water Line Replacement - PCCP Mitchell Feeder Water Main Improvement	1,007,500	0	0	0	0	0	0	201,500	806,000	0	0
101	Water Line Replacement - PCCP Murrow Blvd. Feeder Water Main Improvements	1,787,500	0	0	0	0	0	0	357,500	1,430,000	0	0
102	Water Line Replacement - PCCP N. Elam Ave. Feeder Water Main Replacement	1,404,000	0	0	0	0	0	0	0	0	234,000	1,170,000
103	Water Line Replacement - PCCP Wendover Ave. Feeder Water Main Improvements	396,500	0	0	0	0	0	0	0	0	0	396,500
Total Water.....		\$ 334,565,763	\$ 37,552,115	\$ 55,310,079	\$ 35,721,029	\$ 27,942,203	\$ 42,146,263	\$ 27,600,498	\$ 35,222,254	\$ 30,743,330	\$ 22,451,426	\$ 19,876,566

Sewer

104	TZO - 56 MGD Upgrade	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
105	TZO - Additional Grit Removal Processing Facilities	3,000,000	0	0	0	0	600,000	2,400,000	0	0	0	0
106	TZO - Mechanical Bar Screen Upgrade	0	0	0	0	0	0	0	0	0	0	0
107	TZO - Non-Potable Water System Expansion	0	0	0	0	0	0	0	0	0	0	0
108	TZO- Ash Clarifier Improvements	0	0	0	0	0	0	0	0	0	0	0
109	WETTEC- Water Environment Technology, Training, and Education Center	0	0	0	0	0	0	0	0	0	0	0

EXHIBIT 2
CITY OF GREENSBORO, NC
SYSTEM DEVELOPMENT FEE STUDY
CAPITAL IMPROVEMENTS PROGRAM FOR FY 2018 - FY 2027

Line	Description	Total	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
110	TZO - 56 MGD Upgrade Phase II - Construction	2,100,000	2,100,000	0	0	0	0	0	0	0	0	0
111	TZO - 56 MGD Upgrade Phase III - Construction	3,145,111	3,145,111	0	0	0	0	0	0	0	0	0
112	TZO - Biological Nitrogen Removal (BNR) - design	600,000	600,000	0	0	0	0	0	0	0	0	0
113	TZO - Biological Nitrogen Removal (BNR) - Construction	54,860,000	16,360,000	19,000,000	19,500,000	0	0	0	0	0	0	0
114	TZO - Biological Nitrogen Removal (BNR) - Construction Admin	4,054,000	1,303,000	1,303,000	1,448,000	0	0	0	0	0	0	0
115	TZO - Phase II (Jordan Lake) Nutrient Removal	60,000,000	0	0	0	0	0	0	0	0	30,000,000	30,000,000
116	Sewer - Land for Line Improvements	400,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000
117	Sewer Line Extension or Replacement - *System Improvement @ Various Locations	6,900,000	150,000	750,000	750,000	750,000	750,000	750,000	750,000	750,000	750,000	750,000
118	Sewer Line Extension - Pleasant Ridge Road	0	0	0	0	0	0	0	0	0	0	0
119	Sewer Line Extension - Pleasant Ridge Road	0	0	0	0	0	0	0	0	0	0	0
120	Sewer Line Replacement - Horsepen Creek Road Widening	0	0	0	0	0	0	0	0	0	0	0
121	Sewer Line Replacement - Wendover and Yanceyville Street	350,000	350,000	0	0	0	0	0	0	0	0	0
122	Sewer System Expansion - Sandy Ridge Rd	250,000	250,000	0	0	0	0	0	0	0	0	0
123	Sewer System Replacement 401 W Avondale Dr. Sewer Relocation	0	0	0	0	0	0	0	0	0	0	0
124	Sewer System Replacement at 3902 Lawndale Dr.	0	0	0	0	0	0	0	0	0	0	0
125	Sewer Line Improvements (SMP) - Benjamin Parkway Crossing	110,000	0	0	0	0	110,000	0	0	0	0	0
126	Sewer Line Improvements (SMP) - East of Amidon Dr to North and East of Grasmere Drive	423,000	0	0	423,000	0	0	0	0	0	0	0
127	Sewer Line Improvements (SMP) - East of MLK Drive Jr. to W. Market Street	732,000	0	0	0	0	0	732,000	0	0	0	0
128	Sewer Line Improvements (SMP) - East of Walnut Circle to W. Market Street	347,000	0	0	0	0	347,000	0	0	0	0	0
129	Sewer Line Improvements (SMP) - Elm Eugene Street to Orchard Street	967,000	0	0	0	0	967,000	0	0	0	0	0
130	Sewer Line Improvements (SMP) - Gatesville Rd to NB Trunkline (at 16th Street)	1,564,000	0	0	0	1,564,000	0	0	0	0	0	0
131	Sewer Line Improvements (SMP) - Gentry St to S. Holden Rd	1,519,000	0	0	0	0	1,519,000	0	0	0	0	0
132	Sewer Line Improvements (SMP) - Irwin Street to Sharon Ave.	157,000	0	0	0	0	157,000	0	0	0	0	0
133	Sewer Line Improvements (SMP) - Jolson Ct to Drexel Rd	884,000	0	0	0	0	884,000	0	0	0	0	0
134	Sewer Line Improvements (SMP) - Pinecroft Rd to High Point Rd. W. Exit Ramp off I-40	257,000	0	0	0	0	257,000	0	0	0	0	0
135	Sewer Line Improvements (SMP) - Randleman Rd to Gregory St	763,000	0	0	0	0	0	763,000	0	0	0	0
136	Sewer Line Improvements (SMP) - South of Executive Sq. to East of Twelfth Street	2,761,000	0	0	0	2,761,000	0	0	0	0	0	0

EXHIBIT 2
CITY OF GREENSBORO, NC
SYSTEM DEVELOPMENT FEE STUDY
CAPITAL IMPROVEMENTS PROGRAM FOR FY 2018 - FY 2027

Line	Description	Total	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
136	Sewer Line Improvements (SMP) - West of Boston Rd to Gentry St	1,551,000	0	0	0	0	1,551,000	0	0	0	0	0
137	Sewer Line Improvements (SMP) - White Street to NB WRF Wetwell	200,000	0	0	0	0	200,000	0	0	0	0	0
138	Sewer Line Rehab - Annual Program	74,975,872	5,986,000	6,383,000	6,780,000	7,178,000	7,575,000	7,972,000	8,091,580	8,212,954	8,336,148	8,461,190
139	Sewer Line Rehab - Gate City Blvd/ West Lee St (Phase II)	500,000	0	500,000	0	0	0	0	0	0	0	0
140	Sewer Line Replacement - North Buffalo Trunkline Phase II	0	0	0	0	0	0	0	0	0	0	0
141	Sewer Pump Station - Horsepen Creek Pump Station	2,100,000	0	0	0	300,000	0	1,800,000	0	0	0	0
142	Water and Sewer - Construction Asphalt Overlayment	0	0	0	0	0	0	0	0	0	0	0
143	Sewer Pump Station - Hilltop Road Lift Station, Gravity Sewer and Forcemain Replacement	12,225,000	6,025,000	6,200,000	0	0	0	0	0	0	0	0
144	Sewer Pump Station - Airport Lift Station Abandonment	3,450,000	3,450,000	0	0	0	0	0	0	0	0	0
145	Sewer Pump Station - Stewart Mill (Terrapin Ridge) Pump Station and Forcemain (Eastern Sewer)	5,500,000	5,500,000	0	0	0	0	0	0	0	0	0
146	Sewer Pump Station - Youngs Mill Rd Outfall Const & Lift Station Abandonment (Eastern Sewer)	16,000,000	4,000,000	12,000,000	0	0	0	0	0	0	0	0
147	Sewer Pump Station - Brightwood Pump Station and Forcemain	2,422,000	0	0	0	200,000	2,222,000	0	0	0	0	0
148	Sewer Line Improvements (SMP) - Hardie St to W. Meadowview Rd	14,663,000	0	0	0	0	0	14,663,000	0	0	0	0
149	Sewer Line Improvements (SMP) - Marston Rd to Saint Jude Street	1,771,000	0	0	0	0	0	1,771,000	0	0	0	0
150	Sewer Line Improvements (SMP) - Old Stage Coach Rd to Bledsoe Drive LS	3,336,000	0	0	0	0	0	3,336,000	0	0	0	0
151	Total Sewer.....	\$ 284,836,983	\$ 49,259,111	\$ 46,176,000	\$ 28,941,000	\$ 12,793,000	\$ 17,179,000	\$ 34,227,000	\$ 8,881,580	\$ 9,002,954	\$ 39,126,148	\$ 39,251,190
152	Total Water & Wastewater CIP.....	\$ 619,402,746	\$ 86,811,226	\$ 101,486,079	\$ 64,662,029	\$ 40,735,203	\$ 59,325,263	\$ 61,827,498	\$ 44,103,834	\$ 39,746,284	\$ 61,577,574	\$ 59,127,756

EXHIBIT 3
CITY OF GREENSBORO, NC
ALLOCATION OF CAPITAL IMPROVEMENTS PROGRAM
WATER AND WASTEWATER SYSTEMS

Line	Funding	Description	Total	Percentage Allocation ⁽¹⁾			Allocation Amount		
				Expand/Upgrade	R&R	Other	Expand/Upgrade	R&R	Other
WATER PROJECTS									
1	Water Plant	Mitchell - Raw Water Line Rehabilitation	\$ 0	0.00%	100.00%	0.00%	\$ 0	\$ 0	\$ 0
2	Water Plant	Lakes - Air Harbor Reservoir Cleanout and Basin Rehab	800,000	0.00%	100.00%	0.00%	0	800,000	0
3	Water Plant	Lakes - Townsend Algae Reduction Project	1,450,000	0.00%	100.00%	0.00%	0	1,450,000	0
4	Water Plant	Mitchell - Backwash Pump Replacement	1,300,000	0.00%	100.00%	0.00%	0	1,300,000	0
5	Water Plant	Mitchell - Clearwell Replacement (1 MG)	0	0.00%	100.00%	0.00%	0	0	0
6	Water Plant	Mitchell - High Lift Station Surge Valve Replacement	0	0.00%	100.00%	0.00%	0	0	0
7	Water Plant	Mitchell - Lake Daniel Liner / Curtain Inspection and Roof Replacement	0	0.00%	100.00%	0.00%	0	0	0
8	Water Plant	Mitchell - Major Electrical Improvements	0	0.00%	100.00%	0.00%	0	0	0
9	Water Plant	Mitchell - MFP Building Structural and Sedimentation Basin Rehabilitation	0	0.00%	100.00%	0.00%	0	0	0
10	Water Plant	Mitchell - Replace Trac Vacs	2,100,000	0.00%	100.00%	0.00%	0	2,100,000	0
11	Water Plant	Mitchell - Waste Clarifier / EQ Basin Improvements	5,000,000	0.00%	100.00%	0.00%	0	5,000,000	0
12	Water Plant	Reidsville - Finished Water Pump Station	2,058,000	0.00%	100.00%	0.00%	0	2,058,000	0
13	Water Plant	Townsend - New Solids Lagoon	3,300,000	0.00%	100.00%	0.00%	0	3,300,000	0
14	Water Plant	Townsend - Plant and Marina Septic System Improvements / Replacement	710,000	0.00%	100.00%	0.00%	0	710,000	0
15	Water Plant	Townsend - Replace Trac Vacs	600,000	0.00%	100.00%	0.00%	0	600,000	0
16	Water Plant	Water Assessment - Water Transmission Mains	0	0.00%	100.00%	0.00%	0	0	0
17	Water Plant	Water Supply - Communications Master Planning	0	0.00%	100.00%	0.00%	0	0	0
18	Water Plant	Mitchell - Major Electrical Improvements - design	670,000	0.00%	100.00%	0.00%	0	670,000	0
19	Water Plant	Townsend - WTP Basin and Filter Improvements	17,659,134	0.00%	100.00%	0.00%	0	17,659,134	0
20	Water Plant	Mitchell - MFP Building Structural and Sedimentation Basin Rehabilitation	4,600,000	0.00%	100.00%	0.00%	0	4,600,000	0
21	Water Plant	Mitchell - Major Electrical Improvements	15,487,496	0.00%	100.00%	0.00%	0	15,487,496	0
22	Water Plant	Townsend - Major Electrical and Genset - Phase II	8,700,000	0.00%	100.00%	0.00%	0	8,700,000	0
23	Water Plant	Townsend - Replace Trac Vacs	3,400,000	0.00%	100.00%	0.00%	0	3,400,000	0
24	Water Plant	PTRWA - Randleman Dam Treatment Plant Expansion	15,000,000	100.00%	0.00%	0.00%	15,000,000	0	0
25	Water Plant	Lakes - Brandt Dam Flood Gate Skin and Mechanical Rehab	5,000,000	0.00%	100.00%	0.00%	0	5,000,000	0
26	Water Plant	Townsend and Mitchell - GAC	30,000,000	0.00%	100.00%	0.00%	0	30,000,000	0
27	Water Plant	Townsend and Mitchell - DAF	15,000,000	0.00%	100.00%	0.00%	0	15,000,000	0
28	Water Distribution	Distribution System - High Point Road Tank Property Acquisition	0	0.00%	100.00%	0.00%	0	0	0
29	Water Distribution	NCDOT - Reimbursements for New Utilities, Utility Conflicts and Encasements	0	0.00%	0.00%	100.00%	0	0	0
30	Water Distribution	NCDOT P-5204 Utility Conflicts	0	0.00%	0.00%	100.00%	0	0	0
31	Water Distribution	NCDOT R-2611 W&S Encasements and Utility Conflicts	0	0.00%	0.00%	100.00%	0	0	0
32	Water Distribution	NCDOT U-2524D W&S Encasements and Utility Conflicts	0	0.00%	0.00%	100.00%	0	0	0
33	Water Distribution	NCDOT U-2525C W&S Encasements and Utility Conflicts	3,750,000	0.00%	0.00%	100.00%	0	0	3,750,000
34	Water Distribution	Water - Land for Line Improvements	250,000	100.00%	0.00%	0.00%	250,000	0	0
35	Water Distribution	Water and Sewer - Reedy Fork Industrial Site Development	4,528,096	100.00%	0.00%	0.00%	4,528,096	0	0
36	Water Distribution	Water and Sewer - Upsizing / Oversizing Policy	10,000,000	100.00%	0.00%	0.00%	10,000,000	0	0
37	Water Distribution	Water Booster Station - Groometown Road Booster Station	0	0.00%	100.00%	0.00%	0	0	0
38	Water Distribution	Water Booster Station - Jessup Grove Station Relocation to Four Farms	2,250,000	0.00%	100.00%	0.00%	0	2,250,000	0
39	Water Distribution	Water Booster Station - New Airpark Ct. Booster Station	1,500,000	100.00%	0.00%	0.00%	1,500,000	0	0
40	Water Distribution	Water Booster Station - New West Friendly Ave. Station	1,079,000	100.00%	0.00%	0.00%	1,079,000	0	0
41	Water Distribution	Water Line Extension - *System Expansion @ Various Locations	2,281,590	100.00%	0.00%	0.00%	2,281,590	0	0
42	Water Distribution	Water Line Extension (County) - Birch Creek Road Water Line Improvements I	0	100.00%	0.00%	0.00%	0	0	0
43	Water Distribution	Water Line Extension (County) - Birch Creek Road Water Line Improvements II	1,480,603	100.00%	0.00%	0.00%	1,480,603	0	0
44	Water Distribution	Water Line Extension (County) - Gray Wilson Rd Water Line Improvements	185,890	100.00%	0.00%	0.00%	185,890	0	0
45	Water Distribution	Water Line Extension (County) - Hicone Road Water Line Improvements	275,000	100.00%	0.00%	0.00%	275,000	0	0
46	Water Distribution	Water Line Extension (County) - Holden Road Water Line Improvements	253,115	100.00%	0.00%	0.00%	253,115	0	0
47	Water Distribution	Water Line Extension (County) - Huffine Mill Road	400,000	100.00%	0.00%	0.00%	400,000	0	0
48	Water Distribution	Water Line Extension (County) - Lees Chapel Road Part I	6,500,000	100.00%	0.00%	0.00%	6,500,000	0	0
49	Water Distribution	Water Line Extension (County) - McLeansville Rd Water Water Line Improvements Part I	0	100.00%	0.00%	0.00%	0	0	0
50	Water Distribution	Water Line Extension (County) - Mt. Hope Church Road Water Line Improvements Part I	473,054	100.00%	0.00%	0.00%	473,054	0	0
51	Water Distribution	Water Line Extension (County) - Pleasant Garden Road Water Line Improvements	1,082,278	100.00%	0.00%	0.00%	1,082,278	0	0
52	Water Distribution	Water Line Extension (County) - Randleman Road / S. Elm-Eugene Street Connector	874,224	100.00%	0.00%	0.00%	874,224	0	0
53	Water Distribution	Water Line Extension (County) - Rockingham Road South Water Line Improvements	260,030	100.00%	0.00%	0.00%	260,030	0	0

EXHIBIT 3
CITY OF GREENSBORO, NC
ALLOCATION OF CAPITAL IMPROVEMENTS PROGRAM
WATER AND WASTEWATER SYSTEMS

Line	Funding	Description	Total	Percentage Allocation ⁽¹⁾			Allocation Amount		
				Expand/Upgrade	R&R	Other	Expand/Upgrade	R&R	Other
54	Water Distribution	Water Line Extension (County) - Rudd Station Rd Water Line Improvements Part I	300,000	100.00%	0.00%	0.00%	300,000	0	0
55	Water Distribution	Water Line Extension (County) - Scotland Road Water Line Improvements	315,637	100.00%	0.00%	0.00%	315,637	0	0
56	Water Distribution	Water Line Extension (County) - Scott Road Water Line Improvements	560,214	100.00%	0.00%	0.00%	560,214	0	0
57	Water Distribution	Water Line Extension (County) - South Bunker Hill Road Water Line Improvements	122,772	100.00%	0.00%	0.00%	122,772	0	0
58	Water Distribution	Water Line Extension (County) - Southeast Greensboro Feeder Main Water Line Improvements Part I	1,355,029	100.00%	0.00%	0.00%	1,355,029	0	0
59	Water Distribution	Water Line Extension (County) - Southeast Greensboro Feeder Main Water Line Improvements Part II	2,618,067	100.00%	0.00%	0.00%	2,618,067	0	0
60	Water Distribution	Water Line Extension (County) - Southeast Greensboro Feeder Main Water Line Improvements Part III	3,256,887	100.00%	0.00%	0.00%	3,256,887	0	0
61	Water Distribution	Water Line Extension (County) - Southeast Greensboro Feeder Main Water Line Improvements Part IV	3,526,530	100.00%	0.00%	0.00%	3,526,530	0	0
62	Water Distribution	Water Line Extension (County) - Vandalia Road East Part I	61,935	100.00%	0.00%	0.00%	61,935	0	0
63	Water Distribution	Water Line Extension (PTAA) - Chimney Rock Road Water Line Improvements	255,434	100.00%	0.00%	0.00%	255,434	0	0
64	Water Distribution	Water Line Extension - Kirkman Street and Sandy Ridge Rd. Water Line Improvements	245,580	100.00%	0.00%	0.00%	245,580	0	0
65	Water Distribution	Water Line Replacement - Horsepen Creek Road Widening	0	100.00%	0.00%	0.00%	0	0	0
66	Water Distribution	Water Line Replacement - Lowdermilk / Holts Chapel	0	100.00%	0.00%	0.00%	0	0	0
67	Water Distribution	Water Line Extension - Old Battleground Ave. Extension	600,000	100.00%	0.00%	0.00%	600,000	0	0
68	Water Distribution	Water Line Extension - Vandalia Road East Water Line Improvements Part II	169,135	100.00%	0.00%	0.00%	169,135	0	0
69	Water Distribution	Water Line Extension - Winding Creek Drive Water Line Improvements	69,137	100.00%	0.00%	0.00%	69,137	0	0
70	Water Distribution	Allerton Place Waterline Extension	300,000	100.00%	0.00%	0.00%	300,000	0	0
71	Water Distribution	Water Line Extension - Soabar Property Purchase	2,500,000	0.00%	0.00%	100.00%	0	0	2,500,000
72	Water Distribution	Water line Extension (County) - Forest Oaks Loop Feed	0	100.00%	0.00%	0.00%	0	0	0
73	Water Distribution	Water Line Extension - Mitchell to Townsend WTP Feeder Main	5,224,331	100.00%	0.00%	0.00%	5,224,331	0	0
74	Water Distribution	Water line Rehab - Gate City Blvd/West Lee Street (Phase 2)	2,065,714	0.00%	100.00%	0.00%	0	2,065,714	0
75	Water Distribution	Water Line Rehab - Line Rehabilitation Program (Epoxy)	35,063,312	0.00%	100.00%	0.00%	0	35,063,312	0
76	Water Distribution	Water Line Rehab - Ryan Street Water Line Improvements	0	0.00%	100.00%	0.00%	0	0	0
77	Water Distribution	Water Line Replacement - *Substandard Water Line (Pipe Bursting) Improvement	28,503,464	100.00%	0.00%	0.00%	28,503,464	0	0
78	Water Distribution	Water Line Replacement - *Substandard Water Line (Dig & Replace) Improvement	4,243,294	100.00%	0.00%	0.00%	4,243,294	0	0
79	Water Distribution	Water Line Replacement - Market Street	0	100.00%	0.00%	0.00%	0	0	0
80	Water Distribution	Water Line Replacement - Cone Mills Community Neighborhood Area	3,620,439	100.00%	0.00%	0.00%	3,620,439	0	0
81	Water Distribution	Water Line Replacement - E. Wendover Ave. / E. Bessemer Ave. Business Area	721,850	100.00%	0.00%	0.00%	721,850	0	0
82	Water Distribution	Water Line Replacement - Phillips Ave. Neighborhood Area	633,738	100.00%	0.00%	0.00%	633,738	0	0
83	Water Distribution	Water Line Replacement - Rosewood Neighborhood Area	1,345,500	100.00%	0.00%	0.00%	1,345,500	0	0
84	Water Distribution	Water Line Replacement - South Church Street Water Line Replacement	400,000	100.00%	0.00%	0.00%	400,000	0	0
85	Water Distribution	Water Line Replacement - Summit Avenue	0	100.00%	0.00%	0.00%	0	0	0
86	Water Distribution	Water Line Replacement - Westerwood Neighborhood	842,072	100.00%	0.00%	0.00%	842,072	0	0
87	Water Distribution	Water Line Replacement - White Oak Neighborhood Area	1,083,776	100.00%	0.00%	0.00%	1,083,776	0	0
88	Water Distribution	Water Line Replacement - East Greensboro Warehouse Area Water Line Replacement	1,011,678	100.00%	0.00%	0.00%	1,011,678	0	0
89	Water Distribution	Water Line Replacement - West Fisher Ave. Water Line Replacement	0	0.00%	100.00%	0.00%	0	0	0
90	Water Distribution	Water and Sewer Extension Reserve (WSER)	7,675,958	100.00%	0.00%	0.00%	7,675,958	0	0
91	Water Distribution	Waterline Extension Hwy 62 Feeder Main	20,000,000	100.00%	0.00%	0.00%	20,000,000	0	0
92	Water Distribution	Customer Service - Water Billing Meter Changeout	20,000,000	0.00%	100.00%	0.00%	0	20,000,000	0
93	Water Distribution	Water Line Replacement - PCCP Feeder Main Rehabilitation	0	0.00%	100.00%	0.00%	0	0	0
94	Water Distribution	Water Line Replacement - PCCP Benjamin Pkwy Feeder Water Main Replacement	0	0.00%	100.00%	0.00%	0	0	0
95	Water Distribution	Water Line Replacement - PCCP Bridgepoint Road Water Main Improvements	617,000	0.00%	100.00%	0.00%	0	617,000	0
96	Water Distribution	Water Line Replacement - PCCP Bryan Park Feeder Main Improvements	6,179,270	0.00%	100.00%	0.00%	0	6,179,270	0
97	Water Distribution	Water Line Replacement - PCCP Cone Mills Feeder Water Main Improvements	2,665,000	0.00%	100.00%	0.00%	0	2,665,000	0
98	Water Distribution	Water Line Replacement - PCCP Lake Brandt PS Raw Water Main Improvement	0	0.00%	100.00%	0.00%	0	0	0
99	Water Distribution	Water Line Replacement - PCCP Latham Park Feeder Water Main Improvements	1,560,000	0.00%	100.00%	0.00%	0	1,560,000	0
100	Water Distribution	Water Line Replacement - PCCP Mitchell Feeder Water Main Improvement	1,007,500	0.00%	100.00%	0.00%	0	1,007,500	0
101	Water Distribution	Water Line Replacement - PCCP Murrow Blvd. Feeder Water Main Improvements	1,787,500	0.00%	100.00%	0.00%	0	1,787,500	0
102	Water Distribution	Water Line Replacement - PCCP N. Elam Ave. Feeder Water Main Replacement	1,404,000	0.00%	100.00%	0.00%	0	1,404,000	0
103	Water Distribution	Water Line Replacement - PCCP Wendover Ave. Feeder Water Main Improvements	396,500	0.00%	100.00%	0.00%	0	396,500	0
104		Subtotal	\$ 334,565,763				\$ 135,485,337	\$ 192,830,426	\$ 6,250,000

EXHIBIT 3
 CITY OF GREENSBORO, NC
 ALLOCATION OF CAPITAL IMPROVEMENTS PROGRAM
 WATER AND WASTEWATER SYSTEMS

Line	Funding	Description	Total	Percentage Allocation ⁽¹⁾			Allocation Amount		
				Expand/Upgrade	R&R	Other	Expand/Upgrade	R&R	Other
WASTEWATER PROJECTS									
105	Sewer Plant	TZO - 56 MGD Upgrade	\$ 0	100.00%	0.00%	0.00%	\$ 0	\$ 0	\$ 0
106	Sewer Plant	TZO - Additional Grit Removal Processing Facilities	3,000,000	100.00%	0.00%	0.00%	3,000,000	0	0
107	Sewer Plant	TZO - Mechanical Bar Screen Upgrade	0	100.00%	0.00%	0.00%	0	0	0
108	Sewer Plant	TZO - Non-Potable Water System Expansion	0	100.00%	0.00%	0.00%	0	0	0
109	Sewer Plant	TZO- Ash Clarifier Improvements	0	100.00%	0.00%	0.00%	0	0	0
110	Sewer Plant	WETTEC- Water Environment Technology, Training, and Education Center	0	100.00%	0.00%	0.00%	0	0	0
111	Sewer Plant	TZO - 56 MGD Upgrade Phase II - Construction	2,100,000	100.00%	0.00%	0.00%	2,100,000	0	0
112	Sewer Plant	TZO - 56 MGD Upgrade Phase III - Construction	3,145,111	100.00%	0.00%	0.00%	3,145,111	0	0
113	Sewer Plant	TZO - Biological Nitrogen Removal (BNR) - design	600,000	100.00%	0.00%	0.00%	600,000	0	0
114	Sewer Plant	TZO - Biological Nitrogen Removal (BNR) - Construction	54,860,000	100.00%	0.00%	0.00%	54,860,000	0	0
115	Sewer Plant	TZO - Biological Nitrogen Removal (BNR) - Construction Admin	4,054,000	100.00%	0.00%	0.00%	4,054,000	0	0
116	Sewer Plant	TZO - Phase II (Jordan Lake) Nutrient Removal	60,000,000	100.00%	0.00%	0.00%	60,000,000	0	0
117	Sewer Collection	Sewer - Land for Line Improvements	400,000	100.00%	0.00%	0.00%	400,000	0	0
118	Sewer Collection	Sewer Line Extension or Replacement - *System Improvement @ Various Locations	6,900,000	100.00%	0.00%	0.00%	6,900,000	0	0
119	Sewer Collection	Sewer Line Extension - Pleasant Ridge Road Sewer Line Extension	0	100.00%	0.00%	0.00%	0	0	0
120	Sewer Collection	Sewer line Replacement - Horsepen Creek Road Widening	0	100.00%	0.00%	0.00%	0	0	0
121	Sewer Collection	Sewer Line Replacement - Wendover and Yanceyville Street	350,000	0.00%	100.00%	0.00%	0	350,000	0
122	Sewer Collection	Sewer System Expansion - Sandy Ridge Rd	250,000	100.00%	0.00%	0.00%	250,000	0	0
123	Sewer Collection	Sewer System Replacement 401 W Avondale Dr. Sewer Relocation	0	0.00%	100.00%	0.00%	0	0	0
124	Sewer Collection	Sewer System Replacement at 3902 Lawndale Dr.	0	0.00%	100.00%	0.00%	0	0	0
125	Sewer Collection	Sewer Line Improvements (SMP) - Benjamin Parkway Crossing	110,000	100.00%	0.00%	0.00%	110,000	0	0
126	Sewer Collection	Sewer Line Improvements (SMP) - East of Amidon Dr to North and East of Grasmere Drive	423,000	100.00%	0.00%	0.00%	423,000	0	0
127	Sewer Collection	Sewer Line Improvements (SMP) - East of MLK Drive Jr. to W. Market Street	732,000	100.00%	0.00%	0.00%	732,000	0	0
128	Sewer Collection	Sewer Line Improvements (SMP) - East of Walnut Circle to W. Market Street	347,000	100.00%	0.00%	0.00%	347,000	0	0
129	Sewer Collection	Sewer Line Improvements (SMP) - Elm Eugene Street to Orchard Street	967,000	100.00%	0.00%	0.00%	967,000	0	0
130	Sewer Collection	Sewer Line Improvements (SMP) - Gatesville Rd to NB Trunkline (at 16th Street)	1,564,000	100.00%	0.00%	0.00%	1,564,000	0	0
131	Sewer Collection	Sewer Line Improvements (SMP) - Gentry St to S. Holden Rd	1,519,000	100.00%	0.00%	0.00%	1,519,000	0	0
132	Sewer Collection	Sewer Line Improvements (SMP) - Irwin Street to Sharon Ave.	157,000	100.00%	0.00%	0.00%	157,000	0	0
133	Sewer Collection	Sewer Line Improvements (SMP) - Jolson Ct to Drexel Rd	884,000	100.00%	0.00%	0.00%	884,000	0	0
134	Sewer Collection	Sewer Line Improvements (SMP) - Pinecroft Rd to High Point Rd. W. Exit Ramp off I-40	257,000	100.00%	0.00%	0.00%	257,000	0	0
135	Sewer Collection	Sewer Line Improvements (SMP) - Randleman Rd to Gregory St	763,000	100.00%	0.00%	0.00%	763,000	0	0
136	Sewer Collection	Sewer Line Improvements (SMP) - South of Executive Sq. to East of Twelfth Street	2,761,000	100.00%	0.00%	0.00%	2,761,000	0	0
137	Sewer Collection	Sewer Line Improvements (SMP) - West of Boston Rd to Gentry St	1,551,000	100.00%	0.00%	0.00%	1,551,000	0	0
138	Sewer Collection	Sewer Line Improvements (SMP) - White Street to NB WRF Wetwell	200,000	100.00%	0.00%	0.00%	200,000	0	0
139	Sewer Collection	Sewer Line Rehab - Annual Program	74,975,872	0.00%	100.00%	0.00%	0	74,975,872	0
140	Sewer Collection	Sewer Line Rehab - Gate City Blvd/ West Lee St (Phase II)	500,000	0.00%	100.00%	0.00%	0	500,000	0
141	Sewer Collection	Sewer Line Replacement - North Buffalo Trunkline Phase II	0	100.00%	0.00%	0.00%	0	0	0
142	Sewer Collection	Sewer Pump Station - Horsepen Creek Pump Station	2,100,000	100.00%	0.00%	0.00%	2,100,000	0	0
143	Sewer Collection	Water and Sewer - Construction Asphalt Overlayment	0	0.00%	100.00%	0.00%	0	0	0
144	Sewer Collection	Sewer Pump Station - Hilltop Road Lift Station, Gravity Sewer and Forcemain Replacement	12,225,000	0.00%	100.00%	0.00%	0	12,225,000	0
145	Sewer Collection	Sewer Pump Station - Airport Lift Station Abandonment	3,450,000	100.00%	0.00%	0.00%	3,450,000	0	0
146	Sewer Collection	Sewer Pump Station - Stewart Mill (Terrapin Ridge) Pump Station and Forcemain (Eastern Sewer)	5,500,000	100.00%	0.00%	0.00%	5,500,000	0	0
147	Sewer Collection	Sewer Pump Station - Youngs Mill Rd Outfall Const & Lift Station Abandonment (Eastern Sewer)	16,000,000	100.00%	0.00%	0.00%	16,000,000	0	0
148	Sewer Collection	Sewer Pump Station - Brightwood Pump Station and Forcemain	2,422,000	0.00%	100.00%	0.00%	0	2,422,000	0
149	Sewer Collection	Sewer Line Improvements (SMP) - Hardie St to W. Meadowview Rd	14,663,000	100.00%	0.00%	0.00%	14,663,000	0	0
150	Sewer Collection	Sewer Line Improvements (SMP) - Marston Rd to Saint Jude Street	1,771,000	100.00%	0.00%	0.00%	1,771,000	0	0
151	Sewer Collection	Sewer Line Improvements (SMP) - Old Stage Coach Rd to Bledsoe Drive LS	3,336,000	100.00%	0.00%	0.00%	3,336,000	0	0
152		Subtotal	\$ 284,836,983				\$ 194,364,111	\$ 90,472,872	\$ 0
153		Total - All Capital Projects	\$ 619,402,746				\$ 329,849,448	\$ 283,303,298	\$ 6,250,000

EXHIBIT 3
CITY OF GREENSBORO, NC
ALLOCATION OF CAPITAL IMPROVEMENTS PROGRAM
WATER AND WASTEWATER SYSTEMS

Line	Funding	Description	Total	Percentage Allocation ⁽¹⁾			Allocation Amount		
				Expand/Upgrade	R&R	Other	Expand/Upgrade	R&R	Other
ALLOCATION OF CAPITAL PROJECTS									
Water Summary:									
154		Treatment Projects	\$ 132,834,630	\$ 15,000,000	\$ 117,834,630	\$ 0			
155		Transmission Projects	195,481,133	120,485,337	74,995,796	0			
156		Other Projects	6,250,000	0	0	6,250,000			
157		Subtotal	\$ 334,565,763	\$ 135,485,337	\$ 192,830,426	\$ 6,250,000			
Wastewater Summary:									
158		Treatment Projects	\$ 127,759,111	\$ 127,759,111	\$ 0	\$ 0			
159		Transmission Projects	157,077,872	66,605,000	90,472,872	0			
160		Other Projects	0	0	0	0			
161		Subtotal	\$ 284,836,983	\$ 194,364,111	\$ 90,472,872	\$ 0			
Combined Summary:									
162		Treatment Projects	\$ 260,593,741	\$ 142,759,111	\$ 117,834,630	\$ 0			
163		Transmission Projects	352,559,005	187,090,337	165,468,668	0			
164		Other Projects	6,250,000	0	0	6,250,000			
165		Grand Total	\$ 619,402,746	\$ 329,849,448	\$ 283,303,298	\$ 6,250,000			

Notes:

(1) The capital costs are allocated in order to determine the costs that are recoverable from a capacity-related fee. The costs allocated as expansion and/or upgrade projects are assumed to be recoverable from such fees. All other capital costs are assumed to either be maintenance-related (R&R) projects or localized projects that do not provide system-wide capacity benefits.

EXHIBIT 4
 CITY OF GREENSBORO, NC
 CALCULATION OF SYSTEM DEVELOPMENT FEE PER ERU
 WATER SYSTEM

Line	Description	Total
Recoverable Capital Facilities		
Existing Facilities:		
1	Treatment Facilities	\$ 242,203,987
2	Transmission Facilities	118,254,386
3	Subtotal	<u>\$ 360,458,373</u> ⁽¹⁾
Capital Improvement Program:		
4	Treatment Facilities	\$ 15,000,000
5	Transmission Facilities	120,485,337
6	Subtotal	<u>\$ 135,485,337</u>
Combined:		
7	Treatment Facilities	\$ 257,203,987
8	Transmission Facilities	238,739,723
9	Subtotal	<u>\$ 495,943,710</u>
Less Debt Service Principal:		
10	Treatment Facilities	\$ (76,924,605)
11	Transmission Facilities	(37,557,895)
12	Subtotal	<u>\$ (114,482,500)</u> ⁽²⁾
Net Recoverable Facilities:		
13	Treatment Facilities	\$ 180,279,382
14	Transmission Facilities	201,181,828
15	Net Recoverable Facilities	<u>\$ 381,461,210</u>

EXHIBIT 4
 CITY OF GREENSBORO, NC
 CALCULATION OF SYSTEM DEVELOPMENT FEE PER ERU
 WATER SYSTEM

Line	Description		Total
Available System Capacity (MGD)			
<u>Daily Treatment Capacity:</u> (3)			
16	Townsend WTP		30.00
17	Mitchell WTP		24.00
18	Reidsville		2.00
19	Burlington		3.20
20	PTRWA		7.80
21	Combined Capacity of Water Treatment Facilities (MGD)		67.00
<u>Average Day Capacity Adjustment:</u>			
22	Treatment Capacity Based on Max/Avg Day Factor	1.50	44.67
23	Line Loss Capacity Adjustment	15.0%	
24	Available Treatment Capacity		37.97 (4)
<u>Estimated Transmission System Capacity:</u>			
25	Transmission:Treatment Capacity Factor	2.00	
26	Estimated Transmission Capacity		75.94 (5)

EXHIBIT 4
 CITY OF GREENSBORO, NC
 CALCULATION OF SYSTEM DEVELOPMENT FEE PER ERU
 WATER SYSTEM

Line	Description	Total
Estimated Cost Per Gallon of Capacity		
<u>Estimated Cost Per Gallon of Capacity:</u>		
27	Treatment (\$/Gallon)	\$ 4.75
28	Transmission (\$/Gallon)	2.65
29	Total Cost Per Gallon of Capacity	\$ 7.40
30	Assumed Standard Level of Service Per ERU (GPD of Capacity)	230 ⁽⁶⁾
Calculation of Proposed Fee Per ERU		
<u>Calculation of System Development Fee Per ERU:</u>		
31	Treatment Facilities	\$ 1,092
32	Transmission Facilities	609
33	Combined Cost	\$ 1,701
<u>Rounding Adjusted Fee - Treatment:</u>		
34	Calculated Fee Per ERU	\$ 1,092
35	Less Rounding Adjustment	(2)
36	Adjusted Fee	\$ 1,090
<u>Rounding Adjusted Fee - Transmission:</u>		
37	Calculated Fee Per ERU	\$ 609
38	Less Rounding Adjustment	(9)
39	Adjusted Fee	\$ 600
<u>Proposed System Development Fee Per ERU (Rounded):</u>		
40	Treatment Facilities	\$ 1,090
41	Transmission Facilities	600
42	Combined Cost	\$ 1,690

EXHIBIT 4
CITY OF GREENSBORO, NC
CALCULATION OF SYSTEM DEVELOPMENT FEE PER ERU
WATER SYSTEM

Line	Description	Total
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Notes:

- (1) See **Exhibit 1** for the development of existing asset costs identified for capital recovery.
- (2) Based upon discussions with utility staff, most of the facilities included for cost recovery in this analysis were funded with debt. In an effort to account for the facility costs that may be recovered from user rates as part of the normal budgetary process, a debt service credit is applied to the applicable fee calculation. The credit is equal to outstanding principal amount on existing utility-related debt as reported in the most recent audited financial report. The principal balance is allocated between water and wastewater as provided in **Exhibit 1**.
- (3) Based on rated maximum daily plant capacity information identified in the 2016 Master Plan.
- (4) The estimated average daily flow capacity assumes an MDF-to-ADF ratio of 1.50 times. An additional adjustment is made for assumed unaccounted-for water flows (e.g. line losses) in the system. For the purpose of this analysis, the line-loss factor is assumed to be 15%.
- (5) It is assumed that the transmission system capacity is at least equal to the maximum day treatment capacity. For the purpose of this analysis, it is assumed that the transmission capacity is 2.0 times the adjusted average daily treatment capacity.
- (6) The system development fees for water are to be applied on an equivalent residential unit (ERU) basis such that 1 ERU is equal to the estimated capacity requirements for a typical single family residential connection with a 5/8-inch X 3/4-inch water meter. Based on discussions with staff, the City's recently updated Water System Master Plan shows 83 gallons per capita per day and a weighted average of 2.77 people per household, based on census data, resulting in 230 gpd per residential connection. As such, this analysis assumes that 1 ERU requires a standard level of service of 230 gpd of water system capacity in accordance with the planning levels applied by the City.

EXHIBIT 5
 CITY OF GREENSBORO, NC
 CALCULATION OF SYSTEM DEVELOPMENT FEE PER ERU
 WASTEWATER SYSTEM

Line	Description	Total
Recoverable Capital Facilities		
Existing Facilities:		
1	Treatment Facilities	\$ 163,087,850
2	Transmission Facilities	175,250,129
3	Subtotal	\$ 338,337,979 ⁽¹⁾
Capital Improvement Program:		
4	Treatment Facilities	\$ 127,759,111
5	Transmission Facilities	66,605,000
6	Subtotal	\$ 194,364,111
Combined:		
7	Treatment Facilities	\$ 290,846,961
8	Transmission Facilities	241,855,129
9	Subtotal	\$ 532,702,090
Less Debt Service Principal:		
10	Treatment Facilities	\$ (69,075,593)
11	Transmission Facilities	(74,226,907)
12	Subtotal	\$ (143,302,500) ⁽²⁾
Net Recoverable Facilities:		
13	Treatment Facilities	\$ 221,771,368
14	Transmission Facilities	167,628,222
15	Net Recoverable Facilities	\$ 389,399,590

EXHIBIT 5
 CITY OF GREENSBORO, NC
 CALCULATION OF SYSTEM DEVELOPMENT FEE PER ERU
 WASTEWATER SYSTEM

Line	Description	Total
Available System Capacity (MGD)		
<u>Wastewater Treatment Capacity (MGD):</u>		
16	T.Z. Osborne	56.00
17	Combined Capacity of Treatment Facilities	56.00
<u>Treatment Capacity:</u>		
18	Average Day Treatment Capacity (MGD)	56.00
19	I&I Capacity Adjustment	30.0%
20	Adjusted Average Day Treatment Capacity	39.20 ⁽³⁾
<u>Estimated Transmission System Capacity:</u>		
21	Transmission:Treatment Capacity Factor	2.00
22	Estimated Transmission Capacity	78.40 ⁽⁴⁾
Estimated Cost Per Gallon of Capacity		
<u>Estimated Cost Per Gallon of Capacity:</u>		
23	Treatment (\$/Gallon)	\$ 5.66
24	Transmission (\$/Gallon)	2.14
25	Total Cost Per Gallon of Capacity	\$ 7.80
26	Assumed Standard Level of Service Per ERU (GPD of Capacity)	207 ⁽⁵⁾

EXHIBIT 5
 CITY OF GREENSBORO, NC
 CALCULATION OF SYSTEM DEVELOPMENT FEE PER ERU
 WASTEWATER SYSTEM

Line	Description	Total
Calculation of Proposed Fee Per ERU		
<u>Calculation of System Development Fee Per ERU:</u>		
27	Treatment Facilities	\$ 1,172
28	Transmission Facilities	443
29	Combined Cost	<u>\$ 1,615</u>
<u>Rounding Adjusted Fee - Treatment:</u>		
30	Calculated Fee Per ERU	\$ 1,172
31	Less Rounding Adjustment	(2)
32	Adjusted Fee	<u>\$ 1,170</u>
<u>Rounding Adjusted Fee - Transmission:</u>		
33	Calculated Fee Per ERU	\$ 443
34	Less Rounding Adjustment	(3)
35	Adjusted Fee	<u>\$ 440</u>
<u>Proposed System Development Fee Per ERU (Rounded):</u>		
36	Treatment Facilities	\$ 1,170
37	Transmission Facilities	440
38	Combined Cost	\$ 1,610

EXHIBIT 5
 CITY OF GREENSBORO, NC
 CALCULATION OF SYSTEM DEVELOPMENT FEE PER ERU
 WASTEWATER SYSTEM

Line	Description	Total
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Notes:

- (1) See **Exhibit 1** for the development of existing asset costs identified for capital recovery.
- (2) Based upon discussions with utility staff, most of the facilities included for cost recovery in this analysis were funded with debt. In an effort to account for the facility costs that may be recovered from user rates as part of the normal budgetary process, a debt service credit is applied to the applicable fee calculation. The credit is equal to outstanding principal amount on existing utility-related debt as reported in the most recent audited financial report. The principal balance is allocated between water and wastewater as provided in Exhibit 1.
- (3) Similar to the line loss adjustment for water, the wastewater system capacity is reduced by the impacts of system inflow and infiltration (I&I). The assumed I&I adjustment is based on discussions with staff.
- (4) It is assumed that the transmission system capacity is at least equal to the maximum day treatment capacity. For the purpose of this analysis, it is assumed that the transmission capacity is 2.0 times the adjusted average daily treatment capacity.
- (5) Similar to the water system, the system development fees for wastewater are to be applied on an equivalent residential unit (ERU) basis such that 1 ERU is equal to the estimated capacity requirements for a typical single family residential connection with a 5/8-inch X 3/4-inch water meter. Based on discussions with staff, the City uses a wastewater level of service of 90% of the water LOS for planning and design purposes. Therefore, it is assumed that 1 ERU requires a standard level of service of 207 gpd of wastewater system capacity.

EXHIBIT 6
CITY OF GREENSBORO, NC
SUMMARY OF PROPOSED SYSTEM DEVELOPMENT FEES
WATER & WASTEWATER

Line	Description	Meter-Based ERU Factor	Fees by System		Combined Fee
			Water	Wastewater	
EXISTING FEES					
Meter Size: (All Commercial and Residential >1,822 SF)					
1	5/8 Inch		\$ 980	\$ 990	\$ 1,970
2	3/4 Inch		\$ 1,472	\$ 1,488	\$ 2,960
3	1.0 Inch		\$ 2,450	\$ 2,480	\$ 4,930
4	1.5 Inch		\$ 4,900	\$ 4,960	\$ 9,860
5	2.0 Inch		\$ 7,844	\$ 7,936	\$ 15,780
6	3.0 Inch		\$ 15,684	\$ 15,872	\$ 31,556
7	4.0 Inch		\$ 24,506	\$ 24,800	\$ 49,306
8	6.0 Inch		\$ 49,012	\$ 49,598	\$ 98,610
9	8.0 Inch		\$ 78,422	\$ 79,358	\$ 157,780
10	10.0 Inch		\$ 112,732	\$ 114,080	\$ 226,812
11	Per Heated Sq Ft (Residential between 1,201 and 1,822 SF)		\$ 0.538	\$ 0.543	\$ 1.081
PROPOSED METER BASIS ⁽¹⁾					
Meter Size:					
12	5/8 Inch	1.00	\$ 1,690	\$ 1,610	\$ 3,300
13	3/4 Inch	1.50	\$ 2,535	\$ 2,415	\$ 4,950
14	1.0 Inch	2.50	\$ 4,225	\$ 4,025	\$ 8,250
15	1.5 Inch	5.00	\$ 8,450	\$ 8,050	\$ 16,500
16	2.0 Inch	8.00	\$ 13,520	\$ 12,880	\$ 26,400
17	3.0 Inch	16.00	\$ 27,040	\$ 25,760	\$ 52,800
18	4.0 Inch	25.00	\$ 42,250	\$ 40,250	\$ 82,500
19	6.0 Inch	50.00	\$ 84,500	\$ 80,500	\$ 165,000
20	8.0 Inch	80.00	\$ 135,200	\$ 128,800	\$ 264,000
21	10.0 Inch	115.00	\$ 194,350	\$ 185,150	\$ 379,500
22	Per Heated Square Foot		\$ 0.93	\$ 0.88	\$ 1.81
OPTIONAL ACTUAL FLOW BASIS ⁽²⁾					
Fee Per Gallon of Capacity (GPD):					
23	Treatment Facilities		\$ 4.75	\$ 5.66	\$ 10.41
24	Transmission Facilities		2.65	2.14	4.79
25	Cost Per GPD		\$ 7.40	\$ 7.80	\$ 15.20

Notes:

- (1) The proposed system development fees are based on the calculated fee per ERU as applied to the respective ERU factor. The proposed ERU factors for the fees are based on meter equivalency factors established by the AWWA.
- (2) In situations where the application of the meter-based fees will result in the collection of fees significantly different than the potential demand requirement, a special fee calculation methodology may be applied based on the unit cost of capacity and the estimated daily capacity needs of the new service connection. The estimated capacity needs will be based on the amount determined by the utility's engineering staff to be appropriate.



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