



Board of Commissioners Version | March 7, 2018

Moore County Public Works
System Development Fee Analysis (SDFA) | Board of Commissioners Version
Moore County, North Carolina

Prepared for:
Moore County Public Works Department

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Executive Summary

This report provides the System Development Fee Analysis per requirements of the North Carolina "Public Water and Sewer System Development Fee Act" (DFA). This version is for review by the Moore County Board of Commissioners and will be posted on the Moore County website for 45 days and comments will be accepted related to the SDF calculations¹. The tapping fees for new water meter or sewer stub installation are calculated separately².

The FY18 System Development Fee Analysis (SDFA), currently using FY16/FY17 data, provides a basis for calculating fair share cost of new development. The study uses a combined "buy-in" and incremental cost methodology using depreciated replacement cost of assets to determine system value plus eligible capital improvements over the next 10 years.

Nelsnick recommends implementing a new full-cost connection fee (FCCF) schedule that separates system development fees (SDF) from tap costs in FY19 (July 1, 2018) using DFA procedures. The new procedures allow adding the cost of Capital Improvement Projects (CIP) to the fee calculation. **Tables E.1 and E.2** summarize the calculation for FY19 using the requirements of the new law.

¹ **"§ 162A-209. Adoption and periodic review.** (a) For not less than 45 days prior to considering the adoption of a system development fee analysis, the local governmental unit shall post the analysis on its Web site and solicit and furnish a means to submit written comments, which shall be considered by the preparer of the analysis for possible modifications or revisions.

² **"§ 162A-201. Definitions. (9) System Development Fee** – 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, as provided in this Article. The term includes amortized charges, lump-sum charges, and any other fee that functions as described by this definition regardless of terminology. The term does not include any of the following: a. A charge or fee to pay the administrative, plan review, or inspection costs associated with permits required for development. b. Tap or hookup charges for the purpose of reimbursing the local governmental unit for the actual cost of connecting the service unit to the system. c. Availability charges. d. Dedication of capital improvements on-site, adjacent, or ancillary to a development absent a written agreement providing for credit or reimbursement to the developer pursuant to G.S. 153A-280, 153A-451, 160A-320, 160A-499 or Part 3A of Article 18, Chapter 153A or Part 3D of Article 19, Chapter 160A of the General Statutes. e. Reimbursement to the local governmental unit for its expenses in constructing or providing for water or sewer utility capital improvements adjacent or ancillary to the development if the owner or developer has agreed to be financially responsible for such expenses; however, such reimbursement shall be credited to any system development fee charged as set forth in G.S. 162A-207(c).

**Table E.1
Water System FCCF**

Meter Size	SDF
3/4"	\$1,027
1"	\$2,568
2"	\$8,216
3"	\$16,432
4"	\$25,675
6"	\$51,350

**Table E.2
Wastewater System FCCF**

Descriptions	SDF
Equivalent Dwelling Unit	\$1,831

Note: The SDF is determined by water meter size for water. For wastewater, the SDF will be based on an equivalent dwelling unit³. Also, the wastewater SDF portion related to the interceptor/treatment plant should be tracked separately in the WPCP's Capital Project Reserve Fund.

Recommendations Summary

The following are recommendations for Moore County's consideration:

1. Refine MCPU and WPCP asset listing to help in managing asset replacement requirements.
2. Implement a phase-in approach by adopting a portion of calculated SDF, \$627/EDU for water and \$1,092/EDU for wastewater⁴. The SDF will be added to the admin, tapping and meter set fees.

³ **§ 162A-205. Supporting analysis.** A system development fee shall be calculated based on a written analysis, which may constitute or be included in a capital improvements plan, that: (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.

⁴ **§ 162A-207. Minimum requirements.** (a) Maximum. – A system development fee shall not exceed that calculated based on the system development fee analysis.

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3. Conduct a Public Hearing after 45-day review period but before July 1, 2018⁵.
4. Adopt accounting procedures based on DFA requirements. (FY18)
5. SDF's collected will need to be accounted for and used for the following items in priority order, system debt then asset renewal/replacement.
6. Full Update of the SDFA every five years as required by legislation or earlier if significant changes in consumption or infrastructure occur.

⁵ **"§ 162A-209. Adoption and periodic review** (b) After expiration of the period for posting, the governing body of the local governmental unit shall conduct a public hearing prior to considering adoption of the analysis with any modifications or revisions.

Section 1 - Introduction

Background Information

Moore County Public Works Department (MCPW) currently operates water and wastewater systems serving a portion the County. Portions of the County are also presently served by others, including the Town of Aberdeen, the Town of Southern Pines, the Town of Carthage, the Town of Pinebluff, the Town of Robbins, Foxfire Village, Whispering Pines Village, Town of Cameron and Woodlake.

Water System

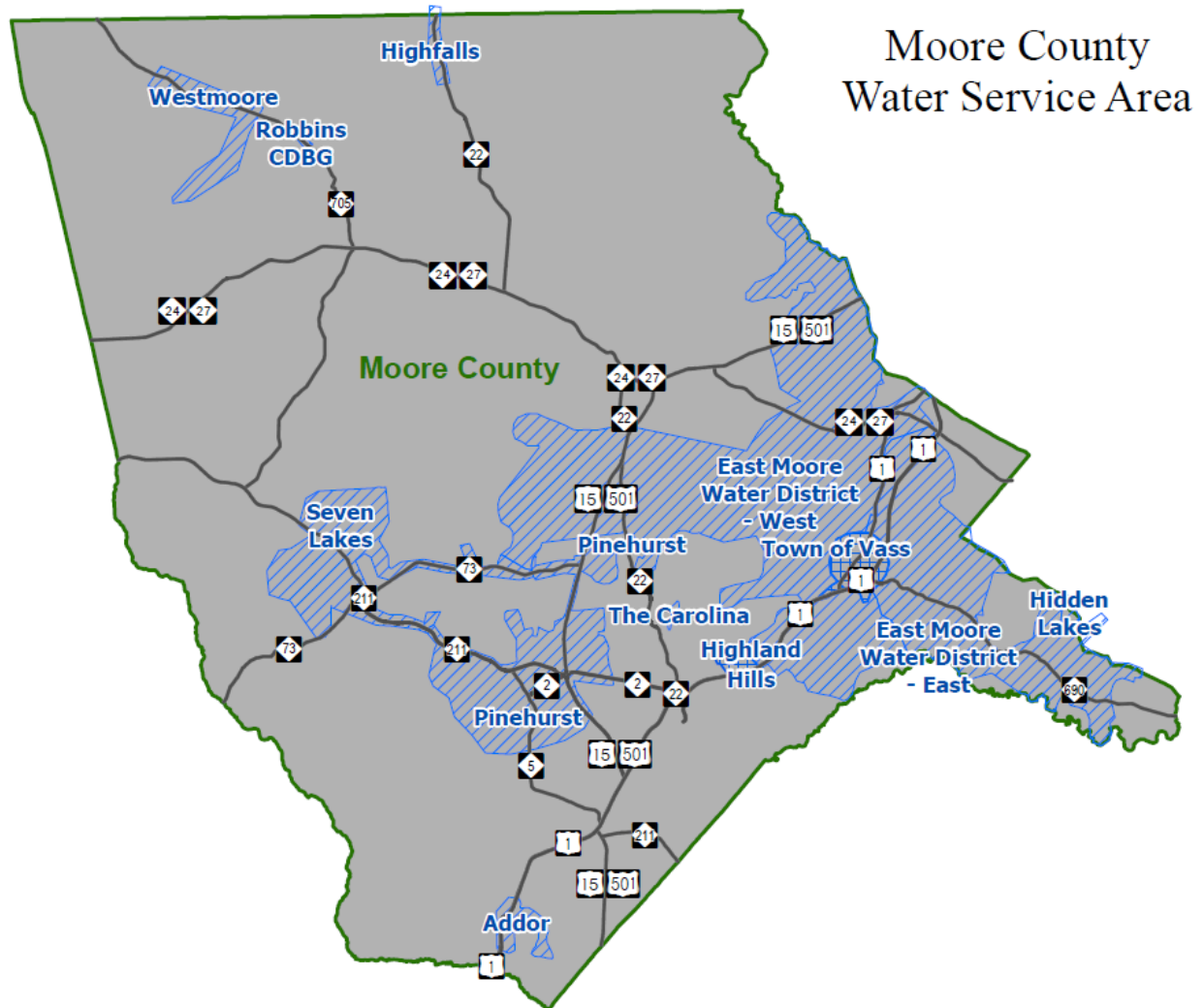
Moore County currently owns and operates, through MCPW, 11 water systems. These are generally depicted in Figure 1.1 and consist of the following:

1. Pinehurst
2. Seven Lakes
3. East Moore Water District
4. Vass
5. Hyland Hills
6. Hidden Lakes
7. The Carolina
8. Addor
9. High Falls
10. Robbins Davis Community Center
11. West Moore.

Please note that the East Moore Water District owns their water system but contracts with the Moore County Public Utilities (MCPU) to manage and operate it. These systems currently serve approximately 12,824 residential, 612 commercial and industrial as well as approximately 122 County-owned accounts. The present system is comprised of approximately 490 miles of water mains, hundreds of valves and 2,210 fire hydrants.

Moore County owns and operates, through MCPW, 17 wells in Pinehurst that withdraw water from Middendorf Aquifer. The County also purchases water from Harnett County, Town of Southern Pines, Town of Aberdeen, Town of Robbins and Chatham County to serve its water system.

Figure 1.1
MCPW Water Systems



Wastewater System

Moore County also owns and operates, through MCPW, the sanitary sewage collection system for Pinehurst, Vass, a small portion of the Addor community and the East Moore Water District. These systems are comprised of approximately 29 miles of force main, 206 miles of gravity sewers and 43 lift stations. Together, these facilities serve approximately 7,624 residential accounts, 316 commercial and industrial as well as 35 County-owned accounts. Moore County also owns and operates, through the MCPW, a 10-million gallon per day (MGD) wastewater treatment plant which treats flows from the MCPW collection system and wastewater received from Southern Pines, Aberdeen, and Carthage.

This report provides the documentation for the water and wastewater System Development Fee (SDF) calculations and its fairness to new development. The SDF covers the cost of the collection, distribution and treatment components of the systems. It includes the wastewater interceptor and treatment plant that reside within the Water Pollution Control Plant (WPCP) Enterprise Fund. A portion of the SDF for wastewater should be transferred to the WPCP Capital Reserve Fund related to the Treatment/Interceptor assets. The remaining assets are accounted for in the Moore County Public Utilities Enterprise Fund.

The SDF calculation should be periodically updated to demonstrate that it is still being appropriately applied to new development. **SDF's collected will need to be accounted for⁶ and used for the following items in priority order, system debt then asset renewal/replacement.** The SDF should be tied to a specific facility and/or property at a specific capacity. In case of future changes, including the possible subdivision of property, Moore County will assign the capacity based on the modification requested by the owner. If additional capacity is requested, the SDF will be based on the latest SDFA calculation at that time and applied to the additional capacity only.

Maintenance, Extension and Expansion

Maintenance of system components allows for extending the useful life of infrastructure and increasing value. Extension projects allow for serving new areas not currently served and expansion projects allow for more customers or volume within an existing service area. The primary funding for capital projects typically comes from three sources: debt, system revenues and connection fees.

Data Sources

For this study, the data sources included the FY17 infrastructure/asset listing, – FY17 Comprehensive Annual Financial Reports (CAFR), monthly water and wastewater billing volumes, FY 18 Adopted Budgets, existing debt amortization schedules, proposed project costs and the latest US Census.

Acknowledgements

The development of this report was made possible through assistance of the Moore County staff. This included provision of data by Mr. Randy Gould, Mr. Leonard McBryde, Ms. Linda Matthews, Ms. Jana Nall, and Ms. Toni Skellington. Several other Moore County team members provided valuable information and assistance throughout this evaluation. Contributions from Ms. Caroline Xiong and Ms. Mary Munz are greatly appreciated and acknowledged as well.

⁶ § 162A-211. Use and administration of revenue. (d) System development fee revenues shall be accounted for by means of a capital reserve fund established pursuant to Part 2 of Article 3 of Chapter 159 of the General Statutes and limited as to expenditure of funds in accordance with this section.

Definitions

The following definitions are used as part of this study.

Capital Improvements Program (CIP) – A listing of planned water and wastewater systems projects and their anticipated costs, design and construction schedule provided by the County and utilized when appropriate in these evaluations.

Collection Component – A component of the wastewater system that is used to transport wastewater from a customer to the treatment plant and includes sewers, interceptors, trunk lines, Lift stations and any associated storage or other buildings.

Connection Fee – A fee charged to new customer or a customer requesting an expanded service. The connection fee comprises of the **tap fee**, (the cost to install a meter or sewer connection) and a **system development fee** (the fair share of the system value based on anticipated usage of the connection).

Book Value – The value of an asset that is carried on the County's balance sheet. This may also be referred to as its acquisition cost.

Net Book Value – The value calculated by taking the acquisition cost (book value) of an asset minus the accumulated depreciation.

Depreciation – The reduction of value of physical assets for accounting purposes. There is a strong relationship between an asset's useful life and the time it takes the asset to reach a zero-book value⁷.

Net Present Value – The current value of a stream of future payments and/or assets using an acceptable discount rate.

Developer Contribution – A contribution of physical assets to Moore County for either the water or wastewater systems. These assets meet the needs of a specific development and do not typically add additional system-wide distribution or collection capacity. These assets will need to be replaced or upgraded by Moore County upon completion of their useful life.

Developer Project or Improvement – A water or wastewater system project or improvement that serves a specific development. These are usually required as part of the development regulations of the community. These typically become a developer contribution.

⁷ A physical asset would usually have usefulness after being fully depreciated; however, when used in some connection fee methodologies, the depreciated asset value provides a more conservative approach by providing a lower system value.

Discount Rate – The interest rate used in determining net present value for future assets. Generally, the interest rate is set at an expected inflation rate or revenue bond rate and is used to reflect the time value of money.

Distribution Component – A component of the water system that is used to provide potable water to the customer and includes transmission lines, pumping stations, storage tanks, additional in-distribution treatment⁸, meters⁹ and any associated storage or other buildings.

Equivalent Dwelling Unit (EDU) – A representative average or peak volume of a single-family household. This volume symbolizes consumption of a $\frac{5}{8}$ -inch or $\frac{3}{4}$ -inch meter used to serve a typical single-family household. This may be used as the basis for calculating the potential capacity of larger meters in terms of EDU's.

Construction-in-progress – Projects that have not been completed but started. They do not appear on the asset listing of Moore County. If the completion date extends beyond a single year, they may also be found on the CIP.

Specialized Contribution – A contribution that is not a developer contribution. These contributions may be in the form a public-private arrangement or a public-public arrangement (intergovernmental agreement). They are treated like a developer contribution in that they are not included in the connection fee calculations. However, unlike developer contributions, system capacity may be added. In this situation, the cost of the capacity may require a credit depending on funding source.

System Project or Improvement – A water or wastewater project that provides additional capacity or replaces existing capacity that serves beyond a single development.

Wastewater Treatment Component – A component of the wastewater system used to process raw sewage into a dischargeable form and includes treatment plants, discharge facilities, associated buildings and storage and lift stations at the treatment plants.

Water Treatment Component – A component of the water system used to process raw water into a potable form and includes supply, raw water transmission, treatment plants, associated buildings, storage and pumping stations at the treatment plants.

⁸ Treatment within the distribution system is needed to maintain water quality standards. These facilities are not for the treatment of raw water.

⁹ The initial meter is paid for up front by the customer and not included in the system value for the connection fee calculation; replacement meters, however, are included.

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Section 2 – System Development Fee Calculation

Methodology

The methodology recommended to compute the SDF for Moore County in this study is based on the combination of the buy-in approach using NBV of the assets, provided by Moore County Finance Department and incremental approach using planned projects. The NBV is converted to a depreciated replacement cost using expected inflation since acquisition. SDF revenues generated from incremental approach (planned projects) must be expended on the construction of capital improvements. SDF revenues generated from the buy-in approach can be expended on the debt and rehabilitation of existing assets¹⁰.

The latest capital asset listing used to conduct these evaluations was provided by the County. The acquisition cost of the assets was then adjusted based depreciation as of June 30, 2017. These values are provided in the Appendix A of this report.

The calculations performed in this Study break out water system costs into two service districts. The primary district is the Moore County Public Utility (MCPU) service area. This district has detailed information on purchased water, water wells, distribution/collection system assets and debts for water and sewer collection system costs. The other district is the East Moore Water District (EMWD) service area. Assumptions have been made to determine a magnitude cost for the EMWD. *Due to the debt payment requirements in the*

¹⁰ "§ 162A-211. Use and administration of revenue.

(a) Revenue from system development fees calculated using the incremental cost method or marginal cost method, exclusively or as part of the combined cost method, shall be expended only to pay: (1) Costs of constructing capital improvements including, and limited to, any of the following: a. Construction contract prices. b. Surveying and engineering fees. c. Land acquisition cost. d. Principal and interest on bonds, notes, or other obligations issued by or on behalf of the local governmental unit to finance any costs for an item listed in sub-subdivisions a. through c. of this subdivision. (2) Professional fees incurred by the local governmental unit for preparation of the system development fee analysis. (b) Revenue from system development fees calculated using the buy-in method may be expended for previously completed capital improvements for which capacity exists and for capital rehabilitation projects. The basis for the buy-in calculation for previously completed capital improvements shall be determined by using a generally accepted method of valuing the actual or replacement costs of the capital improvement for which the buy-in fee is being collected less depreciation, debt credits, grants, and other generally accepted valuation adjustments.

EMWD and resulting credit an SDF is currently not warranted. As such, the EMWD assets and capacity are not included in the overall system value.

Moore County also owns and operates a sewage collection system with lift stations. The SDF related to wastewater is for the collection system assets accounted for by the MCPU Enterprise Fund but also includes the treatment plant and interceptor accounted for by the WPCP Enterprise Fund. **We recommend that the wastewater SDF's collected and deposited into the Capital Projects Fund be tracked separately by collection system and treatment/interceptor for MCPU and WPCP, respectively.**

The starting point in calculating the system's SDF is to determine the value of the system. This will include all assets with a life span of 10 or more years when first constructed. The total value of a system is the sum of the existing assets, construction-in-progress, planned projects, and any cost attributed to obtaining existing debt to finance Moore County's projects. *However, developer and specialized contributions, grants and costs associated with planned projects are not included in the overall system value.*

Existing Assets

Moore County's Finance Department keeps track of revenues, expenses, investments and capital assets for the entire County Government including the Moore County Public Works Department. The capital asset listing includes a description of the asset as well as an acquisition date, life of asset, acquisition cost, depreciation to-date, NBV and depreciated replacement value of asset.

Assets with useful life of less than 10 years as well as those fully depreciated have been excluded to determine system value for the system development fee calculation. The assumption is that assets with less than 10 years of useful life should be considered an operational capital expense as opposed to a system capital expense.

Appendix A contains a listing of the WPCP and MCPU capital assets provided by the County and used for this Study. The net asset values are summarized in **Table 2.1 and Table 2.2**. Also, the percentages shown in these tables are calculated based on the depreciated replacement value of assets.

Table 2.1
Moore County’s Water System FY17 Value Using Depreciated Replacement Value
Including Assets with Useful Life of 10 and More Years

Description	Water
System-Wide Percent of Assets Water vs. Wastewater	28.7%
Percent of Water Assets that are part of Distribution	67.5%
Shared Water and Wastewater Systems Assets	\$79,971
Shared Water Distribution and Wells/Purchased Water Assets	\$0
Distribution	\$14,065,061
Shared with other components	\$53,970
Total Distribution	\$14,119,031
Treatment	\$6,776,263
Shared with other components	\$26,001
Total Treatment	\$6,802,264

Table 2.2
Moore County’s Wastewater System FY17 Value Using Depreciated Replacement Value
Including Assets with Useful Life of 10 and More Years

Description	Wastewater
System-Wide Percent of Assets Wastewater vs. Water	71.3%
Percent of Wastewater Assets that are part of Collection	34.3%
Shared Both Water and Wastewater Systems	\$198,430
Shared Both Wastewater Collection and Treatment	\$0
Collection	\$17,754,975
Shared with other components	\$68,128
Total Collection	\$17,823,103
Treatment	\$33,957,979
Shared with other components	\$130,301
Total Treatment	\$34,088,280

The above tables include shared assets. These assets may serve both water and wastewater customers, e.g. the public utility administrative building or certain service vehicles. Assets may also fall into a category where they are shared between collection/treatment or

distribution/treatment components. There were no assets identified in Moore County that fell into the second category for this Study.

Projects-in-Progress

There are no identified projects that are currently in progress and expected to be completed in FY18. Therefore, no adjustments of the net asset values are warranted for the water and wastewater system components.

Capital Improvements Program

Moore County has developed a capital improvements program (CIP) for renewal, expansion and extension of the water and wastewater systems. DFA legislation allows inclusion of planned improvements to calculate SDFs. Therefore, the cost associated with the CIP will need to be recovered by both new and existing customers. The total value of the Water System CIP is approximately \$10.3 million over a 10-year period¹¹. This includes both water distribution and treatment projects. **Table 2.3** presents the planned projects that have been included in the SDF calculations for the Moore County water system. **Table 2.4** presents the planned projects that have been included in the SDF calculations for the Moore County wastewater system.

**Table 2.3
Water System 10-Year CIP**

WATER SYSTEM PROJECTS	Cost	Use	Component
Ground Storage Tank Building Rehabilitation	100,000	1	Water Distribution
Murdocksville Road Water Line Line Extension	1,900,000	1	Water Distribution
Paving (previously by VoP, not in tap fee)	1,000,000	1	Shared
Storage Yard at Juniper Lake Road	115,000	1	Shared
Vehicle Fleet Replacement - 7 vehicles every 7-11 years	350,000	0	Not Used
Water and Sewer Line Extensions/Replacements (Seaboard, Niagara, South St., Hyland Hills, Hidden Lakes, EMWD)	750,000	1	Water Distribution
Water Resources Project - Phase 2 Wells (Wells on Linden Road)	1,083,186	1	Water Treatment
Water Resources Project Phase 3-NC 73 Parallel (Parallel & BPS Upgrades)	4,880,756	1	Water Treatment
Well 8 & Well 15 Construction	100,000	1	Water Treatment
	10,278,942		

¹¹ "§ 162A-205. Supporting analysis. (7) Covers a planning horizon of not less than 10 years nor more than 20 years.

Table 2.4
Wastewater System 10-Year CIP

WASTEWATER SYSTEM PROJECTS	Cost	Use	Component
Pavement Rehab	320,000	1	WRF
Tractor	60,000	0	Not Used
Septic Receiving Station	150,000	1	WRF
Header (to separate air going to First Stage from Second Stage)	150,000	1	WRF
Clarifier Weir Cleaning Equipment	100,000	0	Not Used
Equalization Basin	1,000,000	1	WRF
Sand Filter Canopy	200,000	0	Not Used
Sludge Canopy Walls	200,000	1	WRF
Sludge Disposal Alternative	1,000,000	1	WRF
LS Replacements (15-1, 3-3, 8-1, 3-2, 4-2, PW1)	1,000,000	1	Collection
Water and Sewer Line Extensions/Replacements (Seaboard, Niagara, South St., Hyland Hills, Hidden Lakes, EMWD)	1,250,000	1	Collection
Inflow and Infiltration, detection and removal projects (CCTV and repairs)	2,000,000	1	Collection
Sewer Line relocation-under buildings (Carter Street, etc.)	300,000	1	Collection
LS 15-1 Replacement	250,000	1	Collection
Vass Sewer System Expansion	3,100,000	1	Collection
Interceptor Rehab and Repair	1,250,000	1	WRF
	12,330,000		

Debt Cost

Moore County has incurred debt to pay for construction of several existing facilities. Debts for EMWD and the WPCP have been excluded from the MCPU water system's SDF calculations.

Table 2.5 summarizes total system debt payments for both water and wastewater systems. The total interest payment included in these evaluations is approximately **\$11,163,458**. The net present value (NPV) in FY19 of this cost is calculated at approximately **\$8,057,968** using a 4-percent per year discount rate. The resulting NPV of the debt costs of approximately **\$5,218,212** and **\$2,839,756** can be added to the water and wastewater systems, respectively.

Table 2.5
Moore County's Debt for Water and Wastewater Systems

Fiscal Year	Water		Wastewater		Total		Total Debt Payment
	Principal	Interest	Principal	Interest	Principal	Interest	
2019	\$774,754	\$523,427	\$764,053	\$364,886	\$1,538,808	\$888,313	\$2,427,121
2020	\$798,812	\$501,075	\$780,908	\$348,031	\$1,579,720	\$849,107	\$2,428,826
2021	\$818,202	\$482,525	\$798,134	\$330,805	\$1,616,336	\$813,330	\$2,429,666
2022	\$834,938	\$463,456	\$815,741	\$313,198	\$1,650,679	\$776,655	\$2,427,334
2023	\$853,036	\$443,862	\$833,736	\$295,203	\$1,686,773	\$739,065	\$2,425,838
2024	\$802,095	\$423,706	\$852,129	\$276,810	\$1,654,224	\$700,516	\$2,354,741
2025	\$822,879	\$403,976	\$870,928	\$258,012	\$1,693,806	\$661,987	\$2,355,794
2026	\$845,057	\$383,604	\$890,141	\$238,798	\$1,735,198	\$622,402	\$2,357,601
2027	\$861,649	\$362,553	\$909,779	\$219,160	\$1,771,428	\$581,714	\$2,353,141
2028	\$886,672	\$340,927	\$929,850	\$199,089	\$1,816,522	\$540,016	\$2,356,538
2029	\$910,146	\$318,543	\$950,364	\$178,575	\$1,860,510	\$497,118	\$2,357,628
2030	\$933,091	\$295,420	\$971,331	\$157,608	\$1,904,423	\$453,028	\$2,357,451
2031	\$265,617	\$271,559	\$992,761	\$136,178	\$1,258,378	\$407,737	\$1,666,115
2032	\$277,570	\$259,606	\$1,014,664	\$114,275	\$1,292,234	\$373,881	\$1,666,115
2033	\$290,060	\$247,116	\$1,037,051	\$91,889	\$1,327,111	\$339,004	\$1,666,115
2034	\$303,113	\$234,063	\$1,059,931	\$69,008	\$1,363,045	\$303,071	\$1,666,115
2035	\$316,753	\$220,423	\$1,016,245	\$45,622	\$1,332,998	\$266,045	\$1,599,043
2036	\$331,007	\$206,169	\$1,038,806	\$23,061	\$1,369,813	\$229,230	\$1,599,043
2037	\$345,902	\$191,274	\$0	\$0	\$345,902	\$191,274	\$537,176
2038	\$361,468	\$175,708	\$0	\$0	\$361,468	\$175,708	\$537,176
2039	\$377,734	\$159,442	\$0	\$0	\$377,734	\$159,442	\$537,176
2040	\$394,732	\$142,444	\$0	\$0	\$394,732	\$142,444	\$537,176
2041	\$412,495	\$124,681	\$0	\$0	\$412,495	\$124,681	\$537,176
2042	\$431,057	\$106,119	\$0	\$0	\$431,057	\$106,119	\$537,176
2043	\$450,455	\$86,721	\$0	\$0	\$450,455	\$86,721	\$537,176
2044	\$470,726	\$66,450	\$0	\$0	\$470,726	\$66,450	\$537,176
2045	\$491,908	\$45,268	\$0	\$0	\$491,908	\$45,268	\$537,176
2046	\$514,044	\$23,132	\$0	\$0	\$514,044	\$23,132	\$537,176
	\$16,175,976	\$7,503,248	\$16,526,553	\$3,660,210	\$32,702,529	\$11,163,458	\$43,865,987

Total Systems Value

Tables 2.6 and 2.7 summarize Moore County's total systems' values. The total water system value after adjusting for contributed assets and components with a useful life of 10 years or less is approximately **\$36,341,098**. This includes **\$17,621,504** of distribution facilities, **\$13,228,734** in existing supply and **\$5,490,860** of applicable debt costs. The total wastewater collection system value after adjusting for contributed assets and components

with a useful life of less than 10 years is approximately **\$25,723,104** with a treatment value of **\$38,158,280** plus **\$3,360,340** in debt related cost or a total of **\$67,241,724**.

Table 2.6
Moore County’s Water System Value

Total Water System Value	Cost (in FY17\$)	Comments
Distribution	\$17,621,504	
Water Purchase/Wells	\$13,228,734	
Financing Cost	\$5,490,860	
TOTAL	\$36,341,098	

Table 2.7
Moore County’s Wastewater System Value

Total Wastewater System Value	Cost (in FY17\$)	Comments
Collection	\$25,723,104	
Treatment	38,158,280	
Financing Cost	\$3,360,340	
TOTAL	\$67,241,724	

Equivalent Dwelling Unit (EDU) Determination

Public water systems, especially smaller systems, mainly serve single-family residences. On average, single-family residential customers use a similar quantity of water during the day and their water-use pattern remains similar and uniform. Therefore, when designing and evaluating water systems, non-residential and multi-family water demands are normally compared to the typical quantity of water a single-family residential unit consumes. The term equivalent dwelling unit (EDU) refers to this typical water use and forms the basis of these comparisons.

The peak month average day water EDU for Moore County was established by taking an average gallon per day per person (100 gpd) from consultant’s judgement multiplied by the average number of persons per housing unit for Moore County identified from the US Census (2.44) and applying a peaking factor of 1.4. This equates to 341.6 gallons of water per day needed for a typical dwelling unit. Wastewater is assumed to return to the system at a rate of 90% of water metered or 307.4 gallons. **Table 2.8** summarizes these EDU calculations for water and wastewater systems.

Table 2.8
Moore County’s Water and Wastewater Systems EDU Calculation

Item	Calculation Item	Value	Units	Source/Calculation
A	Average Consumption per person per day	100	GPD	MC 2013 Land Use Plan Adjusted
B	Persons per dwelling unit (DU)	2.44	Persons	US Census
C	Average DU usage (gallons per day)	244	GPD	A*B
D	Peaking Factor	1.4		Consultant Assumption
E	Water Consumption Per DU	341.6	GPD	C*D
F	Return Factor	90%		Consultant Assumption
G	Wastewater Consumption Per DU	307.4	GPD	E*F

Capacity Determination

The capacities of the water distribution and treatment and the wastewater collection and treatment estimated for these financial computations are summarized in the following tables. Please note that these values are general in nature and are not meant to represent design engineering values. **Table 2.9** outlines the calculation to move from the wastewater permitted capacity provided as a peak month average day to a peak day.

The goal here is to identify the capacity of the system components available for customers use in a general sense. Since system design incorporates infiltration and inflow considerations these elements must also be removed. Finally, since the SDF is based on a typical peak day use by a customer, the units must be converted using generally accepted factors.

Table 2.9
Moore County's Wastewater System Capacity

Item	Calculation Item	Value	Units	Source/Calculation
A	WPCP's Permitted Capacity (MGD)	10.0	MGD	By Permit (Peak Month Avg. Day)
B	Peak month avg. day to annual avg. day ratio	1.4		Consultant Assumption
C	Avg. daily flow capacity at WPCP (MGD)	7.1	MGD	A/B
D	Collection Design Peak Day to Avg. Daily Ratio	2.5		Factor Recommended for Lift Station Design by State of North Carolina
E	Collection System Capacity (Peak Day)	17.8	MGD	C*D
F	Portion Reserved for I&I	7.1	MGD	40% I&I
G	Collection System Capacity for Customers (Peak Day)	10.7	MGD	E-F
H	Treatment Peak Month avg. day to peak day ratio	1.2		Consultant Assumption
I	Treatment System Capacity (Peak Day)	12.0	MGD	A*H
J	Portion Reserved for I&I	4.8	MGD	40% I&I
K	Wastewater Treatment Capacity for Customers (Peak Day)	7.2	MGD	I-J

Table 2.10 provides for the supply/treatment capacity of the water system. The MCPU has several intergovernmental agreements (IGA's) for water supply. These are added to the well capacity assuming a 12-hour run-time per day. The well capacity information was provided by MCPU. An agreement with the EMWD reserves 1.25 MGD of this supply¹².

¹² Resolution approving services contract and water purchase contract between the County of Moore and East Moore Water District.

Table 2.10
Moore County's Water System Supply/Treatment Capacity

Item	Calculation Item	Value	Units	Source/Calculation
A	Chatham County Peak Month Avg. Day	25,000	Gallons	Per IGA
B	Peak day to annual avg. day ratio	1.4		Per Consultant
C	Chatham County Peak Day Calculated	35,000	Gallons	A*B
D	Well capacity	1,997	gpm	MCPU asset spreadsheet
E	Run Time	12	hours	Consultant Assumption
F	Wells (Peak Day)	1,437,840	Gallons	D*E*60
G	Harnett County (Peak Day)	3,000,000	Gallons	Per IGA
H	Aberdeen (Peak Day)	600,000	Gallons	Per IGA
I	Robbins (Peak Day)	25,000	Gallons	Per IGA
J	Chatham County (Peak Day)	35,000	Gallons	See A-B above
K	Southern Pines (Peak Day)	1,000,000	Gallons	Per IGA
L	Total MCPU and EMWD Water Supply	6,097,840	Gallons	Sum of F-K
M	EMWD (Peak Day)	1,250,000	Gallons	Per IGA
N	Total MCPU (Peak Day)	4,847,840	Gallons	L-M

To calculate the effective capacity available for customers on the distribution side, fire protection volumes should be subtracted out and storage added in. **Table 2.11** assumes a goal of 180,000 gallons available for fire flows. This equates to a fire flow rate of about 1,500 gpm over a two-hour period. The Moore County Water & Wastewater Development Policy requires 1,500 gpm for buildings that are 10 feet or less from each other to maintain ISO ratings. Please note that the 180,000 gallons calculated and mentioned above should be viewed as a MCPU wide value for the purposes of calculating an average SDF. Actual modeling and field testing may show different volumes are available in different areas of the water distribution system.

**Table 2.11
Moore County's Water System Distribution Capacity**

Item	Calculation Item	Value	Units	Source/Calculation
A	EMWD (Peak Day)	1,250,000	Gallons	Per IGA
B	Total MCPU (Peak Day)	4,847,840	Gallons	From Table 2.9
C	Fire Protection Capacity Needed	180,000	Gallons	See Text on previous page
D	Storage Capacity	2,100,000	Gallons	MCPU asset spreadsheet
E	Storage Capacity (Not Reserved for Fire Protection)	1,920,000	Gallons	D-C
F	EMWD Proration of Storage	393,582	Gallons	$E*(A/(A+B))$
G	MCPU Proration of Storage	1,526,418	Gallons	$E*(B/(A+B))$
H	Distribution Capacity EMWD	1,643,582	Gallons	A+F
I	Distribution Capacity MCPU	6,374,258	Gallons	B+G

The final step is to convert the system capacities into various EDU figures. **Table 2.12** summarizes the capacities of the water treatment/supply and distribution and wastewater collection and treatment. Please note that the wastewater treatment portion is not used as the wastewater treatment assets are outside of the MCPU.

**Table 2.12
Moore County's Water System Distribution Capacity**

Item	Calculation Item	Value	Units	Source/Calculation
A	Water EDU	341.6	Gallons	Table 2.7
B	Wastewater EDU	307.4	Gallons	Table 2.7
C	Water Purchase/Supply	4,847,840	Gallons	Table 2.9
D	Water Distribution	6,374,258	Gallons	Table 2.10
E	Wastewater Treatment	7.2	MGD	Table 2.8
F	Wastewater Collection	10.7	MGD	Table 2.8
G	Water Purchase/Supply	14,192	EDU's	C/A
H	Water Distribution	18,660	EDU's	D/A
I	Wastewater Treatment	23,422	EDU's	$E*1,000,000/B$
J	Wastewater Collection	34,808	EDU's	$F*1,000,000/B$

Rate Credit per EDU

The last step before SDF calculations are finalized is associated with determination of the credit for debt payments made from rate revenues. This is done since new customers will contribute through rate revenue to the retirement of debt cost included within the connection fee calculation.

To avoid double charging the customer for the same asset value, a credit is provided against the SDF to account for the anticipated payments made by a typical customer over the life of the debt. Connection fees anticipated for debt are subtracted from total anticipated debt paid by rate revenues. A net present value is then calculated using a 4% discount rate to determine the credit in today's dollars. **Tables 2.13 and 2.14** summarize the growth projections and the payments in terms of EDU's.

Table 2.13
Rate Credit Calculation for Wastewater System

Fiscal Year	Growth Rate	Billable Wastewater (1000 Gallons)	Wastewater Debt Payment	Debt Payments by Connection Fees	Debt Payments through rate revenues	\$ per 1000 Gallons	\$ per EDU
2019	1.0%	1,781,900	\$1,128,939	\$50,000	\$1,078,939	\$0.61	\$53.93
2020	1.0%	1,799,719	\$1,128,939	\$50,000	\$1,078,939	\$0.60	\$53.39
2021	1.0%	1,817,717	\$1,128,939	\$50,000	\$1,078,939	\$0.59	\$52.86
2022	1.0%	1,835,894	\$1,128,939	\$50,000	\$1,078,939	\$0.59	\$52.34
2023	1.0%	1,854,253	\$1,128,939	\$50,000	\$1,078,939	\$0.58	\$51.82
2024	1.0%	1,872,795	\$1,128,939	\$50,000	\$1,078,939	\$0.58	\$51.31
2025	1.0%	1,891,523	\$1,128,939	\$50,000	\$1,078,939	\$0.57	\$50.80
2026	1.0%	1,910,438	\$1,128,939	\$50,000	\$1,078,939	\$0.56	\$50.30
2027	1.0%	1,929,543	\$1,128,939	\$50,000	\$1,078,939	\$0.56	\$49.80
2028	1.0%	1,948,838	\$1,128,939	\$50,000	\$1,078,939	\$0.55	\$49.31
2029	1.0%	1,968,327	\$1,128,939	\$50,000	\$1,078,939	\$0.55	\$48.82
2030	1.0%	1,988,010	\$1,128,939	\$50,000	\$1,078,939	\$0.54	\$48.33
2031	1.0%	2,007,890	\$1,128,939	\$50,000	\$1,078,939	\$0.54	\$47.86
2032	1.0%	2,027,969	\$1,128,939	\$50,000	\$1,078,939	\$0.53	\$47.38
2033	1.0%	2,048,249	\$1,128,939	\$50,000	\$1,078,939	\$0.53	\$46.91
2034	1.0%	2,068,731	\$1,128,939	\$50,000	\$1,078,939	\$0.52	\$46.45
2035	1.0%	2,089,418	\$1,061,867	\$50,000	\$1,011,867	\$0.48	\$43.13
2036	1.0%	2,110,313	\$1,061,867	\$50,000	\$1,011,867	\$0.48	\$42.70
			\$20,186,763	\$900,000	\$19,286,763		\$888
						Discount Rate	4.0%
						Credit for Wastewater NPV (Part 2 Step A of FCCF Calc)	\$632

Table 2.14
Rate Credit Calculation for Water System

Fiscal Year	Growth Rate	Billable Water (1000 Gallons)	Water Debt Payment	Debt Payments by Connection Fees	Debt Payments through rate revenues	\$ per 1000 Gallons	\$ per EDU
2019	1.2%	820,000	\$1,298,182	\$260,000	\$1,038,182	\$1.27	\$112.76
2020	1.2%	830,000	\$1,299,887	\$260,000	\$1,039,887	\$1.25	\$111.58
2021	1.2%	840,000	\$1,300,727	\$260,000	\$1,040,727	\$1.24	\$110.34
2022	1.2%	850,000	\$1,298,395	\$260,000	\$1,038,395	\$1.22	\$108.80
2023	1.2%	860,000	\$1,296,899	\$260,000	\$1,036,899	\$1.21	\$107.38
2024	1.2%	870,000	\$1,225,802	\$260,000	\$965,802	\$1.11	\$98.87
2025	1.1%	880,000	\$1,226,855	\$260,000	\$966,855	\$1.10	\$97.85
2026	1.1%	890,000	\$1,228,662	\$260,000	\$968,662	\$1.09	\$96.93
2027	1.1%	900,000	\$1,224,202	\$260,000	\$964,202	\$1.07	\$95.41
2028	1.1%	910,000	\$1,227,599	\$260,000	\$967,599	\$1.06	\$94.70
2029	1.1%	920,000	\$1,228,689	\$260,000	\$968,689	\$1.05	\$93.77
2030	1.1%	930,000	\$1,228,512	\$260,000	\$968,512	\$1.04	\$92.75
2031	1.1%	940,000	537,176	\$260,000	277,176	0.29	26.26
2032	1.1%	950,000	537,176	\$260,000	277,176	0.29	25.98
2033	1.1%	960,000	537,176	\$260,000	277,176	0.29	25.71
2034	1.0%	970,000	537,176	\$260,000	277,176	0.29	25.45
2035	1.0%	980,000	537,176	\$260,000	277,176	0.28	25.19
2036	1.0%	990,000	537,176	\$260,000	277,176	0.28	24.93
2037	1.0%	1,000,000	537,176	\$260,000	277,176	0.28	24.69
2038	1.0%	1,010,000	537,176	\$260,000	277,176	0.27	24.44
2039	1.0%	1,020,000	537,176	\$260,000	277,176	0.27	24.20
2040	1.0%	1,030,000	537,176	\$260,000	277,176	0.27	23.97
2041	1.0%	1,040,000	537,176	\$260,000	277,176	0.27	23.74
2042	1.0%	1,050,000	537,176	\$260,000	277,176	0.26	23.51
2043	1.0%	1,060,000	537,176	\$260,000	277,176	0.26	23.29
2044	0.9%	1,070,000	537,176	\$260,000	277,176	0.26	23.07
2045	0.9%	1,080,000	537,176	\$260,000	277,176	0.26	22.86
2046	0.9%	1,090,000	537,176	\$260,000	277,176	0.25	22.65
			\$23,679,224	\$7,280,000	\$16,399,224		\$1,612
						Discount Rate	4.0%
						Credit for Water NPV (Part 2 Step A of FCCF Calc)	\$1,143

We can now calculate the SDF. These calculations are provided in **Table 2.15** and **Table 2.16** for the water and wastewater systems, respectively. In each table, Part 1 provides the calculations of total system values and those costs per EDU's. Part 2 provides the credit applied based on new development's contribution of rate revenue applied to debt. Part 3 provides the fair share cost of new developments per EDU.

Table 2.15
Water System SDF Calculations

PART 1: Calculate Facilities Cost Per EDU

Step A Calculate Distribution Facilities Component

Distribution Facilities	Cost (in FY17\$)	Comments
Existing Facilities: Water Mains, Pumps, Storage	\$14,119,031	
Projects in Progress or Planned	\$3,502,473	20%
SUBTOTAL	\$17,621,504	
<hr/>		
TOTAL	\$17,621,504	
CAPACITY (in EDUs)	18,660	
RESULTS (\$'s/EDU)	\$944	

Step B Calculate Treatment System Facilities Component

Treatment Facilities	Cost (in FY17\$)	Comments
Water Purchase/Wells	\$6,802,264	
Projects in Progress or Planned	\$6,426,469	49%
SUBTOTAL	\$13,228,733	
<hr/>		
TOTAL	\$13,228,733	
CAPACITY (in EDUs)	14,192	
RESULTS (\$'s/EDU)	\$932	

Step C Calculate Debt Costs & Interest Component

Debt Costs & Interest	Cost (in FY17\$)	Comments
Total Debt Cost (Not including Principal)	\$5,490,860	

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CAPACITY (in EDUs)	18,660
RESULTS (\$'s/EDU)	\$294

Step D Calculate Total Facilities Cost per EDU

All Components	Cost (in FY17\$)	Comments
Distribution Component	\$944	
Treatment System Component	\$932	
Debt Costs & Interest Component	\$294	
RESULTS (\$'s/EDU)	\$2,170	

Total Water System Value	Cost (in FY17\$)	Comments
Distribution	\$17,621,504	
Water Purchase/Wells	\$13,228,734	
Financing Cost	\$5,490,860	
TOTAL	\$36,341,098	

PART 2: Calculate Rate Credit Per EDU

Step A Calculate Per EDU Share of Annual Water System Debt

Net Present Value Per EDU of Annual Debt = Credit Value

Annual Debt Payments of Water System for Existing and Anticipated Debt	Cost (in FY17\$)	Comments
RESULTS (\$'s/EDU)	-\$1,143	

PART 3: Calculate Full Proportionate Share Water Connection Fee Per EDU

Step A Subtract Rate Credit Per EDU from Total Facilities Cost Per EDU

	Cost (in FY17\$)	Comments
Facilities Cost Per EDU	\$2,170	
Rate Credit	-\$1,143	
RESULTS (\$'s/EDU)	\$1,027	

Table 2.16
Wastewater System SDF Calculations

PART 1: Calculate Facilities Cost Per EDU

Step A Calculate Collection Facilities Component

Collection Facilities	Cost (in FY17\$)	Comments
Existing Facilities: Gravity Sewers, Force Mains, Lift Stations	\$17,823,103	
Projects in Progress or Planned	7,900,000	31%
SUBTOTAL	\$25,723,103	
TOTAL	\$25,723,103	
CAPACITY (in EDUs)	34,808	
RESULTS (\$'s/EDU)	\$738	

Step B Calculate Treatment System Facilities Component

Treatment Facilities	Cost (in FY17\$)	Comments
Treatment Plant	\$34,088,280	
Projects in Progress or Planned	4,070,000	11%
SUBTOTAL	\$38,158,280	
TOTAL	\$38,158,280	
CAPACITY (in EDUs)	23,422	
RESULTS (\$'s/EDU)	\$1,629	

Step C Calculate Debt Costs & Interest Component

Debt Costs & Interest	Cost (in FY17\$)	Comments
Total Debt Cost (Not including Principal)	\$3,360,340	
CAPACITY (in EDUs)	34,808	
RESULTS (\$'s/EDU)	\$96	

Step D Calculate Total Facilities Cost per EDU

All Components	Cost (in FY17\$)	Comments
Collection Component	\$738	
Treatment System Component	1,629	
Debt Costs & Interest Component	\$96	
RESULTS (\$'s/EDU)	\$2,463	

Total Wastewater System Value	Cost (in FY17\$)	Comments
Collection	\$25,723,104	
Treatment	38,158,280	
Financing Cost	\$3,360,340	
TOTAL	\$67,241,724	

PART 2: Calculate Rate Credit Per EDU

Step A Calculate Per EDU Share of Annual Wastewater System Debt

Net Present Value Per EDU of Annual Debt = Credit Value

Annual Debt Payments of Wastewater System for Existing and Anticipated Debt	Cost (in FY17\$)	Comments
RESULTS (\$'s/EDU)	-\$632	

PART 3: Calculate Full Proportionate Share Wastewater Connection Fee Per EDU

Step A Subtract Rate Credit Per EDU from Total Facilities Cost Per EDU

	Cost (in FY17\$)	Comments
Facilities Cost Per EDU	\$2,463	
Rate Credit	-632	
RESULTS (\$'s/EDU)	\$1,831	

The EDU is based on a typical residential demand using a 5/8-inch or 3/4-inch meter for water service. Larger meters will be charged a multiple based on the expected increase in

provided capacities over the 5/8" meter¹³. Capacities are based on the AWWA meter equivalency ratios. **Table 2.17** provide the Water System SDF by meter size. The SDF will be added to any applicable tapping and administrative fees.

Table 2.17
Water EDU and SDF by Meter Size

Meter Size (in inches)	Meter Equivalency Ratios	Results
3/4	1.0	\$1,027
1	2.5	\$2,568
2	8	\$8,216
3	16	\$16,432
4	25	\$25,675
6	50	\$51,350
8	80	\$82,160

For wastewater service, the EDU is based on 307.4 Gallons per day. **Table 2.18** provides that calculation up to 5 EDU's. Larger requests are determined by taking the daily capacity needed and dividing by 307.4 gallons. This results in an EDU value that is then multiplied by \$1,831.

Table 2.18
Wastewater SDF by EDU's

EDU's	Results	Peak Day Volume (no I&I)
1.0	\$1,831	307
2.0	\$3,662	615
3.0	\$5,493	922
4.0	\$7,324	1,230
5.0	\$9,155	1,537

¹³ The 5/8" meter represents the equivalent residential demand (EDU). Though many homes now use 3/4" meters, their demand did not increase, as such it is still treated as a single EDU and larger meter EDU's are based on the 5/8" capacity ratio. The ratio was confirmed by an analysis of existing billed volumes.

Section 3 - Findings/Recommendations

Findings

This report presents an analysis of the system development fee for the Moore County Public Works. The findings and recommendations are summarized in this section.

In general, the MCPW has capacity to sell to new development for water and wastewater service. The "Buy-in" approach was selected to numerate the value of the existing system in terms of an equivalent dwelling unit (EDU). Additionally, the incremental cost approach was utilized to capture the future cost of replacement and expansion projects over the next 10 years. *Assets with less than 10 years of useful life were excluded from these valuations.*

The East Moore Water District (EMWD) assets and debts were also analyzed during this project. However, due to the high debt load and resulting rate credit, an SDF for water is not warranted. Since a small portion of wastewater assets serves EMWD, an SDF related to wastewater service would be appropriate.

Tables 3.1 and 3.2 summarize the SDF recommended for FY19.

Table 3.1
Water System SDF by Meter Size

Meter Size (in inches)	Meter Equivalency Ratios	Results
3/4	1.0	\$1,027
1	2.5	\$2,568
2	8	\$8,216
3	16	\$16,432
4	25	\$25,675
6	50	\$51,350
8	80	\$82,160

**Table 3.2
Wastewater SDF by EDU's**

EDU's	Results	Peak Day Volume (no I&I)
1.0	\$1,831	307
2.0	\$3,662	615
3.0	\$5,493	922
4.0	\$7,324	1,230
5.0	\$9,155	1,537

The fixed asset listing provided sufficient level of detail for the analysis presented in this report. However, additional details would allow for both a higher level of analysis and potential future replacement costs. Many asset descriptions were based on information provided from the purchase from other entities. In some cases, fixed assets were consolidated under a single heading/description.

Recommendations

The following are recommendations for MCPU's consideration:

1. Refine MCPU and WPCP asset listing to help in managing asset replacement requirements.
2. Implement a phase-in approach by adopting a portion of calculated SDF, \$627/EDU for water and \$1,092/EDU for wastewater¹⁴. The SDF will be added to the admin, tapping and meter set fees.
3. Conduct a Public Hearing after 45-day review period but before July 1, 2018¹⁵.
4. Adopt accounting procedures based on DFA requirements. (FY18)
5. SDF's collected will need to be accounted for and used for the following items in priority order, system debt then asset renewal/replacement.
6. Full Update of the SDF every five years as required by legislation or earlier if significant changes in consumption or infrastructure occur.

¹⁴ "§ 162A-207. **Minimum requirements.** (a) Maximum. – A system development fee shall not exceed that calculated based on the system development fee analysis.

¹⁵ "§ 162A-209. **Adoption and periodic review** (b) After expiration of the period for posting, the governing body of the local governmental unit shall conduct a public hearing prior to considering adoption of the analysis with any modifications or revisions.

The following proposed SDF schedules are based on meter size. The water EDU increase from ¾" to 1" is based on 5-year historic billed volumes analyzed. The actual capacity of the ¾" water meter is being underutilized by the typical dwelling unit. The American Water Works Association (AWWA) meter capacity ratios are used to determine potential peak volumes thereafter.

**Table 3.3
Water SDF Phased-In**

Water Meter Size (In Inches)	Peak Volume	EDU's	SDF
¾"	342	1	\$627
1"	854	2.5	\$1,568
2"	2,733	8	\$5,019
3"	5,466	16	\$10,038
4"	8,540	25	\$15,684
6"	17,080	50	\$31,369

For wastewater there is an assumed outdoor water usage based on meter size. Larger meters are assumed to use more water outside for landscaping purposes than a typical dwelling unit. Please note irrigation meters would not be used to determine the Wastewater SDF. ***The Table 3.4 schedule should cover most new development.*** Other situations for the wastewater SDF that do not follow this schedule shall be determined by actual daily demand requested. Such requests shall be approved by Moore County on a case by case basis and resulting sewer tap shall be sized as appropriate.

**Table 3.4
Wastewater SDF Phased-In**

Water Meter Size (in inches)	Assumed Peak Day Sewer Volume (no I&I)	EDU's	SDF
¾	307	1	\$1,092
1	615	2	\$2,184
1.5	1,230	4	\$4,368
2	1,968	6	\$6,989
3	3,935	13	\$13,978
4	6,149	20	\$21,840
6	12,298	40	\$43,680
8	19,676	64	\$69,888

Appendix A

Assets with less than 10 years of useful life were excluded from the SDF calculation.

Acq Date	Asset #	Description	Acq Cost	Acq Year	Net Book Value	Inflation Factor	Book Life	Depreciated Replacement Value
7/1/1999	0007757-01	Well Lot #3	5,000	1999	5,000	1.45	999	7,261
7/1/1999	0007757-02	Well Lot #4	5,000	1999	5,000	1.45	999	7,261
7/1/1999	0007757-03	Well Lot #6	6,000	1999	6,000	1.45	999	8,713
7/1/1999	0007757-04	Well Lot #7	15,000	1999	15,000	1.45	999	21,783
7/1/1999	0007757-05	Well Lot #8	15,000	1999	15,000	1.45	999	21,783
7/1/1999	0007757-06	Well Lot #9	15,000	1999	15,000	1.45	999	21,783
7/1/1999	0007757-07	Well Lot #9A	15,000	1999	15,000	1.45	999	21,783
7/1/1999	0007757-08	Well Lot #11	15,000	1999	15,000	1.45	999	21,783
7/1/1999	0007757-09	Well Lot #11A	15,000	1999	15,000	1.45	999	21,783
7/1/1999	0007757-10	Westside Tanksite	18,000	1999	18,000	1.45	999	26,139
7/1/1999	0007757-27	Well-Auman Property	4,000	1999	4,000	1.45	999	5,809

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Acq Date	Asset #	Description	Acq Cost	Acq Year	Net Book Value	Inflation Factor	Book Life	Depreciated Replacement Value
7/1/1999	0007757-35	West and Water Line	89,749	1999	5,985	1.45	20	8,692
7/1/1999	0007757-40	Northside Operational Equip	322,207	1999	79,466	1.45	30	115,399
7/1/1999	0007757-41	Southside Operational Equip	149,688	1999	36,917	1.45	30	53,611
7/1/1999	0007757-42	Westside Operational Equip	395,643	1999	111,063	1.45	30	161,283
7/1/1999	0007758-03	Pinehurst Water System	3,489,491	1999	1,360,998	1.45	35	1,976,423
7/1/1999	0007758-03	Pinehurst Water System	1,744,745	1999	680,499	1.45	35	988,211
7/1/1999	0007758-03	Pinehurst Water System	581,582	1999	226,833	1.45	35	329,404
7/1/1999	0007758-05	Sugar Gum Road Force Main	51,830	1999	18,235	1.45	35	26,481
7/1/1999	0007758-06	Booster Sta Midland RD	31,272	1999	12,004	1.45	35	17,431
7/1/1999	0007758-08	Sewer-Centennial Golf Course	27,000	1999	11,248	1.45	35	16,335
7/1/1999	0007758-14	Palmetto Dr Main Extension	15,832	1999	1,466	1.45	20	2,129
7/1/1999	0007758-16	Mccaskill rd sewer line	30,414	1999	2,958	1.45	20	4,295
7/1/1999	0007758-17	Addor/Jackson Hamlet Water Pro Department	1,065,000	1999	101,594	1.45	20	147,533
7/1/1999	0007764-01	Hyland Hills Water Sys	81,000	1999	1,277	1.45	20	1,854
7/1/1999	0007764-02	Vass Water System (1993)	74,136	1999	27,634	1.45	35	40,130

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7/1/1999	0007764-03	Niagra Tie-In	5,697	1999	269	1.45	20	391
7/1/1999	0007764-04	Vass Water System (1995)	15,529	1999	6,155	1.45	35	8,939
7/1/1999	0007764-07	Vass Water Plant Rehabilitation	53,685	1999	23,584	1.45	35	34,248
7/1/1999	0007764-13	Vass Sewer System	991,878	1999	461,724	1.45	35	670,509
7/1/1999	0007764-14	Watermain ext-vass-mckeithan	9,070	1999	874	1.45	20	1,269
6/30/2000	0008077	Mobbs well project foxfire rd	234,495	2000	35,174	1.40	20	49,383
6/30/2000	0008080	Seven Lakes 211 water line pro	643,750	2000	96,563	1.40	20	135,569
6/30/2002	0008497	Cannon Park water tower projec	848,974	2002	212,243	1.35	20	286,177
6/30/2002	0008498	Well#22 Pinehurst, nc added 45	72,890	2002	18,222	1.35	20	24,570
6/30/2003	0008534	Monroetown Util System Spring	500,522	2003	147,303	1.32	20	194,653
6/30/2003	0008535	West end/hwy 705 robbins	860,000	2003	238,154	1.32	20	314,708
3/6/2005	0008693	Interconnect phurst & emwd	49,000	2005	20,907	1.24	20	25,870
6/30/2005	0008694	Pinewild bypass 328000.0290	922,460	2005	569,741	1.24	20	704,997
12/31/2005	0008716	L.S 14-1 Upgrade 328000.0330	427,633	2005	199,324	1.24	20	246,644
12/31/2005	0008717	Generator NC211 booster station	2,700	2005	1,148	1.24	20	1,420
3/1/2006	0008732	Interconnect - 7 Lakes 328000	440,843	2006	276,327	1.21	20	333,510
6/30/2006	0008766	Lake Pinehurst Rehab	352,562	2006	221,106	1.21	20	266,861
9/30/2006	0008805	Old Town Pinehurst Sewer rehab	404,901	2006	230,482	1.21	20	278,177
9/1/2006	0008811	60' Road Bore under us hwy 1	7,435	2006	3,408	1.21	20	4,113
12/31/2006	0008815	Pinehurst test wells for wells	18,418	2006	8,748	1.21	20	10,559

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12/31/2006	0008817	Pump Replacement #10-3 324200	19,446	2006	10,209	1.21	20	12,322
3/31/2007	0008835	Scada Telemetry System 328000	201,049	2007	89,021	1.16	20	103,202
4/30/2007	0008880	Lake Pinehurst Emergency repair	251,560	2007	123,684	1.16	20	143,387
6/30/2007	0008881	Pinehurst Well 5A 3280000755	58,403	2007	29,202	1.16	20	33,853
6/30/2007	0008882	PH Lake lift station replacement	229,000	2007	148,850	1.16	20	172,562
6/30/2007	0008884	Water source study	43,404	2007	23,872	1.16	20	27,675
6/30/2007	0008885	Ls 9-1 Ph Hospital 420 Longlea	649,000	2007	324,500	1.16	20	376,194
6/30/2007	0008887	PH#2 Sewer repair main golf co	23,487	2007	11,744	1.16	20	13,614
6/30/2007	0008888	PH#10 Well Pump replacement 32	9,288	2007	4,644	1.16	20	5,384
6/30/2007	0008889	Pinewild pump replacement LS P	10,131	2007	5,065	1.16	20	5,872
9/30/2007	0008918	US 15/501 water main 328000.02	2,395,311	2007	1,556,952	1.16	20	1,804,981
3/31/2008	0008959	Construct well 9 and 5A 328000	186,775	2008	121,404	1.16	20	140,775
3/31/2008	0008960	Water Line services EXT 328000	15,994	2008	10,996	1.16	20	12,750
9/30/2008	0009028	Six Inch Water Main, Mckinon R	112,875	2008	63,492	1.16	20	73,623
6/30/2009	0009054	Pinehurst Elevated Stor Tank 3	1,300,945	2009	857,179	1.13	20	966,746
7/1/1999	0009055	Land Easement Settlement Agreement	29,500	1999	29,500	1.45	999	42,839
5/1/2010	0009104	HWY 211 Water Main	74,151	2010	47,580	1.11	20	52,902
3/1/2010	0009108	Well#23 328000.8125	7,093	2010	4,492	1.11	20	4,994
3/1/2010	0009109	Well#9	17,950	2010	11,368	1.11	20	12,640
6/30/2010	0009110	Vass Sewer Project 328000.8126	204,368	2010	133,090	1.11	20	147,975
6/13/2011	0009148	PH Lake Life Station Arra Proj	2,792,803	2011	2,653,163	1.08	20	2,862,242
6/13/2011	0009183	PH Water Tank Project Lob Capi	7,041,740	2011	6,769,404	1.08	20	7,302,858

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6/14/2011	0009188	Water Main Extension	180,221	2011	125,404	1.08	20	135,286
6/14/2011	0009189	Old Town Dist Hydrant Upgrade	54,783	2011	38,120	1.08	20	41,124
6/14/2011	0009190	Ground Water Monitoring Well	49,000	2011	34,096	1.08	20	36,783
6/14/2011	0009191	Well 3A	225,746	2011	188,505	1.08	20	203,360
6/25/2012	0009251	Midland RD Waterline Improvements	674,902	2012	514,070	1.06	20	544,872
6/25/2012	0009252	Vass Wastewater improvements	1,855,158	2012	1,507,839	1.06	20	1,598,183
6/25/2012	0009253	Lift station 3-4 Replacement	1,136,617	2012	1,079,786	1.06	20	1,144,483
6/25/2012	0009261	MCPU Hydraulic Model, Float Up	8,000	2012	5,967	1.06	20	6,324
9/22/2011	0009262	JD Z710A Ztrack Mower w/48" Deck	6,556	2011	0	1.08	5	0
9/22/2011	0009263	JD Z710A Ztrack Mower w/48" Deck	6,556	2011	0	1.08	5	0
3/1/2012	0009264	1 1/2" SQ Drive Imp Wrench	9,396	2012	0	1.06	5	0
9/30/2011	0009265	Upgrade Pinewild LS#4	11,134	2011	7,887	1.08	20	8,508
3/9/2012	0009266	Upgrade Lift Station 10-4	11,005	2012	8,070	1.06	20	8,554
6/22/2012	0009279	Well PW 5-Lift Station/3A	17,932	2012	13,374	1.06	20	14,176
7/25/2012	0009306-1	Jaguar Software - Tax Utility	8,761	2012	1,752	1.06	5	1,857
3/25/2013	0009335	Countertops and Doors in bldg	16,420	2013	2,189	1.04	5	2,285
11/26/2012	0009336	Gravity Sewer OMR2 Pump Station	63,781	2012	48,899	1.06	20	51,829
12/10/2012	0009337	New Meter Base Well #13	36,753	2012	28,331	1.06	20	30,028
11/26/2012	0009338	LDR Backhoe 58 OSN	84,723	2012	5,648	1.06	5	5,987
6/30/2014	0009387	Well 24	5,800	2014	4,906	1.04	20	5,086
6/30/2014	0009388	Linden RD Wells	94,500	2014	79,931	1.04	20	82,860

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11/1/2013	0009389	McLean Road Tank 1 Renovation	459,895	2013	375,581	1.04	20	392,024
8/1/2013	0009390	RD1000 GPR Complete System	14,025	2013	3,039	1.04	5	3,172
6/15/2014	0009391	Centaur Argo 34 DT2012	44,324	2014	16,991	1.04	5	17,613
6/30/2014	0009392	Edgewood Terrace Project	78,500	2014	66,398	1.04	20	68,831
6/30/2014	0009393	Water Resources Project	6,041,355	2014	5,739,287	1.04	20	5,949,598
6/30/2015	0009467	3-3, 3-1 LS Replacement	313,180	2015	313,180	1.03	20	323,898
8/28/2014	0009469	2015, 8 1/2 X 24 Enclosed Trai	10,932	2014	4,555	1.04	5	4,722
11/21/2014	0009473	Submersible Pump Treehouse LS	6,347	2014	5,501	1.04	20	5,702
12/4/2014	0009474	McLean Tank Renovations	540,876	2014	471,013	1.04	20	488,273
9/30/2014	0009475	Pump 10-3 TreeHouse LS	35,134	2014	31,913	1.04	20	33,083
9/7/2014	0009476	KWMI Easement Machine	46,991	2014	20,363	1.04	5	21,109
6/30/2016	0009508	2016 Aquatech Model B10 Vac TR	371,203	2016	290,776	1.02	5	296,981
2/10/2016	0009509	2016 Ford F550 Super Cab	51,773	2016	37,104	1.02	5	37,896
4/22/2016	0009510	2016 Chevrolet Colorado Truck	22,316	2016	16,737	1.02	5	17,094
4/1/2016	0009511	2016 Ford Transit Connect Van	20,828	2016	15,621	1.02	5	15,954
9/4/2016	0009519	Wilo 25 HP Pump	10,206	2016	8,505	1.02	5	8,687
2/1/2016	0009520	Ground Penetrating Radar Unit	13,200	2016	9,460	1.02	5	9,662
5/11/2016	0009521	Handheld Transceiver Ranger	7,439	2016	5,703	1.02	5	5,825
9/12/2016	0009559	2016 Ford F-SD F450-550	52,101	2016	43,418	1.02	5	44,344
4/1/2003	0008533	EAST MOORE WATER DIST PHASE I WATER	3,112,217	2003	1,988,594	1.32	20	2,627,827
4/15/2004	0008610	MECKLENBURG UTILITIES PHASE I CONTRA	39,132	2004	13,249	1.28	40	16,941

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6/30/2005	0008695	EMWD PHASE II 338100.0020 CIP PROJECT	10,942,122	2005	7,091,608	1.24	20	8,775,158
9/30/2005	0008718	PHASE I CONTRACT III 338000.0065	3,540,821	2005	2,596,684	1.24	15	3,213,138
6/1/2006	0008767	RING LAND .34 ACRE LOT WATER TANK	21,998	2006	21,998	1.21	99	26,551
11/8/2016	0009586	LS 13-2 PARCEL .047 ACRES	9,000	2016	9,000	1.02	99	9,192
6/16/2017	0009589	MAINTENANCE YARD FENCE IN PINEHURST	37,104	2017	36,795	1.00	30	36,795
9/23/2016	0009590	LAND PRIDE BUSHHOG	6,050	2016	5,042	1.02	5	5,149
5/17/2017	0009592	TRIMBLE RANGER 3 WITH INTERNAL CE	6,875	2017	6,646	1.00	30	6,646
1/10/2017	0009594	.11 ACRES PINEHURST LRK#20160018	11,980	2017	11,980	1.00	99	11,980
4/20/2017	0009595	SCADA FOR WELL 5A & 9 RADIO	7,033	2017	6,681	1.00	20	6,681
3/8/2017	0009596	MONITORING STATION FOR TAYLORTOWN	41,686	2017	40,991	1.00	30	40,991
9/26/2016	0009597	HP28 TWN CIRCUIT POWER UNIT FOR PIPE SAW	7,060	2016	5,883	1.02	5	6,009
6/22/2017	0009598	WELL REHABILITATION #17	14,029	2017	13,971	1.00	30	13,971
6/16/2017	0009600	FIBER INSTALL IN 2017	70,657	2017	69,480	1.00	30	69,480
6/28/2017	0009610	GENERATOR PROJECT LS 16-1,14-5,15-2,14-4	58,967	2017	57,984	1.00	30	57,984
		WPCP Interceptor	14,127,297	1900	5,015,173	#N/A	1	#N/A
		WPCP	34,661,152	1900	21,365,933	#N/A	1	#N/A
9/17/2013		Water Supply	5,450,000	2013	5,232,000	1.04	100	5,461,066
4/15/2007	8878	ROOF REPLACEMENT 3141000040	49,338	2007	24,052	1.16	20	27,884

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1/1/1978	1000074	LAND EASEMENTS	349,815	1978	349,815	3.61	99	1,262,885
6/30/2013	9332	WPCP INTERCEPTOR SEWER REHAB	1,100,010	2013	1,040,426	1.04	20	1,085,978
1/1/1992	6511	AERATION PROJECT	451,045	1992	0	1.72	20	0
12/11/1992	6706	SOUTHERN PINES PUMP STATION	43,187	1992	0	1.72	15	0
7/1/1999	7737	CAMP MCCALL SEWER PROJ	514,542	1999	0	1.45	15	0
4/30/2001	8255	BAR SCREEN & INFL PUMP STATION	250,318	2001	0	1.38	10	0
3/31/2004	8585	MONITORING STATION #10 3180000	105,079	2004	35,464	1.28	20	45,348
6/30/2005	8691	INFLUENT PUMP STATION UPGRADE	2,149,487	2005	974,395	1.24	20	1,205,716
6/30/2005	8692	INTERCEPTOR LINES & MANHOLES	318,798	2005	167,181	1.24	20	206,870
9/30/2005	8712	RAW SEWAGE PUMP STATION DESIGN	30,800	2005	12,705	1.24	20	15,721
6/30/2006	8762	LIME SYSTEM 318000.0600	357,856	2006	232,607	1.21	20	280,742
8/1/2006	8803	WWTP UPGRADE MAIN PLANT 318000	28,500	2006	12,944	1.21	20	15,622
9/30/2006	8804	SOUTHERN PINES #4 PUMP REPLACE	1,397,492	2006	908,370	1.21	20	1,096,346
12/31/2006	8814	SLUDGE SYSTEM TRANSITION PROJE	38,707	2006	18,386	1.21	20	22,191
6/30/2008	8988	SLUDGE SYSTEM TRANSITION 31800	106,144	2008	60,872	1.16	20	70,584
6/14/2011	9187	BAR SCREEN #2 REHAB WPCP	31,179	2011	21,695	1.08	20	23,405
6/16/2017	9588	BAR RAKE	131,000	2017	130,454	1.00	20	130,454
1/1/1978	1000075	SEWER LINES #1	3,335,322	1978	700,418	3.61	50	2,528,611
1/1/1978	1000076	SEWER LINES #2	2,139,480	1978	449,291	3.61	50	1,622,006
1/1/1978	1000077	SEWER LINES #3	487,560	1978	102,388	3.61	50	369,634

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1/1/1978	1000078	SEWER LINES #4	412,781	1978	86,684	3.61	50	312,942
7/1/1979	1000079	SOUTHERN PINES INTERCEPTOR	796,445	1979	191,147	3.19	50	609,306
1/1/1978	1000080	SEWER PLANT	9,167,837	1978	0	3.61	30	0
10/1/1987	1000083	SLUDGE BEDS	89,765	1987	748	2.12	30	1,586
10/1/2013	9386	SECURITY GATE FOR FRONT ENTRAN	10,344	2013	8,405	1.04	20	8,772
10/13/2015	9517	GREEN VINYL CHAIN LINK/BARBED	5,569	2015	5,082	1.03	20	5,256
7/1/1999	7765	CONCRETE-FUEL AREA-WWTP	8,500	1999	0	1.45	1	0
4/15/2004	8608	SEPTIC HAULER TRUCK UNLOADING	23,138	2004	7,447	1.28	20	9,522
9/30/2004	8626	OFFICE RENOVATIONS SANDHILLS B	26,546	2004	9,623	1.28	20	12,305
5/1/2005	8677	VASS 12X30 BLDG REPLACE LAB	5,400	2005	2,115	1.24	20	2,617
6/13/2011	9100	WPCP UPGRADE PLANT	25,174,821	2011	21,268,394	1.08	20	22,944,421
6/30/2017	9611	STORAGE BARN	41,428	2017	41,256	1.00	20	41,256
10/1/1987	1000084	MAINTENANCE/STORAGE BLDG	99,971	1987	0	2.12	15	0