



March 28, 2024

Sparty B. Hammett, County Manager
Charles Jordan, Chairman, and Board of Commissioners
c/o David Smithson, Utilities Director
Pasquotank County
Elizabeth City, NC 27909

Reference: 18034 "G"– **Water and Sewer System Development Fees**

Honorable Chairman, Commissioners and County Manager:

American Engineering Associates (American), in consultation with and on behalf of your Utilities staff, is pleased to offer this report of our analysis to assist Pasquotank County in providing the required 5-year update of the 2018 cost-based justification for Water and Sewer System Development Fees, as required under NCGS 162A, Article 8, the Public Water and Sewer System Development Fee Act, adopted by the General Assembly in its 2017 session (House Bill 436), and amended last year by amended by Session Law 2023-55. We will refer to the original act and last year's amendment, collectively as the "SDF Act" for short.

Much of the explanatory language in this report is the same as in our April 16, 2018 report; we have included it for the benefit of any new readers who may need, or at least appreciate, the background.

§162A-203(b) of the SDF Act states, "A system development fee adopted by a local governmental unit under any lawful authority other than this Article and in effect on October 1, 2017, shall be conformed to the requirements of this Article not later than July 1, 2018." We worked with your staff in 2018 to establish a basis for the County to conform its water and sewer SDF programs to the requirements of the SDF Act. This 2024 Update will follow the same methodology, as no circumstances have arisen which would warrant otherwise; we'll just be updating with current cost

This letter report to you, upon your acceptance and adoption, is intended to...

- Comprise the Supporting analysis for this 2024 Update, required by the SDF Act.
- Recommend changes to the County's tap fees, as presented on the third page of the document on the Utilities Department's web page, titled "RESIDENTIAL WATER RATES, Effective July 1, 2022", along with any and all supporting codes, ordinances and policies regarding connection to the County's water and/or sewer systems.

- Serve as Interim Amendment to the Capital Improvement Planning process of the Pasquotank County Utilities Department. This will satisfy the SDF Act's requirement that its supporting analysis "constitute or be included in a capital improvements plan."

In the following portion of the report, we recite the detail requirements in the SDF Act for a "supporting analysis," with the *verbatim* text of the Act in blue type and our response in black type.

162A-205 of the SDF Act, entitled **Supporting Analysis**, requires the following:

A system development fee shall be calculated based on a written analysis, which may constitute or be included in a capital improvements 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.

This Report, and our included Supporting Analysis, is prepared by American Engineering Associates, PA and signed by Walton P. Burkheimer, Jr., P. E., a professional engineer licensed in the State of North Carolina (PE #10786), in consultation with your Finance Director, Ms. Sheri Small, and Utilities Director, Mr. David Smithson.

Collectively, we will refer to ourselves as your SDF Analysis Team. In developing this Report, your SDF Analysis Team considered the similar efforts by other jurisdictions in the northeastern North Carolina region. Your SDF Analysis Team meets the qualifications requirements of the Act.

(2) Documents in reasonable detail the facts and data used in the analysis and their sufficiency and reliability.

The facts and data used by your SDF Analysis Team are cited specifically in the Analysis presented below.

(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.

The SDF Analysis Team cites its basis for selecting the "Buy-In" method and develops its reasoning to support the SDF based on sound engineering and financial practices. The methodology is similar to that used by other jurisdictions in the region with relatively modest rates of annual growth.

(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.

The SDF Analysis Team, in the **Findings and Recommendations** below, describes specifically and in detail its reasoning, every step of the way. Supporting calculations are attached.

(5) Identifies all assumptions and limiting conditions affecting the analysis and demonstrates that they do not materially undermine the reliability of conclusions reached.

For the most part, the SDF Analysis Team was able to find and rely upon factual information, rather than having to make assumptions. For example, in assessing the value of all the water and sewer piping, overall lengths of pipe were available by size and type. Less detailed information was available as to the age of each system component. This reduced level of detail was compensated for by rounding the assumed overall age of such system elements toward "older," thus reducing their value. Similarly, very complete information of system elements donated through the land development process is not available, so assumptions as to the percentage of such donated assets are rounded up. In general, where assumptions were required, the Team adjusted such assumptions, conservatively, in the direction which would result in lower system values and would support lower System Development Fees.

(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.

The information presented in Paragraphs 9 and 10 of the SDF Analysis Team's **Findings and Recommendations** below does exactly this.

(7) Covers a planning horizon of not less than 10 years nor more than 20 years.

The work of your SDF Analysis Team is based on recognizing the major capital investments made relatively recently in the County's water and sewer systems. A 10-year planning horizon contemplates primarily the maintenance and rehabilitation-driven capital projects required to attain the service lifespans cited in the assets registry (e.g., cleaning and recoating elevated tanks at prudent 10-12-year intervals), as opposed to projects driven by expansion of capacity.

(8) Is adopted by resolution or ordinance of the local governmental unit in accordance with G.S. 162A-209.

For compliance with the SDF Act's requirements, the Board of Commissioners will need to hold a public hearing not later than its June 17, 2024 regular meeting, at which it would adopt any changes in rates, ordinances and/or policies as needed to confirm to the SDF Act. The June 17 date would allow time for a special meeting to be called for late in June for final action, in case public input and/or Board discussion on June 17 required rework of the Analysis and its recommendations.

Alternatively, a less pressed schedule would result from bringing the matter to the Board's May 20, 2024 Regular Meeting.

The 45 day period of public review and comment mandated by §162A-209(a) would require that a draft of the changes be published not later than the end of the day Friday, May 3, 2024 to accommodate the June 18 regular meeting, or by the end of the day Friday, April 5, 2024 to accommodate the May 20, 2024 meeting.. Your SDF Analysis Team will be prepared to hone and refine the proposed changes to the SDF program as you direct through May and June.

* * * * *

We have, as a member of Pasquotank County's team for this effort, reviewed the provisions of the SDF Act, including its amendment by S. L. 2023-55 and actively participated in the Supporting Analysis. As with the original 2018 Analysis, this 2024 Update's emphasis will be on the engineering cost analysis in support of the "buy-in" methodology.

Key to our part of this effort will be updating a Costs and Life of Facilities tabulation of all County Water and Sewer assets. The overall goal is to determine the aggregate Replacement Cost (New) Less Depreciation (RCNLD) of the Pasquotank County Water and Sewer Systems. We will also assist with the derivation of the overall system capacity, to enable the establishment of a cost per gallon per day (GPD) of capacity.

This report is signed by us as the "licensed professional engineer," and you as "financial professional," as required by §162A-205(1).

Findings and Recommendations:

1. Your current RESIDENTIAL WATER RATES, Effective July 1, 2022" lumps together under the term "Meter Cost by Size" two different components:
 - a. The costs of providing and physically installing water services and meters, and/or sewer laterals and cleanouts, to a new customer, and
 - b. A cost assessed to the new customer as a "buy-in" of his share of the overall water and/or sewer system, helping to bear the costs of new or rehabilitative capital improvements to the system(s).

Use of the single term "Tap Fee" does not clearly characterize the two different purposes and intent of these fees. **We recommend that, after the 45-day comment period, you adopt a new Schedule of Water and Sewer Connection Fees and Charges, effective July 1, 2024, and that it provided for both Tap Fees (based on the cost of providing and installing the new connection to the system) and**

System Development Fees (SDF's) This will eliminate any potential confusion with their purpose and intent, and will conform to the terminology used in the SDF Act. Details on our recommended amounts of such fees and charges follow below.

2. We have reviewed the following record information:
 - a. Pasquotank County Land Use Plan, adopted August 21, 2023.
 - b. Population records for the County (net of Elizabeth City's population).

It is clear that residential and other growth in Pasquotank County is modest. County population has remained substantially flat since the 2018 SDF Analysis.

As of the 2018 Analysis, your total water system capacity was 4.4 million gallons per day (mgd). In 2020, the County purchased the portion of the South Mills Water Association system lying within Pasquotank, including about 1,000 customers, for \$1,394,149. From information furnished by Utilities Department staff, your latest water use data was 613,950,000 gallons for the year ending June 30, 2023, or an average of 1.682 mgd (compare with 572,379,700 gallons for the year ending 6-30-2017) . A typical combined allowance for peaking factor and leakage losses of 2.0 would bring this to a peak day demand of about 3.3 mgd, or 25% below your 4.4 mgd combined capacity. This change from 2018 results mostly (about 60%) from the addition of the 1,000± customers from the former South Mills Water Association, with the remainder due to the number of other residential customers growing by about 10% and non-residential by 1, from 17 to 18. The average billed consumption per residential customer grew by only 1.6%.

In any case, 3.3 mgd daily consumption, with 4.4 mgd capacity, with relatively flat growth, represents a healthy capacity reserve.

Accordingly, we find that yours is a mature system in an area experiencing very limited growth, not expected to require significant capacity-driven capital expenditures in the foreseeable future.

3. Based on 2 above, **we recommend that your System Development Fee program be based upon the "Buy-In" method**, and find that your past such fees have, in fact, been implicitly based on the Buy-In method. The principle of the Buy-In method is that each new customer, in paying his SDF, "buys into" his proportional share of the overall cost of the system. These contributions then help to fund Capital Rehabilitation Projects, as defined in the SDF Act (§162A-201(2)) as "Any repair, maintenance, modernization, upgrade, update, replacement, or correction of deficiencies of a facility, including any expansion or other undertaking

- to increase the preexisting level of service for existing development.” The other method, Incremental Cost or Marginal Cost, is based on the premise that each new customer is paying his proportional share of the increased capacity made necessary by new development. Thus, **neither** the Incremental Cost method, **nor** a combination of Buy-In and Incremental Cost, is the appropriate choice for Pasquotank County.
4. The next step in determining your SDF is to determine the total value of your water system. §162A-211(b)(first sentence) includes the following (**bold** emphasis added): “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.” Your SDF Analysis Team has used the Replacement Cost (New), Less Depreciation, or RCNLD method to establish the total value of the system, as of the date of this report. This includes in-place infrastructure, projects which have been completed and project currently under design and scheduled for completion. An Excel workbook entitled *Pasquotank County Water Assets and RCNLD.xlsx* (the Workbook, for short). As indicated in the Total System Valuation sheet of the Workbook, **we find the total value of Pasquotank County water treatment, storage, distribution infrastructure and supporting facilities to be \$78,300,000.00** (rounded to 3 significant figures). This is about 47% higher than in the 2018 Analysis; about a third of this is attributable to the addition of the Newland portion of the South Mills Water Association system and the remainder reflects significant inflation in infrastructure construction/replacement costs in the last 5 years. The Workbook is attached to and made a part of this report.
 5. The SDF Act requires (§162A-211(b), second sentence) that (**bold** emphasis added) “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.”
 - a. The SDF Analysis Team **recommends** that **depreciation** be computed using a straight-line method over the life of the asset. This is the method used in the Workbook. 100 years is used as the life of PVC pipe, 75 years for Ductile Iron, with 50 years used for most above-ground assets.
 - b. The SDF Analysis Team **finds that the only significant outstanding debt** on the Pasquotank County is the remaining balance on the financing of the RO Plant and related systems. Its current balance,

after the September, 2023 payment, is **\$6,654,865.65**, down over \$4 million since the 2018 Analysis.

- c. The SDF Analysis Team **finds no record**, nor any recollection **of any funding of water assets from past grants**. Thus, there will be no deduction for grant-funded improvements.
 - d. The SDF Act seems unclear on the question of credits or deductions from the SDF in cases where the water distribution system serving the lot or parcel was installed by a developer and conveyed to the County. It is clear that such a credit is in order when the developer installs oversized improvements greater than needed by his project. But where the lines and appurtenances are the minimum needed to serve just his development, we find no clear statement that a credit is required. We note that Elizabeth City 's consultant excludes the entire value of such "contributed assets," stating "...these assets do not represent an investment in system capacity by the City." We agree that there is some equity in this premise, whether or not demanded by the SDF Act. In considering and discussing all of the above, the SDF Analysis Team has decided to recommend excluding, as best we can from incomplete records, the value of all water distribution mains installed as part of past development and conveyed to the County.
 - e. Given the absence of complete records of plans and other documentation of developments and their donated water distribution assets, the SDF Analysis Team **recommends a deduction of 50% of the value of the water distribution system as "contributed assets."**
 - f. **In summary, the SDF Analysis Team finds that the total value of Pasquotank County's Water System has increased to about \$78.3 million, determined in a manner consistent with the SDF Act, due to inflation and acquisition of the Newland/SMWA assets.**
 - g. Using similar methodology, **the SDF Analysis Team finds that the total value of Pasquotank County's Wastewater System is \$3.7 million, determined in a manner consistent with the SDF Act.** This nets out the depreciated value of the treatment plant as a "developer-contributed" asset, as it was built with Pasquotank Correctional Institute, and includes a conservative deduction of **20%** of the value of gravity lines and force mains as having been contributed by developers.
6. Next, we determine the total capacity of the system. This is relatively simple, and is the same as in the 2018 Original Analysis. **Your SDF Analysis Team finds that the Capacity of the Pasquotank County Water System is 4.4 Million Gallons per Day (mgd).**

- a. The design capacity of the Weeksville Conventional Water Treatment Plant is 2.4 mgd.
 - b. The design capacity of the Reverse Osmosis Water Treatment Plant is 2.0 mgd.
 - c. Our cursory review of the other elements of the water system (wells and raw water piping, storage and pumping equipment, distribution piping) indicates that the combined capacity of the plants themselves establishes total system capacity.
 - d. Similarly, **the SDF Analysis Team finds that the capacity of Pasquotank County's Wastewater System is 174,000 gpd**, which is the rated capacity of the treatment plant.
7. Having determined system-wide asset value and capacity, the SDF Analysis Team **finds the Water System's Cost per Unit of Capacity is \$17.80 per gpd**. This is simply \$78.3 million divided by 4.4 mgd.
8. The next step in establishing a base SDF is to determine the demand per unit of development. Our fundamental unit will be an Ordinary Single-Family Home. While actual uses are lower, it is important to note that these computations are based on system capacity, which recognizes seasonal and daily peaks in use. Our methodology is the same as in the 2018 Original Analysis.
- a. NC DEQ Rules for design of on-site sewage disposal systems (15A NCAC 02T, Waste not Discharged to Surface Waters) includes provisions for wastewater systems to be designed for 120 gpd (daily average flow) per bedroom, with a 2-bedroom minimum. Your SDF Analysis team recommends the use of 2.5 bedrooms at 120 gpd, or 300 gpd, as a typical average daily flow applicable to an Ordinary Single-Family home, and we recommend that rate be found typical of homes with 1, 2, 3 or 4 bedrooms for purposes of establishing a simple fee schedule. We designate this as an **Equivalent Residential Unit** and will refer to it as an **ERU** hereafter.
 - b. It may be appropriate, since the 120 gpd sewage design flow is an average, to apply a peaking factor to the 300 gpd daily flow for Water SDF purposes. The 2018 Original Analysis used the 2016 Local Water Supply Plan (LSWP) for Pasquotank on file with the NC DEQ Public Water Supply Section (PWS) for the two plant service areas. Analysis of the 2016 monthly average and peak day information in that LWSP led us to recommend a peaking factor of 1.6 be used for Water SDF. In this Updated Analysis, we looked at the LWSP's for 2021, 2022 and 2023. These later years might tend to suggest a lower peaking factor of 1.4 or 1.5, except for some high summer "max day" ratios of 1.7 or higher. Accordingly, we will **continue to use the 1.6 peaking factor**

from the Original Analysis. With this rather conservative factor, no separate allowance is made for leakage losses.

- c. Applying the peaking factor of 1.6 to the average of 300 gpd per ERU, we **recommend a total peak flow for Water SDF purposes of 480 gpd.**
 - d. For Wastewater, there is no peaking factor required, but we apply a relatively small loss allowance for infiltration and inflow, given the relatively low age of the system and small amount of gravity lines. We **recommend a flow for Wastewater SDF purposes of 300 gpd x 1.2, or 360 gpd.**
9. The approach your SDF Analysis Team has followed would result in a Water SDF for an ERU of \$17.80 per gpd x 480 gpd per ERU, or \$8,544.00, rounded to \$8,500.00.
- While we fully believe an SDF of \$8,500.00—which does and should include a peaking factor—complies with the letter and intent of the SDF Act, **we recommend staying closer to the current “Meter Cost”**—which we have recommended be split into a true Tap Fee of \$500.00 and the remainder redesignated as a **Water System Development Fee**—of **\$2,500.00 for an ERU**. Again, the Tap Fee, under the new definition, would be \$500.00 and the Water SDF would be \$2,500.00. **Increasing the total cost of water connection to \$3,000.00**, in our opinion, at least partially reflects the serious infrastructure cost inflation of the last six years, strikes a reasonable balance between the burden on the new customer and the burdens on the long-term ratepayers. It also leaves a generous “cushion” factor for the unavoidable uncertainties in our computational processes.
10. The SDF Analysis Team **recommends** that the provisions of the new **Schedule of Water and Sewer Connection Fees and Charges be modified to more accurately reflect the proportional effect of higher-demand customers.**

- a. The current schedule of “Meter Cost” versus meter size is as follows:

Meter Size	IHF
5/8 or ¾inch	\$2,500.00
1 inch	\$3,250.00
1½ inch	not used
2 inch	\$6,500.00
3 inch	\$9,000.00
4 inch	\$12,000.00
6 inch	\$16,500.00
8 inch	\$21,000.00

- b. In this schedule, a 8” meter has a fee 8.4 times that of a 5/8” / ¾” meter, but a capacity **80 times larger**. To leave this unchanged seems inconsistent with the intent of the SDF Act, that there be a rational nexus between the demand of a connecting customer to the SDF he pays.
- c. Many jurisdictions follow this principle rather literally. For example, in the City of Chesapeake, Virginia, the Connection Fee (like to an SDF) for a 5/8” meter is \$3,108, while for a 6” meter it is \$155,400, a ratio of 50, tracking exactly with the AWWA meter capacity ratio. Realistically, it is rare to see a facility need a 6” meter for **domestic-only flows**, as opposed to fire flow. However, for Pasquotank County to change to a linear relationship with meter capacity would be a dramatic departure from past practice. A more modest change would be a progression based not on capacity linearly (to the power 1.0) but to a lesser power, such as the square root of capacity (power 0.5), or something in between. In examining the relationship of Pasquotank’s minimum-size water meter, used for an ERU, or single-family home, we decided to treat your ¾” meter as if it were a 5/8” meter (used as the minimum meter by many jurisdictions and having adequate capacity for a single-family home). We aren’t recommending you depart from the ¾” meter but are just de-rating it for comparison with the larger meters. **The SDF Analysis Team recommends a schedule like the one below**, which is based on meter capacity to the power 0.5:

Pasquotank County Water and Sewer System Development Fees

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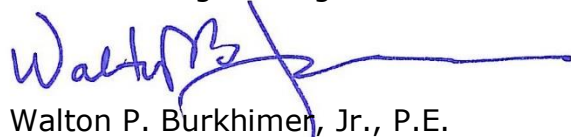
Meter Size	AWWA Capacity Ratio	AWWA Capacity Ratio to 0.5 power	Proposed Water SDF	Proposed Water Tap Fee	Proposed Total Connection Charges ("Meter Cost")	Current "Meter Cost" (for comparison)
3/4 inch	1.0	1.00	\$2,500	\$500	\$3,000	\$2,500
1 inch	2.5	1.73	\$4,000	\$700	\$4,700	\$3,250
1 1/2 inch	5.0	2.63	Not offered	Not offered	Not offered	Not offered
2 inch	8.0	2.83	\$7,000	\$1,000	\$8,000	\$6,500
3 inch	15.0	3.87	\$9,500	\$1,500	\$9,000	\$9,000
4 inch	25.0	5.00	\$12,500	\$2,000	\$14,500	\$10,500
6 inch	50.0	7.07	\$17,500	\$2,500	\$20,000	\$16,000
8 inch	80.0	8.94	\$22,500	\$3,000	\$25,500	\$21,000

- d. We recommend incorporating into your policies for water connections a sentence such as **"Meter size shall be selected using AWWA Manual M22."**
- e. Your current Tap Fee program provides a schedule of Wastewater Tap Fees which exactly match the Water Tap Fees. **Your SDF Analysis Team recommends continuing this approach, with proposed Wastewater SDF's matching Water SDF's for each meter size.**
- f. **We recommend that fire flows not be a factor in determining meter size, and thus SDF.** If a domestic service is upsized for fire flow, as opposed to having a separate fire service, SDF and other fees should be assessed on the lower meter size that would result if no fire flow was added.

Thank you for your time and consideration in reviewing this report. Please feel free to contact us with any questions or comments you may have.

Sincerely,

American Engineering Associates – Southeast, PA



Walton P. Burkheimer, Jr., P.E.
Senior Consultant

https://Americanea-My.Sharepoint.Com/Personal/Pburkheimer_American-Ea_Com/Documents/Pasquotank SDF Analysis 3-6-24.Docx