WATER AND SEWER RATE ANALYSIS

JUNE 2018

PREPARED FOR

New Kent County

Department of Public Utilities

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Draper Aden Associates
Engineering • Surveying • Environmental Services

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1.0 INTRODUCTION

New Kent County operates water and wastewater systems that serve more than 2,800 water customers and 1,500 sewer customers. The customers are billed on a bi-monthly basis. The existing rates and fees are as shown below.

Table 1-1: Current Rates and Fees (FY18)

Water **Minimum Usage : 0 - 6,000 Gallons**	
5/8" and 3/4" meter minimum usage charge	$48.58
1" meter minimum usage charge	$90.83
1 1/2" meter minimum usage charge	$191.42
2" meter minimum usage charge	$287.66
3" meter minimum usage charge	$501.81
4" meter minimum usage charge	$803.54
6" meter minimum usage charge	$1,605.97
8" - 10" meter minimum usage charge	$2,870.71
Plus charges per 1,000 gallons over the minimum usage for total water consumption (domestic and irrigation)	
6,001 - 12,000 gallons	$ 7.29
12,001 - 18,000 gallons	$ 7.95
18,000+ gallons	$ 8.33
Sewer **Minimum Usage : 0 - 6,000 Gallons**	
5/8" and 3/4" meter minimum usage charge	$67.49
1" meter minimum usage charge	$158.97
1 1/2" meter minimum usage charge	$310.37
2" meter minimum usage charge	$537.49
3" meter minimum usage charge	$1,074.95
4" meter minimum usage charge	$1,746.97
6" meter minimum usage charge	$3,576.37
8" - 10" meter minimum usage charge	$7,332.28
Plus charges per 1,000 gallons over the minimum usage for total water consumption (domestic and irrigation)	
6,001 - 12,000 gallons	$10.11
12,001 - 18,000 gallons	$10.96
18,000+ gallons	$11.55

The purpose of this report is to:

- Review the existing water usage and the sewer billings to examine usage patterns to develop rates and fees that are reflective of usage;
- Develop a 5-year projection[1] of water and sewer revenues assuming reasonable increases in the customer base;
- Project the operating expenses, the capital costs and the debt service costs over the next five years;
- Develop three options for revised water and sewer rates that enable New Kent County to continue to collect revenue adequate to pay projected expenses;
- Develop a conservation-oriented water rate structure
- Modifications to the rate structure include:
    - Consider reducing the "minimum" of water or sewer usage to less than 6,000 gallons per bi-monthly billing period; and
    - Consider a series of rate structure adjustments over 5 years that *gradually reduces* the minimum to 3,000 gallons per bi-monthly billing period.
- Establish a separate set of rates and fees for irrigation; and
- Consider opportunities to transfer the connection and availability fees to a capital reserve fund that can be used for future water and wastewater system improvements.
- Finally, review the existing connection fees from the Bottoms Bridge Service District, consider that buildout will likely be reached in 2019, and project the likely impact to the *ad valorem* tax.

-- End of Section --

[1] The projections included herein include FY2019 – FY2023.

2.0 PROJECTED REVENUES AND EXPENSES FY2019 – FY2023

In order to determine the projected revenue requirements for the upcoming 5-year period, a projection of revenues and expenses was prepared – *assuming no increases in water or sewer rates*. The projection assumed reasonable growth in the systems, assumed reasonable increases in expenses, and incorporated the proposed capital projects scheduled for the next 5 years.

In reviewing the projections, it is important to recognize that the water system generates revenues that exceed the water expenses, and those excess water revenues are used to support the expenses of the wastewater system. Since the number of sewer customers is approximately 53% of the number of water customers, it is not practical at this time to establish sewer rates and fees that cover the revenue requirements of the sewer system – without significant increases to those sewer customers.

Detailed projections of water and wastewater revenues and expenses are included in Appendix A. Table 2-1 summarizes the projected revenues and expenses for the water and wastewater systems and includes the following assumptions:

- Residential connections - 100 new water and 100 new sewer connections each year; average usage is 9,600 gallons per bi-monthly billing period.
- Non-Residential connections - 3 new non-residential water and sewer connections each year, usage is 20,000 gallons per bi-monthly billing period, assumed 5/8 or ¾-inch meter. This assumption is meant to be conservative, some non-residential connections are likely to require a larger meter or use more than 20,000 gallons per billing period – both of which would result in larger water and sewer bills.
- Most operating expenses are increased at 1.5% to 3% per year (and are detailed in Appendix A).
- The capital projects included in the utility's capital plan are included and all are funded with operating revenues (the capital projects are shown in Table 2-2).
- One of the goals of the analysis was to transfer all the connection and availability fees to a capital reserve fund that would be used to fund future capital projects. After additional analysis, and considering that the water connection and availability fees total approximately $676,000 per year and the sewer fees total approximately $575,163 per year, the transfer of those funds would drive a rate increase that would not be acceptable to the County's decision-makers or to the water and sewer customers.

  As a result, the attached projections assume that the connection and availability fees are transferred to a capital reserve – but, in 2020, 45% of the fees are transferred; in 2021, 50% are transferred; 55% are transferred in 2022 and 60% are transferred in 2023.

  Ideally, over the few years following 2023, the utility can transfer 100% of the connection/availability fees to the capital reserve and stop relying on the fees to subsidize operating expenses.

Further, as shown at the bottom of Table 2-1, the transfer of these fees each year will result in an accumulation of funds in the capital reserve that can be used to fund future capital projects or debt service on capital projects. Over the 4-year period from 2020 – 2023 – the *increase* in the capital reserve is projected to total approximately $2.6 million.

Table 2-1: Projected Water and Sewer Revenues and Expenses – No Rate Increases

Department	Budget 2018	Projected 2019	Projected 2020	Projected 2021	Projected 2022	Projected 2023
WATER						
Revenue:						
Revenue from Water Sales	$ 1,892,800	$ 1,941,388	$ 1,989,976	$ 2,038,565	$ 2,087,153	$ 2,135,741
Misc. Revenue	$ 76,250	$ 76,250	$ 76,250	$ 76,250	$ 76,250	$ 76,250
Revenue from Jail	$ 125,047	$ 127,943	$ 130,271	$ 132,643	$ 135,060	$ 137,522
Connection and Availability Fees	$ 252,750	$ 676,450	$ 676,450	$ 676,450	$ 676,450	$ 676,450
Interest on Investments	$ 33,800	$ 33,800	$ 33,800	$ 33,800	$ 33,800	$ 33,800
Transfer From Fund Balance	$ 79,483	$ -	$ -	$ -	$ -	$ -
Total Revenue	**$ 2,460,130**	**$ 2,855,831**	**$ 2,906,748**	**$ 2,957,708**	**$ 3,008,713**	**$ 3,059,763**
Expenses:						
Administration	$ 355,626	$ 362,149	$ 368,795	$ 375,566	$ 382,465	$ 389,494
Utility Fund	$ 518,847	$ 527,523	$ 536,718	$ 546,081	$ 555,613	$ 565,318
Bottoms Bridge Water	$ 26,450	$ 26,847	$ 27,249	$ 27,658	$ 28,073	$ 28,494
Parham Landing Water	$ 139,794	$ 142,159	$ 144,746	$ 147,382	$ 150,067	$ 152,802
Debt Service	$ 75,645	$ 73,544	$ 73,544	$ 73,544	$ 300,144	$ 300,144
Transfers Out	$ 109,352	$ -	$ -	$ -	$ -	$ -
Total Operations	**$ 1,225,714**	**$ 1,132,221**	**$ 1,151,053**	**$ 1,170,231**	**$ 1,416,361**	**$ 1,436,251**
Capital Projects	$ 203,600	$ 980,220	$ 308,530	$ 817,930	$ 229,030	$ 252,730
Total Expenses	**$ 1,429,314**	**$ 2,112,441**	**$ 1,459,583**	**$ 1,988,161**	**$ 1,645,391**	**$ 1,688,981**
Net Income	**$1,030,816**	**$743,390**	**$ 1,447,165**	**$969,548**	**$ 1,363,322**	**$ 1,370,781**
Transfer of Connection/Availability Fees	$ -	$ -	$(304,403)	$(338,225)	$(372,048)	$(405,870)
Net Available	**$1,030,816**	**$743,390**	**$ 1,142,763**	**$631,323**	**$991,274**	**$964,911**

Department	Budget 2018	Projected 2019	Projected 2020	Projected 2021	Projected 2022	Projected 2023
SEWER						
Revenue:						
Revenue from Sewer Sales	$ 1,237,200	$ 1,304,651	$ 1,372,102	$ 1,439,553	$ 1,507,004	$ 1,574,455
Misc. Revenue	$ 17,325	$ 17,325	$ 17,325	$ 17,325	$ 17,325	$ 17,325
Revenue from Jail	$ 251,593	$ 516,826	$ 261,129	$ 265,506	$ 357,692	$ 362,222
Connection and Availability Fees	$ 94,200	$ 575,163	$ 575,163	$ 575,163	$ 575,163	$ 575,163
Interest on Investments	$ 18,200	$ 18,200	$ 18,200	$ 18,200	$ 18,200	$ 18,200
Transfer From Fund Balance	$ 42,798	$ -	$ -	$ -	$ -	$ -
Total Revenue	**$ 1,661,316**	**$ 2,432,165**	**$ 2,243,919**	**$ 2,315,747**	**$ 2,475,384**	**$ 2,547,364**
Expenses:						
Administration	$ 189,842	$ 193,493	$ 197,041	$ 200,656	$ 204,339	$ 208,091
Utility Fund	$ 276,838	$ 281,460	$ 286,379	$ 291,377	$ 296,466	$ 301,647
Parham Landing Sewer	$ 1,263,933	$ 1,284,131	$ 1,305,646	$ 1,327,531	$ 1,349,793	$ 1,372,439
County Sewer Reclaim System	$ 382,855	$ 389,186	$ 395,640	$ 402,223	$ 408,937	$ 415,787
Bottoms Bridge Sewer	$ 37,572	$ 38,136	$ 38,708	$ 39,288	$ 39,878	$ 40,476
Debt Service	$ -	$ -	$ -	$ -	$ 438,669	$ 438,669
Transfers Out	$ 109,352	$ -	$ -	$ -	$ -	$ -
Total Operations	**$ 2,260,392**	**$ 2,186,406**	**$ 2,223,414**	**$ 2,261,075**	**$ 2,738,081**	**$ 2,777,108**
Capital Projects	$ 325,772	see below	$ 12,670	$ 4,270	$ 2,170	$ 1,470
Total Expenses	**$ 2,586,164**	**$ 2,186,406**	**$ 2,236,084**	**$ 2,265,345**	**$ 2,740,251**	**$ 2,778,578**
Net Income	**$(924,848)**	**$245,759**	**$7,835**	**$50,402**	**$(264,867)**	**$(231,214)**
Transfer Connection/Availability Fees	$ -	$ -	$(258,823)	$(287,581)	$(316,339)	$(345,098)
Net Available	**$(924,848)**	**$245,759**	**$(250,989)**	**$(237,179)**	**$(581,206)**	**$(576,312)**
Net Available from Water System	$ 925,816	$ 837,890	$ 1,142,763	$ 631,323	$ 991,274	$ 964,911
Net Available from Sewer System	$(924,848)	$ 245,759	$(250,989)	$(237,179)	$(581,206)	$(576,312)
Total	**$ 968**	**$ 1,083,649**	**$891,774**	**$394,143**	**$410,068**	**$388,600**
Overall Revenue Increase Needed $		N/A	$ -	$ -	$ -	$ -
Overall Revenue Increase Needed %		N/A	0%	0%	0%	0%
Summary of Capital Reserve:						
Beginning Reserve	$ -	$ 2,000,000	$ 868,805	$ 1,432,031	$ 2,057,837	$ 2,746,224
Transfer Water Conn./Avail. Fees	$ -		$ 304,403	$ 338,225	$ 372,048	$ 405,870
Transfer Sewer Conn./Avail. Fees	$ -		$ 258,823	$ 287,581	$ 316,339	$ 345,098
Use of Reserve	$ -	$(1,131,195)	$ -	$ -	$ -	$ -
Ending Reserve	**$ -**	**$ 868,805**	**$ 1,432,031**	**$ 2,057,837**	**$ 2,746,224**	**$ 3,497,191**

As shown in the table above, the combined system *does not need significant water and sewer rate increases* in the next few years to adequately fund operating expenses and capital projects. However, the projections assume that the growth and development of new homes and non-residential uses continues. Slower growth would have a negative impact on these projections.[2] Additionally, significant reductions in water usage (if users consistently implement water conservation measures and water usage is reduced) would impact the projected increase in both water and wastewater revenue.

The capital projects that are to be funded each year are summarized above, but are shown in greater detail in Table 2-2. Certain projects, including software, vehicles and similar items are

[2] DPU will be provided the rate model to run additional scenarios.

shared by the water and sewer operations and the cost is split between the water and sewer budgets as shown below.

Table 2-2: Water and Sewer System Capital Projects

	2018	2019	2020	2021	2022	2023
Water System						
Munis Software ($11,920)	$-	$7,748	$-	$-	$-	$-
Vehicle Replacement ($62,000, $32,000)	$-	$40,300	$20,800	$-	$-	$-
Computer Replacement ($28,800/5 Years)	$-	$1,300	$2,730	$7,930	$4,030	$2,730
Storage Bldg. Siding Replacement ($20,086)	$-	$13,056	$-	$-	$-	$-
F-550 Utility Truck ($92,409)	$-	$60,066	$-	$-	$-	$-
ARC/GIS Mobile Collector ($35,000)	$-	$22,750	$-	$-	$-	$-
Water Treatment Permit	$75,000	$-	$-	$-	$-	$-
Parham Well Pump Replacement	$105,000	$-	$-	$-	$-	$-
Vehicle Replacement	$28,600	$-	$-	$-	$-	$-
Water System Interconnect - Phase 1a	$50,000	$-	$-	$-	$-	$-
Well & Pump Preventive Maintenance	$50,000	$-	$-	$-	$-	$-
Bottoms Bridge Cary Rd. Well Replacement	$-	$-	$155,000	$585,000	$-	$-
Minitree Glen Backup Well	$-	$-	$-	$-	$-	$250,000
Sherwood Estates Backup Well	$-	$250,000	$-	$-	$-	$-
Easements - Interconnect Project	$-	$50,000	$-	$-	$-	$-
Sherwood/Whitehouse Storage Tank	$-	$300,000	$-	$-	$-	$-
PER - Raw Water Pumping And Treatment		$100,000	$100,000	$-	$-	$-
Land Acquisition / River Withdrawal	$-	$-	$-	$225,000	$225,000	$-
Well & Pump Preventative Maintenance	$-	$30,000	$30,000	$-	$-	$-
Parham Landing Well Pump Replacement	$-	$105,000	$-	$-	$-	$-
TOTAL WATER SYSTEM	**$308,600**	**$980,220**	**$308,530**	**$817,930**	**$229,030**	**$252,730**
Sewer System						
Munis Software ($11,920)	$-	$4,172	$-	$-	$-	$-
Vehicle Replacement ($62,000, $32,000)	$-	$21,700	$11,200	$-	$-	$-
Computer Replacement ($28,800/5 Years)	$-	$700	$1,470	$4,270	$2,170	$1,470
Storage Bldg. Siding Replacement ($20,086)	$-	$7,030	$-	$-	$-	$-
F-550 Utility Truck ($92,409)	$-	$32,343	$-	$-	$-	$-
ARC/GIS Mobile Collector ($35,000)	$-	$12,250	$-	$-	$-	$-
Odor Control Unit	$77,000	$-	$-	$-	$-	$-
Talleysville PS Spiral Lift	$175,000	$-	$-	$-	$-	$-
Parham Landing SBR Diffuser Maintenance	$69,600	$-	$-	$-	$-	$-
Parham Landing Intellipro Upgrade	$-	$13,000	$-	$-	$-	$-
Solids Stab., Dewatering/ P. Landing WWTP		$1,300,000	$-	$-	$-	$-
TOTAL SEWER SYSTEM	**$321,600**	**$1,391,195**	**$12,670**	**$4,270**	**$2,170**	**$1,470**

-- End of Section -

3.0 CUSTOMER BASE AND USAGE PATTERNS

New Kent County provided twelve months of bi-monthly billing records for the timeframe from July/August 2016 through the May/June 2017 billing period.

During this 12-month period, the County billed:

- 163,666,500 gallons of water for domestic use (not including water used for irrigation purposes)
- 93,992,900 gallons of sewer, based on water meter readings, and
- 38,833,300 gallons of water for irrigation purposes.
- The total water billed (domestic use and irrigation) was 202,499,800 gallons, with irrigation usage accounting for approximately 19% of the overall water usage.

Figure 3-1: Water Billed (Gallons, not including irrigation)

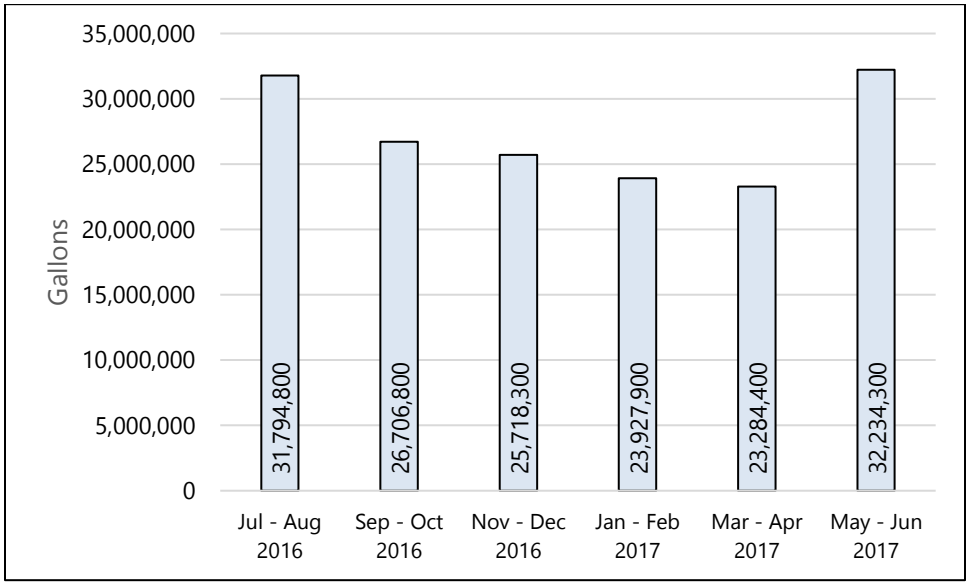


Figure 3-2: Sewer Billed (Gallons)

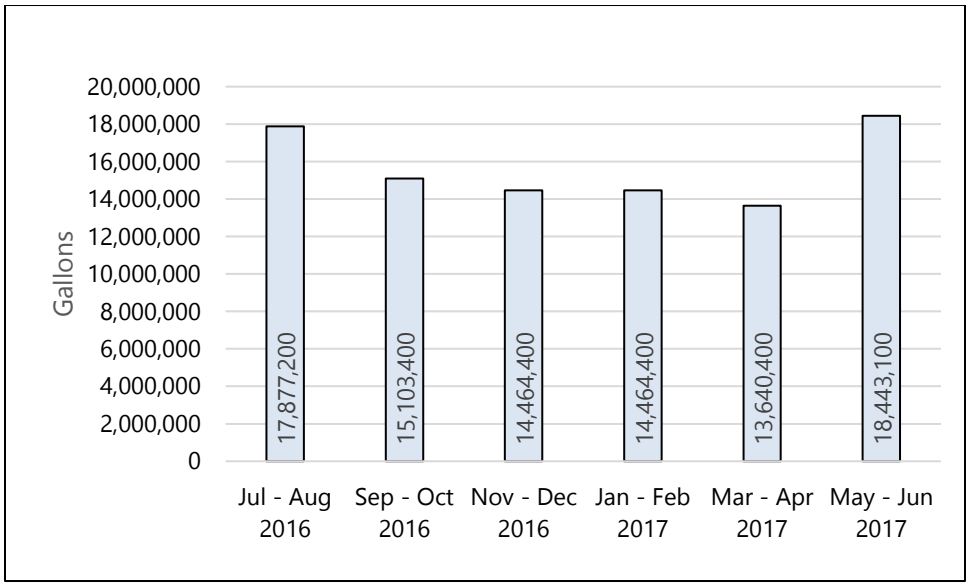
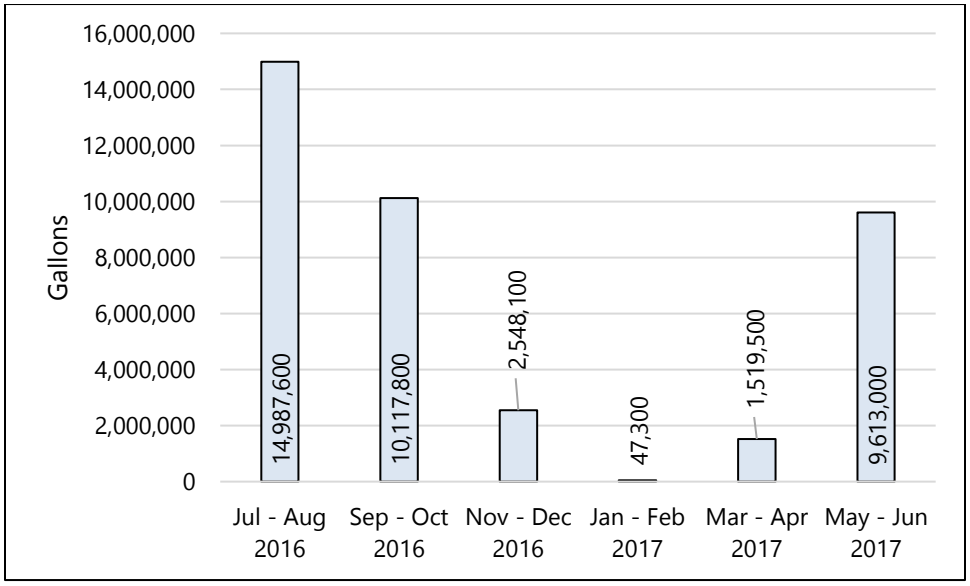


Figure 3-3: Irrigation Water Billed (Gallons)



3.1 Residential Customer Base and Usage

Table 3-1 provides an overview of residential water usage in the County's water systems. Approximately 38% of the residential water bills are for usage of 6,000 gallons or less during any billing period. This is important for several reasons:

- The minimum bill includes 6,000 gallons of water (or sewer) usage. Based on the usage patterns in 2017, over one-third of the residential customers are using 6,000 gallons, or less, during each billing period.
- It is important to recognize that adjusting the rate structure (i.e., including only 3,000 gallons of water, or less, in the ***new*** minimum charge) will have a significant impact on the customer group that uses up to 6,000 gallons. This can be most easily understood when one considers that a customer using 6,000 gallons of water currently pays a flat charge of $48.58 per bi-monthly billing period for water and $67.49 for sewer. Any customer using more than 6,000 gallons pays for each additional 1,000 gallons at the rate of $7.29 for water and $10.11 for sewer – up to total usage of 12,000 gallons per billing cycle. Most of the residential customers use 12,000 or less per billing cycle.

  However, if the minimum is lowered to 3,000 gallons (for example), the customer using 6,000 gallons or more, will pay at least $5.00 to $7.00 per 1,000 gallons for usage that exceeds the ***new*** minimum usage.

  The net result is that in order to temper the impacts to the average user, the smallest users will receive a *lower rate*.

  In addition, when the minimum is lowered, the County is applying a charge per 1,000 gallons to every gallon that *was previously included in the minimum*. For example, the billing records examined for this study revealed approximately 47 million gallons of water were included in the usage of customers who used 3,000 gallons or less and an additional 39 million gallons are included in the usage between 3,001 and 6,000 gallons per month. Applying a charge to this volume of water will almost certainly mean that the charges per 1,000 gallons will be lower than today's rates.

  In making changes in the rate structure of this nature, ***it is not possible to set rates and fees that result in all customers receiving an increase of the same or a similar percentage or dollar amount.***

3.2 Options 1 and 2

Options 1 and 2 were developed with the goal of immediately reducing the bi-monthly minimum usage. Currently the bi-monthly minimum is 6,000 gallons.

- Option 1 reduces the minimum to 3,000 gallons per bi-monthly billing period.
- Option 2 reduces the minimum to zero gallons.

Options 1 and 2, as shown on the following pages, are designed to recover revenue that:

- Covers projected expenses over the next 5 years,
- Encourages conservation for all customers and rewards the customers who use less water,
- Sets rates that better reflect actual water or sewer usage,

- Establishes a separate schedule of rates and fees for irrigation meters with the intent to discourage excessive use of water for irrigation,
- Establishes a structure that makes it easier to apply future rate increases to the water or sewer rates that are more reflective of the costs associated with the service. Since the water revenues currently support the sewer operations, it is recommended that the County consider gradually increasing the sewer rates at a pace that is greater than future increases in the water rates, if feasible.

While Options 1 and 2 generally meet the goals listed above, both cause significant "lack of continuity" in today's rate structures and customer bills. While some customers, in particular those who use very little water, receive a smaller bill, others receive bills that are significantly higher than the current bills.

Both Options 1 and 2 are discussed in the following sections of this report, ***but neither is recommended.***

3.3 Option 3 – Recommended Option

Option 3 recommends a process of reducing the minimum usage from the current 6,000 gallons per bi-monthly billing period to 5,000 gallons, to 4,000 gallons and ultimately, over a period of 5 years, to 3,000 gallons per bi-monthly billing period. The slow reduction in the minimum charges helps to moderate the dramatic impacts illustrated in Options 1 and 2.

Option 3 includes an "irrigation" rate that is similar to the irrigation rate proposed in Options 1 and 2.

3.4 Eastern Virginia Groundwater Management Area

New Kent County is located in Virginia's Eastern Virginia Groundwater Management Area. Under the Ground Water Management Act of 1992, Virginia manages groundwater through a program that regulates the withdrawal of groundwater in certain areas of the state. The Department of Environmental Quality (DEQ) is the state agency that oversees and administers the groundwater management area. Due to the concern of dwindling groundwater supply in the eastern part of Virginia, DEQ, through the issuance of groundwater withdrawal permits is applying pressure for utilities that rely on groundwater to encourage water conservation and reduction in water use through whatever means possible. In New Kent, one area where water usage can be reduced is irrigation of yards and common areas in residential neighborhoods and business areas.

As noted in Figure 3-3, during at least six months of the year, there is a significant amount of water that is identifiable as "irrigation water" because it is measured via irrigation meters. In addition, it is likely that other homes and businesses use water during the warmer months for outside water usage.

This study recommends that a separate set of rates and fees be established for irrigation and that the user is charged for usage of all water that is registered on the irrigation meter (there is no usage included in the minimum).

3.5 Residential and Non-Residential Water Usage

The following table illustrates the usage patterns of the residential customer base. Approximately 38% of the customer base uses 6,000 gallons or less of water per billing cycle.

Table 3-1: Analysis of Residential Usage

B-Monthly Water Consumption (Gallons)		# of Residential Bills in this Category	% of all Water Bills	Gallons Billed in this Category	% of all Water Billed
-	1,000	542	3%	172,600	0%
1,100	2,000	449	3%	726,300	1%
2,100	3,000	735	5%	1,898,400	1%
3,100	4,000	1,012	6%	3,636,900	3%
4,100	5,000	1,457	9%	6,659,400	5%
5,100	6,000	1,884	12%	10,475,400	8%
6,100	7,000	1,849	12%	12,093,500	9%
7,100	8,000	1,647	10%	12,420,500	9%
8,100	9,000	1,337	8%	11,414,000	9%
9,100	10,000	1,119	7%	10,664,500	8%
10,100	11,000	878	5%	9,248,800	7%
11,100	12,000	693	4%	8,001,200	6%
12,100	13,000	505	3%	6,334,900	5%
13,100	14,000	390	2%	5,268,400	4%
14,100	15,000	287	2%	4,174,600	3%
15,100	16,000	227	1%	3,532,500	3%
16,100	17,000	185	1%	3,061,100	2%
17,100	18,000	134	1%	2,349,900	2%
18,100	19,000	121	1%	2,238,100	2%
19,100	20,000	83	1%	1,616,400	1%
20,100	21,000	75	0%	1,542,300	1%
21,100	22,000	67	0%	1,443,700	1%
22,100	23,000	50	0%	1,129,600	1%
23,100	24,000	44	0%	1,030,500	1%
24,100	25,000	33	0%	809,700	1%
In excess of 25,000 gallons		273	2%	10,284,300	8%
Total		**16,076**	**100%**	**132,227,500**	**100%**

The following table illustrates the usage patterns of the non-residential customer base. Less than 20% of the customer base uses 12,000 gallons or less per billing cycle and more than 50% of the customer base uses 40,000 gallons or more per billing cycle.

Table 3-2: Analysis of Non-Residential Usage

Bi-Monthly Water Consumption (Gallons)		# of Non-Residential Bills in this Category	%	Gallons Billed in this Category	% of Water Billed
-	1,000	25	8.9%	2,500	0.0%
1,100	2,000	4	1.4%	5,200	0.0%
2,100	3,000	3	1.1%	6,900	0.0%
3,100	4,000	3	1.1%	10,900	0.0%
4,100	5,000	-	0.0%	-	0.0%
5,100	6,000	4	1.4%	22,700	0.1%
6,100	7,000	3	1.1%	20,000	0.1%
7,100	8,000	2	0.7%	15,200	0.1%
8,100	9,000	-	0.0%	-	0.0%
9,100	10,000	3	1.1%	28,800	0.1%
10,100	11,000	6	2.1%	64,600	0.2%
11,100	12,000	1	0.4%	11,900	0.0%
12,100	13,000	5	1.8%	62,800	0.2%
13,100	14,000	5	1.8%	68,700	0.3%
14,100	15,000	6	2.1%	86,600	0.3%
15,100	16,000	5	1.8%	77,900	0.3%
16,100	17,000	1	0.4%	17,000	0.1%
17,100	18,000	4	1.4%	68,800	0.3%
18,100	19,000	1	0.4%	18,900	0.1%
19,100	20,000	3	1.1%	58,400	0.2%
20,100	21,000	4	1.4%	81,500	0.3%
21,100	22,000	2	0.7%	42,500	0.2%
22,100	23,000	3	1.1%	68,400	0.2%
23,100	24,000	4	1.4%	94,200	0.3%
24,100	25,000	6	2.1%	146,700	0.5%
25,100	40,000	29	10.3%	930,500	3.4%
40,100	50,000	11	3.9%	495,700	1.8%
50,100	90,000	60	21.3%	4,215,900	15.4%
In excess of 90,000 gallons		79	28.0%	20,693,800	75.5%
Total		**282**	**100.0%**	**27,417,000**	**100.0%**

-- End of Section --

4.0 OPTIONS 1 AND 2

As shown in Table-2-1 of this report, the projected revenues of the systems are adequate to cover expected expenses in FY2020 – 2023, assuming that growth continues as expected and assuming that the increases in operating costs continue at the rates shown in the tables in Appendix A.

The rate options explored in this report attempt to achieve the following:

- Encourage all customers to conserve water,
- Develop rates and fees that are more reflective of how customers actually use water (for example, over one-third of the residential customers do not use the 6,000 gallons of water and sewer that are included in the minimum charges),
- Establish a set of rates and fees for customers who use irrigation meters, the rates for irrigation will not include any "minimum" usage in the base fee,
- The existing practice of charging a flat fee to each customer based on the size of the customer's meter will be continued and the customers with larger meters will pay proportionately larger base fees,
- The projections of future water and sewer revenues assume that the customer base increases during 2019 by 103 water customers and the sewer customer base increases by 103 customers.

In making projections of future revenues based on water sales, it is important to recognize the changes in customer habits (conservation) and changes in the weather (amount of rain, for example) more or less rain) will impact water sales in ways that are not predictable.

4.1 Option 1 – Minimum Charge includes 3,000 Gallons

Option 1 evaluates reducing the gallons included in the minimum to 3,000 gallons.

Advantages of this approach include:

- Customers who use less than 6,000 gallons per billing cycle are not continuing to pay for water and sewer usage that is in excess of actual usage.
- Customers using in excess of 3,000 gallons in a billing cycle will pay for each additional 1,000 gallons. If the usage exceeds 6,000 gallons, the rate increases.
- Currently, approximately 38 million gallons of water is included in the minimum in the 3,001 – 6,000 gallons of usage. Under Option 1, that usage will have a rate applied to it (a rate per 1,000 gallons); similarly the approximately 20 million gallons of sewer will now be billed at a rate per 1,000 gallons. The net result is that the charges per 1,000 gallons are reduced.

Disadvantages of this approach include:

- Customers who use 4,000 gallons or less per month, will receive a bill that is less than the current bill.
- The increases to the customers who use 6,000 to 12,000 gallons per month are approximately $20 per billing cycle, or $10 per month.

The following tables outline the rates and fees proposed under Option 1.

It is important to understand that when the rate structure is modified, the impacts to various customers will not be consistent across the board – not all customers will have the same percentage increase in the bill, in fact, some will receive a smaller bill.

Table 4-1: Rates and Fees - Option 1

Table 4-2: Comparison of Current Rates to Option 1 Rates

Table 4-3: Projected Revenues and Expenses – Option 1

4.2 Option 2 – Minimum Charge includes 0 Gallons

Option 2 evaluates reducing the gallons included in the minimum to 0 gallons.

Advantages of this approach include:

- Customers who use less than 6,000 gallons per billing cycle are not continuing to pay for water and sewer usage that is in excess of actual usage.
- All customers pay for the gallons they use. Rates increase as usage increases.
- Currently, approximately 86 million gallons of water is included in the minimum (6,000 gallons or less). Under Option 2, that usage will have a rate applied to it (a rate per 1,000 gallons); similarly the approximately 44 million gallons of sewer will now be billed at a rate per 1,000 gallons. The net result is that the charges per 1,000 gallons are reduced.

Disadvantages of this approach include:

- Customers who use 4,000 gallons or less per month, will receive a bill that is less than the current bill.
- The increases to the customers who use 6,000 to 12,000 gallons per month are approximately $20 - $26 per billing cycle, or $10 - $13 per month.

The following tables outline the rates and fees proposed under Option 2.

Table 4-4: Rates and Fees - Option 2

Table 4-5: Comparison of Current Rates to Option 2 Rates

Table 4-6: Projected Revenues and Expenses – Option 2

4.3 Rates and Fees for Irrigation

In both Options 1 and 2, there is a separate set of rates and fees for irrigation water. In both cases, the minimum charge is $10 per billing cycle and the user pays for every thousand gallons of water that is used for irrigation.

In both cases, the charges for water usage is set at 125% of the charges for domestic water usage under that Option.

The irrigation rates are an attempt to recover the utility's costs related to reading the irrigation meter, to impose a surcharge on water used for irrigation, and to encourage conservation.

The following table provides an example of the impact to a customer bill if the irrigation charges are adopted. The proposed domestic plus irrigation charges for Option 1 and 2 produce higher bills than the current rates and fees.

Table 4-7: Irrigation Charges

Water Consumption			Current Charges and Fees			Option 1			Option 2		
Domestic Usage	Irrigation	Total	Current Minimum Charge[3]	Charge for usage over 6,000 gallons	Total Bill	Domestic Charges	Irrigation Charges	Total Bill	Domestic Charges	Irrigation Charges	Total Bill
9,000	5,000	14,000	$48.58	$59.64	$108.22	$77.17	$50.30	$127.47	$77.55	$35.44	$112.99
9,000	9,000	18,000	$48.58	$91.44	$140.02	$77.17	$83.77	$160.94	$77.55	$66.96	$144.51
10,000	10,000	20,000	$48.58	$108.10	$156.68	$83.94	$92.24	$176.18	$83.85	$74.84	$158.69
10,000	12,000	22,000	$48.58	$124.76	$173.34	$83.94	$109.18	$193.12	$83.85	$90.60	$174.45
15,000	15,000	30,000	$48.58	$191.40	$239.98	$119.63	$136.87	$256.50	$119.13	$137.85	$256.98
15,000	20,000	35,000	$48.58	$233.05	$281.63	$119.63	$183.02	$302.65	$119.13	$169.98	$289.11

-- End of Section --

[3] 6,000 gallons is the minimum usage.

5.0 OPTION 3 – RECOMMENDED APPROACH

Option 3 evaluates reducing the gallons included in the minimum over a period of five (5) years. As shown on the following pages – the minimum usage is reduced to 5,000 gallons for FY2020 and FY2021. The following two years, the minimum usage is reduced to 4,000 gallons. In 2024, the minimum usage is reduced to 3,000 gallons.[4] During this 6-year period, adjustments are made to the minimum charges and the usage charges in order to provide moderate rate increases to most customers and to generate the revenue needed to operate the systems. This approach also includes an irrigation rate for customers with irrigation meters.

The adjustments outlined above would be dependent upon annual Board of Supervisors approval of changes to both the rates and the minimum usage.

This Option is more appealing than Options 1 and 2 because the reduction in the minimum usage is phased in and reduces the severe impacts to certain customer groups shown in Options 1 and 2.

Table 5-1, on the following page outlines the projected water and sewer rates and fees over the 5-year planning period.

[4] The DPU CIP have been developed through 2023 only – even though the projected revenues are shown through 2025, the expense projections do not include the future CIP in 2024 and 2025.

Table 5-1: Option 3 – Rates and Fees – 2020 - 2025

5.1 Analysis of Option 3

Option 3 is the recommended approach to changing the rate structure because the extended period of adjusting rates provides more continuity from year to year and results in less severe changes to the customer bill in any given year.

In Option 3, the customers who use 5,000 gallons of water, or less, initially pay a bill in 2020 that is $13.07 less than today's minimum charge. Customers who use more water will pay $2.50 - $4.50 more per billing period.

The estimated revenue from water usage through irrigation meters is $390,600 (in 2017 the revenue from irrigation meters was approximately $204,600.)

Overall, the projected revenues under this rate scenario is approximately $200,000 more than the existing (FY2018) revenue.

The rates set forth under Option 3 gradually increase over the 5-year period, with noticeable increases in FY2022 and 2024 – and the increase is due to the *reduction* in the gallons included in the minimum.

If a rate schedule similar to the rates proposed for FY2020 is adopted, the County will need to evaluate the revenues and rates on an annual basis to evaluate the rate increases needed. The actual growth rate, the customer usage patterns, and the actual expenses at that time will all determine how the rates should be adjusted.

Table 5-2, on the following page provides a summary of the projected revenues and expenses through 2023 assuming the rates and fees shown in Table 5-1 are adopted.

Table 5-2: Projected Revenues and Expenses – Option 3

5.2 Rates and Fees for Irrigation

Option 3 includes a separate set of rates and fees for irrigation water - the minimum charge is $5 per billing cycle and the user pays for every thousand gallons of water that is used for irrigation. The charge for water usage is set at 125% of the charges for domestic water usage.

The irrigation rates are an attempt to recover the utility's costs related to reading the irrigation meter, to impose a surcharge on water used for irrigation, and to encourage conservation.

The following table provides an example of the impact to a customer bill if the irrigation charges are adopted. The proposed domestic plus irrigation charges for Option 3 result in higher bills than the current rates and fees.

Table 5-3: Irrigation Charges (Option 3)

Water Consumption			Current Fees and Charges			Option 3 (Proposed 2020 rates)					
Domestic Usage (Gallons)	Irrigation Usage (Gallons)	Total	Current minimum charge(6,000 gallons)	Charge for Usage over 6,000 Gallons	Total Water Bill	Minimum Charge - Domestic	Charge for Usage over 5,000 Gallons	Minimum Irrigation Charge	Irrigation Usage	Total Water Bill	Increase
9,000	5,000	14,000	$48.58	$59.64	$108.22	$41.00	$27.72	$5.00	$43.31	$117.03	$ 8.81
9,000	9,000	18,000	$48.58	$91.44	$140.02	$41.00	$27.72	$5.00	$77.94	$151.66	$ 11.64
10,000	10,000	20,000	$48.58	$108.10	$156.68	$41.00	$34.65	$5.00	$86.60	$167.25	$ 10.57
10,000	12,000	22,000	$48.58	$124.76	$173.34	$41.00	$34.65	$5.00	$105.48	$186.13	$ 12.79
15,000	15,000	30,000	$48.58	$191.40	$239.98	$41.00	$74.20	$5.00	$133.79	$253.99	$ 14.01
15,000	20,000	35,000	$48.58	$233.05	$281.63	$41.00	$74.20	$5.00	$183.23	$303.43	$ 21.80

-- End of Section --

6.0 COMPARISON OF PROPOSED RATES TO OTHER UTILITIES

The table below compares the proposed water and water charges and fees to rates in other utilities in rural but developing counties in eastern Virginia and to counties in close proximity to New Kent. As shown below, New Kent's rates are currently higher than any of the other counties in the chart, and the proposed rates are also higher that the rates in the other localities (keep in mind the proposed rates are for 2020 – it is likely that some of the other localities will increase rates in the meantime.)

Table 6-1: Comparison of Rates – Other Utilities

	Bi-Monthly Charge for 10,000 Gallons Residential		
Locality	**Water**	**Wastewater**	**Combined**
Goochland County	$69.96	$97.09	$ 167.05
Louisa County Water Authority	$55.00	$82.90	$ 137.90
Henrico County	$56.58	$73.46	$ 130.04
Powhatan County	$85.73	$92.76	$ 178.49
Hanover County	$45.90	$87.20	$ 133.10
New Kent County	$77.74	$107.73	$185.47
Option 1	$83.94	$121.92	$205.86
Option 2	$83.85	$118.51	$202.36
Option 3 - 2020	75.65	112.55	$188.20
Average in Virginia	**$66.94**	**$90.12**	**$157.06**

-- End of Section --

7.0 FINDINGS AND RECOMMENDATIONS

New Kent County's current schedule of rates and fees does not suit the County's needs because the minimum charge, which includes 6,000 gallons of usage is in excess of what many customers use and does not reflect the usage of the customer base.

Further, the current rate structure does not promote conservation – the proposed rates add a schedule of rates and fees for irrigation – and the fees for irrigation water are 25% higher than domestic use.

However, the most critical issue that arises in a community where the *rate structure* is changed is that the impacts to the various customer classes are not all the same.

- It is important to recognize that adjusting the rate structure (ie, including only 3,000 gallons of water, or less, in the minimum charge, will have a significant impact on the customer group that uses up to 6,000 gallons. This can be most easily understood when one considers that a customer using 6,000 gallons of water currently pays a flat charge of $48.58 per bi-monthly billing period for water and $67.49 for sewer. Any customer using more than 6,000 gallons pays for each additional 1,000 gallons at the rate of $7.29 for water and $10.11 for sewer – up to total usage of 12,000 gallons per billing cycle. Most of the residential customers use 12,000 or less per billing cycle.

  However, if the minimum is lowered to 3,000 gallons (for example), the customer using 6,000 gallons or more, will pay at least $5.00 to $7.00 per 1,000 gallons for usage that exceeds the minimum. So, the customer using 4,000 to 6,000 gallons will have $15 to $21 dollars added to the minimum charge.

  The net result is that in order to temper the impacts to the average user, the smallest users will receive a *lower rate*.

  In addition, when the minimum is lowered, the County is applying a charge per 1,000 gallons to every gallon that was previously *included in the minimum*. For example, the billing records that were examined for this study revealed approximately 47 million gallons of water were included in the usage of customers who used 3,000 gallons or less and an additional 39 million gallons are included in the usage between 3,001 and 6,000 gallons per month. Applying a charge to this volume of water will almost certainly mean that the charges per 1,000 gallons will be lower than today's rates.

  In making changes in the rate structure of this nature***, it is not possible to set rates and fees that result in all customers receiving an increase of the same or a similar percentage.***

  Options 1, 2 and 3, as discussed on the previous pages are designed to recover revenue that:

  1) Covers projected expenses over the next 5 years,
  2) Encourages conservation for all customers and rewards the customers who use less water,

3) Sets rates that better reflect actual water or sewer usage.

4) Establishes a separate schedule of rates and fees for irrigation meters with the intent to discourage excessive use of water for irrigation.

Options 1 and 2 are not recommended, because the immediate impact to some of the groups of customers is more significant than users or decision-makers will likely find acceptable.

Option 3 is the recommended approach because the decreases to the minimum charges are phased in over 5 years and the impacts to various customer classes are not as severe.

Regardless of which Option the County pursues, there is a chance that water consumption will decrease, at least temporarily, and the resulting water and sewer revenues will decrease. The County will need to carefully monitor the income that results from the changed rates and be alert to changing patterns of consumption. If consumption decreases and users are able to permanently reduce water usage, additional future rate increases may be needed.

In addition, each year, as the County's utility budget is prepared, the County can consider applying different rate increases to the water rates and to sewer rates and can evaluate the impacts of increasing the minimum charges or the volume charges, or both. Over time, higher increases in the sewer rates could lead the sewer fund toward less financial reliance on the revenues of the water fund.

-- End of Section --

8.0 BOTTOMS BRIDGE SERVICE DISTRICT

The Bottoms Bridge Service District was created in 2004 as a financing vehicle to provide resources for the construction of water and sewer facilities in the Bottoms Bridge area. An *ad valorem* tax in the amount of $0.15 per $100 of assessed value of real estate in the Service District was implemented to pay the debt service on the bonds used to finance the improvements. The rate was established in 2004 and has not changed since that time.

Certain revenues generated in the Bottoms Bridge Service area – specifically, connection fees, the *ad valorem* tax revenues and any interest income are legally dedicated to pay the debt service on the bonds related to the original construction. Since 2004, the County has seen significant growth in the Bottoms Bridge Service District and the County has been able to rely on the connection fees to service the debt. The housing developments in the Service District are nearing buildout and the connection fees will diminish significantly after 2019. Once the connection fees are no longer a revenue source, the County will be faced with considering an increase in the *ad valorem* tax to continue to meet the debt service payments – or need to determine another source of funds to pay the debt service, The debt service payments vary slightly from year to year, but are approximately $705,000 - $711,000 per year and extend through 2034.

The table on the following page below provides an analysis of the debt service requirements of the Bottoms Bridge infrastructure debt over the next few years, the approximate value of the real estate in Bottom Bridge and the projected increase in the *ad valorem*. Based on buildout of the remaining residential lots during fiscal 2019, and an annual increase in the valuation of the real estate of 1% in the subsequent years, the ad valorem would need to increase from $0.15 per $100 of assessed value to approximately $0.38 per $100 dollars of assessed value.

Table 8-1: Projected Ad Valorem Taxes – Bottoms Bridge

BOTTOMS BRIDGE SERVICE DISTRICT	Budget 2018	Projected 2019	Projected 2020	Projected 2021	Projected 2022	Projected 2023
Assessed Value of Bottoms Bridge Real Estate	$189,826,500	$195,521,295	$197,476,508	$199,451,273	$201,445,786	$203,460,244
Increase In RE Values Each Year		3%	1%	1%	1%	1%
Increase In Assessed Value	$ -	$ 5,694,795	$1,955,213	$ 1,974,765	$ 1,994,513	$ 2,014,458
Ad Valorem Tax Rate (Per $100 Of Value)	$0.15	$0.15	$ 0.15	$0.15	$0.15	$0.15
Total Ad Valorem Tax Assessed	$284,740	$293,282	$ 296,215	$299,177	$302,169	$305,190
Collection Rate	95%	95%	95%	95%	95%	95%
Total Revenue From Ad Valorem	$270,503	$278,618	$ 281,404	$284,218	$287,060	$289,931
Delinquent Real Estate Taxes	$8,373	$14,664	$ 14,811	$14,959	$15,108	$15,260
Subtotal	**$279,095**	**$293,282**	**$ 296,215**	**$299,177**	**$302,169**	**$305,190**
Bottoms Bridge Service District Penalty	$ 500	$ 500	$500	$ 500	$ 500	$ 500
Bottoms Bridge Service District Interest	$ 500	$ 500	$500	$ 500	$ 500	$ 500
Subtotal	**$1,000**	**$1,000**	**$ 1,000**	**$1,000**	**$1,000**	**$1,000**
B. Bridge Water Connection Fee	$178,150	$178,150	$-	$ -	$ -	$ -
$4,650 Per Connection / Number Of Connections	39	39	-	-	-	-
B. Bridge Sewer Connection Fee	$361,725	$361,725	$-	$ -	$ -	$ -
$9,275 Per Connection / Number Of Connections	39	39	-	-	-	-
Subtotal	**$539,875**	**$539,875**	$-	$ -	$ -	$ -
Transfer From Fund 98	$85,287	$ -	$-			$ -
TOTAL REVENUES	**$ 905,257**	**$ 834,157**	**$ 297,215**	**$ 300,177**	**$ 303,169**	**$ 306,190**

Expenses						
Annual Administration Fee	$7,100					
Principal-W&S Series 2012B Refinance	$455,000	$703,985	$ 706,333	$707,627	$711,224	$703,572
Principal-W&S Series 2012C Refinance	$30,000					
Interest-W&S Series 2012B Refinance	$370,497					
Interest-W&S Series 2012C Refinance	$175,982					
Total Debt Service	**$ 1,038,579**	**$703,985**	**$ 706,333**	**$707,627**	**$711,224**	**$703,572**
Annual Surplus / Deficit	**$ (133,322)**	**$ 130,172**	**$ (409,118)**	**$ (407,450)**	**$ (408,055)**	**$ (397,382)**
Approximate Ad Valorem Tax Rate Needed						
	Current Rate		**Projected Rate**			
Rate ($/100 Value)	0.15	.015	0.380	0.380	0.380	0.380
Value of Real Estate			$197,476,508	$199,451,273	$201,445,786	$203,460,244
Tax Generated			$750,410.73	$ 757,914.84	$ 765,493.99	$ 773,148.93
% Collected (95%)			$712,890.19	$ 720,019.10	$ 727,219.29	$ 734,491.48
Expenses / Debt Service			$(706,333)	$(707,627)	$(711,224)	$(703,572)
Annual/Surplus / Deficit			$ 6,557	$12,392	$15,995	$30,919

Appendix A:

Detailed Projections of Water and Sewer Revenues and Expenses

(With No Rate Increase)