



## City of Annapolis

# Utility Rate Study Update - Final Report

June 13, 2018





June 13, 2018

Ms. Melissa Leaman  
Acting Finance Director  
City of Annapolis  
160 Duke of Gloucester St.  
Annapolis, MD 21401

Re: Utility Rate Study Update -  
Final Report

Dear Ms. Leaman,

Stantec is pleased to present this Final Report of the Utility Rate Study Update (Study) that we performed for the City of Annapolis ("City"). We appreciate the fine assistance provided by you and all of the members of the City staff who participated in the Study.

If you or others at the City have any questions, please do not hesitate to contact me. We appreciate the opportunity to be of service to the City of Annapolis, and look forward to the possibility of doing so again in the near future.

Sincerely,

A handwritten signature in black ink, appearing to read "David A. Hyder".

David A. Hyder  
Principal

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Enclosure

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# 1. EXECUTIVE SUMMARY

## 1.1 INTRODUCTION

This Executive Summary presents an overview of the results of the comprehensive Water and Sewer Rate Study Update (Study) that was conducted for the water and sewer systems of the City of Annapolis (hereafter referred to as the “City” or “Utility”) by Stantec Consulting Services.

## 1.2 STUDY OBJECTIVE

The principal objective of the Study was to perform a revenue sufficiency analysis to determine the ability of the City’s current and future revenues to meet the system funding requirements, and to develop a financial management plan to ensure the ongoing financial health of the City’s utilities. To facilitate the study, we updated and populated the City’s financial forecasting model that simulates the financial operations of the water and sewer systems. The model was used to determine the level of annual revenue required to satisfy projected annual operating and maintenance expenses, debt service payments, debt service coverage and capital cost requirements, as well as maintain adequate reserves.

## 1.3 REVENUE SUFFICIENCY ANALYSIS

Our analysis evaluated the sufficiency of the City’s current water and sewer revenues to meet all of its current and projected financial requirements over a ten-year projection period, and determined the level of any rate revenue increases necessary in each year of the projection period to provide sufficient revenues to fund all of the City’s cost requirements.

Based on the revenue sufficiency analysis we have determined that the City’s current water and sewer rates will not be sufficient to meet the funding requirements of the water and sewer system over the next several years. Based on the system revenue requirements, including ongoing capital reinvestment in the systems, the current revenues will be insufficient and without adjustment the City will exhaust all funds within the Water and Sewer Fund, and not be able to meet debt service coverage in coming years.

To address the needs of the system, we have developed a financial management plan that will gradually increase water and sewer revenues. The recommended financial management plan and corresponding plan of water and sewer rate revenue adjustments are based upon the revenue and expense information, beginning cash balances, and assumptions as described in Section 4 of this report. Our analysis examined the historical trends in system expenditures and revenues, including a detailed analysis of the usage by customer class to examine the impacts of changing usage patterns on system revenues.

The recommended rate revenue adjustment for Fiscal Year 2019 is presented in Table 1-1 along with a forecast of future rate adjustments.

**Table 1-1 Recommended Plan of Water and Sewer Rate Revenue Increases**

	FY 19	FY 20	FY 21	FY 22	FY 23
<i>Effective Date</i>	7/1/2019	7/1/2020	7/1/2021	7/1/2022	7/1/2023
<b>Water Rate Increase</b>	<b>2.50%</b>	2.50%	2.50%	2.50%	2.50%
<b>Sewer Rate Increase</b>	<b>2.50%</b>	2.50%	2.50%	2.50%	2.50%

The rate revenue adjustments identified in Table 1-1 for Fiscal Years 2020 to 2023 are estimates at this time based on projected needs of the system. The City has adopted a policy of completing annual water and sewer rate reviews. These reviews will allow the City to refine and adjust the level of rate adjustment given the actual funding requirements of the system each year. The proposed water and sewer rates for Fiscal Year 2019 are presented in Tables 1-2 and 1-3. It should be noted that as part of the rate study update, the recurring and one-time costs incurred by the City associated with metering sewer flows from the US Naval Academy were analyzed and the sewer rate proposed for FY19 for the Academy reflects the 2.5% increase over FY18 rates and an additional increase of \$0.14 to account for the metering costs. The detailed calculations of the metering costs are presented in Section 4.2.7 of this report.

**Table 1-2 Proposed Fiscal Year 2019 Water and Sewer Fixed Charges**

Meter Size	Water Fixed Charge	Sewer Fixed Charge
1" or Less	\$11.46	\$13.05
1 ½"	\$57.28	\$65.25
2"	\$91.62	\$104.42
3"	\$183.27	\$208.80
4"	\$286.35	\$326.27
6"	\$572.69	\$652.53

**Table 1-3 Proposed Fiscal Year 2019 Water and Sewer Usage Charges**

Type	Usage Charge (per 1,000 gallons)
Residential Water	
Tier 1: 0 - 7,000 gallons	\$3.61
Tier 2: 7,001 - 20,000 gallons	\$7.24
Tier 3: Over 20,000 gallons	\$10.85
Non-Residential Water	\$5.39
Sewer Usage Rates	\$5.74
Naval Academy Usage Rates	\$5.09

## 1.4 FINANCIAL METRICS

The City has established financial policies that designate the maintenance of specific cash reserves. Specific reserve funds include operating, repair and replacement, and debt service reserves. The reserves ensure that the City maintains healthy fund balances to address unexpected drops in revenues due to weather or emergency capital improvement needs, and ensures adequate liquidity within the Utility. The City's bond covenants define the specific reserves that must be maintained and are designated as restricted. Specifically, the City has to maintain restricted reserves for repair and replacement of the water plant, a debt service reserve, and an operating reserve set at 2 months of operating expenses. In addition to the restricted reserves, we recommend that the City maintain an additional 4 months of operating expenses in an unrestricted reserve, which would bring the operating reserves to a minimum of 180 days (6 months) of operating expenses.

Fund balances resulting from the recommended financial plan are illustrated in Table 1-4.

**Table 1-4 Fund Reserve Balances (\$ millions)**

	FY 19	FY 20	FY 21	FY 22	FY 23
<b>Restricted Reserves</b>					
Operating	\$2.64	\$2.74	\$2.86	\$2.97	\$3.09
Repair and Replacement	\$0.72	\$0.72	\$0.72	\$0.72	\$0.72
Debt Service Reserve	\$3.33	\$3.50	\$3.66	\$3.81	\$3.95
<b>Total Restricted</b>	<b>\$6.69</b>	<b>\$6.96</b>	<b>\$7.24</b>	<b>\$7.50</b>	<b>\$7.76</b>
<b>Total Unrestricted</b>	<b>\$8.97</b>	<b>\$9.73</b>	<b>\$10.06</b>	<b>\$10.05</b>	<b>\$9.69</b>
Unrestricted Days Cash on Hand	308	325	325	314	293
<b>Total Reserves</b>	<b>\$15.66</b>	<b>\$16.69</b>	<b>\$17.30</b>	<b>\$17.56</b>	<b>\$17.45</b>

In addition to maintaining reserve funds, the annual revenues of the water and sewer system must be sufficient to meet the City's debt service coverage requirements. The City's bond resolution states revenue available for debt service must stay above 125% of total debt service for the combined water and sewer utility. The City has adopted a financial policy which is more conservative than the bond resolution, setting the minimum debt service coverage ratio at 150%. The debt service coverage over the projection period based on the financial plan is presented in Table 1-5.

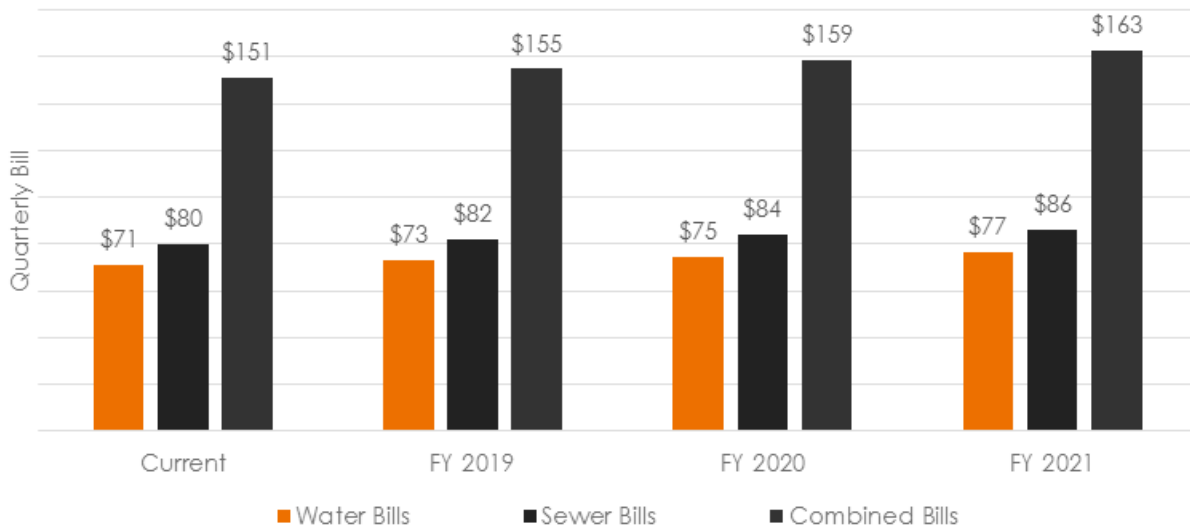
**Table 1-5 Senior Lien Debt Service Coverage (\$ millions)**

	FY 19	FY 20	FY 21	FY 22	FY 23
Total Revenues Available for Coverage	\$17.0	\$17.3	\$17.6	\$17.9	\$18.3
Less Operating Expenses	(\$10.6)	(\$10.9)	(\$11.3)	(\$11.7)	(\$12.1)
Net Income Available for Debt Service	\$6.3	\$6.4	\$6.3	\$6.3	\$6.2
Annual Senior Lien Debt Service <sup>(1)</sup>	\$1.4	\$1.6	\$1.8	\$2.3	\$2.5
<b>Debt Service Coverage Ratio</b>	<b>4.42</b>	<b>3.96</b>	<b>3.46</b>	<b>2.72</b>	<b>2.52</b>

<sup>(1)</sup> Includes only senior debt which is subject to 1.5 debt service coverage policy

While reserve fund balances and coverage ratios serve as key metrics for the Utility, customer bill impacts are also a key factor in policy decisions, and must be considered within the recommended financial plans for the City. The typical quarterly water and sewer bills for the City’s retail residential customers based on the proposed financial plan are represented in Figure 1-1.

**Figure 1-1 Quarterly Water and Sewer Bill for Typical Residential Customer (12,000 gallons per quarter)**



As demonstrated in the figure above, the quarterly increases in the typical customers bill is fairly minimal, amounting to an increase of \$3.78 a quarter or \$1.26 a month in FY 2019.

## 2. INTRODUCTION

Stantec Consulting Services has conducted a comprehensive Rate Study Update (Study) for the water and sewer systems of the City of Annapolis (hereafter referred to as the “City” or “Utility”). This report presents the background, approach, methodologies, source data, assumptions, as well as the results and recommendations of the Study.

### 2.1 BACKGROUND

The City of Annapolis provides water and sewer service to residents and business located within the City, and a few areas outside the City. Service is currently provided to approximately 11,700 customers located inside the City and just over 1,400 outside the City. The water and sewer systems are managed by the City’s Department of Public Works.

The City owns and operates a water system consisting of the recently constructed Water Treatment Plant with a maximum capacity of 8.0 MGD, approximately 140 miles of water lines ranging in size from 2 inches to 20 inches and 5 distribution system storage tanks.

The City’s sewer system consists of approximately 125 miles of gravity fed collection mains, 25 pumping stations and the Annapolis Water Reclamation Facility (“AWRF”). The AWRF is jointly owned by the City and Anne Arundel County. The City is allocated 6.7 MGD of permitted average daily capacity within the plant. The City currently maintains a wholesale agreement to provide sewer collection service to the U.S. Naval Academy.

The City Council has adopted a policy that requires the City to engage an outside consultant to annually review the financial performance of the water and sewer systems including the development of long-term financial plans. This policy augments and assists with validating the detailed financial forecasting completed internally by City staff.

### 2.2 STUDY OBJECTIVES

The scope of service identified for the water and sewer rate study update include the following tasks:

**Review Customer Usage Profile** – Conduct a detailed review of the customer counts and annual consumption for the City’s water and sewer customer base. The detailed review examines usage trends and patterns within the current water usage rate structure.

**Perform a Revenue Sufficiency Analysis Update** – Populate and update a multi-year forecasting model for the City’s water and sewer system that will determine the level of annual revenue required to satisfy projected annual operating, debt service, and capital cost requirements, as well as maintain adequate reserves.



**Demonstrate Customer Impacts** – Demonstrate the impact of the recommended financial plan on the customers of the water and sewer systems.

**Reporting** – Document the results of the study for consideration and adoption by the City.

## 3. DEMAND AND CUSTOMER ANALYSIS

### 3.1 CUSTOMER ANALYSIS

To complete the water and sewer rate study update, the City provided detailed customer and usage data from the City's utility billing system. The data was provided for Fiscal Year 2017 by customer for each quarterly billing period. The customer count by customer type and meter size is presented in Table 3-1.

**Table 3-1 Water System Customer Counts**

Meter Size	Residential	Multi-Family	Non-Residential	Total
5/8"	9,550	260	730	10,540
3/4"	69	9	15	93
1"	1,430	56	226	1,712
1 1/2"	10	151	150	311
2"	1	158	217	376
3"	0	29	58	87
4"	0	16	67	83
6"	0	6	6	12
<b>Total</b>	<b>11,060</b>	<b>685</b>	<b>1,469</b>	<b>13,214</b>

The sewer system customer account is provided for the same time period in Table 3-2.

**Table 3-2 Sewer System Customer Counts**

Meter Size	Residential	Multi-Family	Non-Residential	Total
5/8"	8,428	259	567	9,271
3/4"	68	9	12	89
1"	1,410	53	176	1,546
1 1/2"	6	151	123	277
2"	1	158	176	331
3"	0	27	54	82
4"	0	15	58	72
6"	0	6	4	10
<b>Total</b>	<b>9,837</b>	<b>678</b>	<b>1,162</b>	<b>11,677</b>

The City has a very stable customer base with little fluctuation in the number of customers billed on an annual basis. For purposes of the rate study, the current number of customers is assumed to remain the same during the projection period.

## 3.2 DEMAND ANALYSIS

The usage data provided by the City for Fiscal Year 2017 was analyzed as part of the study. Particular attention was paid to the ongoing changes in customer usage patterns in light of the inclining block rate structure used for the water system. Similar to most water utilities around the United States, the City of Annapolis has experienced declining water sales on a per customer basis over the past several years. Water customers continue to use less water due to more efficient water fixtures, conservation efforts and to minimize their water bills. However, it should be noted that the total water usage in FY 2017 was approximately 5.5% higher than in FY 2016. The total billable sewer usage was lower in FY 2017 due to significant reductions in billable usage from the US Naval Academy. Table 3-3 presents the FY 16 and FY17 billed usage for the water and sewer systems.

**Table 3-3 FY 17 Water and Sewer Usage (1,000 gallons)**

Customer Class	Water - FY 16	Water - FY 17	Sewer - FY 16	Sewer - FY 17
Single-Family Residential	476,290	503,729	457,754	484,713
Multi-Family	247,215	258,746	241,347	252,395
Non-Residential	368,835	390,247	318,150	343,549
US Naval Academy	-	-	265,280	183,385
<b>Total</b>	<b>1,092,340</b>	<b>1,152,722</b>	<b>1,282,531</b>	<b>1,264,042</b>

To forecast water and sewer usage, our analysis assumes an ongoing annual reduction in per customer usage of 0.5%. In addition to the ongoing reductions in water sales, City staff informed our project team that in mid-2016, the US Naval Academy modified its systems such that flows to the City would be reduced as reflected in the FY 17 Academy usage. This is a significant reduction, amounting to nearly 33% reduction since FY14.

The final component of the usage analysis was to examine how the City's residential water customers are using water within the inclining block rate structure. The usage patterns are shown in Table 3-4.

**Table 3-4 FY 17 Residential Water Usage Patterns**

Water Rate Tiers	Water Volume	Water Rate Tiers
Tier 1: 0 - 7,000 gallons	261,939	52%
Tier 2: 7,001 - 20,000 gallons	186,380	37%
Tier 3: Over 20,000 gallons	55,410	11%
<b>Total</b>	<b>503,729</b>	<b>100%</b>

While the overall usage has fluctuated year to year in the City, the usage patterns within the current water tiers have stayed fairly consistent. The usage distribution in FY13 was approximately 50%, 40% and 10% among the three years. The usage patterns shown in Table 3-4 are fairly consistent with results over the last several years. The usage breakdown shown in Table 3-4 is identical to the usage distribution observed in FY16.

## 4. REVENUE SUFFICIENCY ANALYSIS

### 4.1 DESCRIPTION

This section presents our revenue sufficiency analysis (RSA) for the City's water and sewer systems. The analysis examines the ability of the water and sewer systems to fund the revenue requirements of the systems with current water and sewer rates, and any necessary adjustments required to ensure revenue sufficiency. The following sub-sections of the report present a description of the source data, assumptions, and results of the RSA.

In order to populate the financial model, we reviewed the City's historical and budgeted financial information regarding the operation of its water and sewer system. We also reviewed the City's multi-year capital improvement programs (CIP), and documented the City's current debt service obligations and covenants, or promises made to lenders, relative to net income coverage requirements, reserves, etc. We also counseled with City staff regarding other assumptions and policies that would affect the financial performance of the Utility, such as changes in system process or other factors that might impact system expenditures and/or revenues. We also examined historical spending levels (budget to actual) to determine if the City has historically executed its budget, and if any adjustments to future spending levels should be made. Finally, we completed a detailed review of historical usage by customer class to assist in the development of demand projections.

All of this information was entered into the City's existing water and sewer financial model. The model was updated and reviewed for accuracy. The projection period within the model was also extended to provide a full ten-year projection period (Fiscal Year 2019 to 2028).

Once the financial model was reviewed and updated, we reviewed alternative multi-year financial management plans and corresponding water and sewer rate revenue adjustment plans through an interactive work session with City staff. During the work session, we examined the impact of various inputs or assumptions upon key financial indicators. The work session focused on the capital improvement plan, including funding sources and spending levels. Each of the scenarios were evaluated in light of key financial metrics for the Utility including cash reserves, debt service coverage requirements and customer bill impacts. After discussions and scenario analysis, we developed the recommended financial management plan and corresponding plan of annual water and sewer rate revenue adjustments presented in this report. The financial plan was developed for the full 10-year projection period with recognition that the City will evaluate the plan annually, and make adjustments as necessary given changing conditions within the Utility.

### 4.2 SOURCE DATA AND ASSUMPTIONS

The following presents the key source data and assumptions relied upon in conducting the RSA.

### 4.2.1 Source Data – Reserves

The FY 2017 Comprehensive Annual Financial Report (CAFR) and supporting trial balance files provided by City staff were used to establish the beginning FY 2018 balances for City’s water and sewer system. As of the end of year FY 2017, the City had approximately \$10.7 million in total fund balance. Included within the total fund balance is \$5.9 million which is restricted per the City’s bond covenants. The restricted reserves include a debt service reserve at \$3.16 million, a repair and replacement reserve at \$0.72 million and operating reserves at \$2.07 million. The remaining \$4.8 million in cash is unrestricted. The total reserves for water system equal \$5.7 million and the reserves for sewer system total \$5.0 million.

### 4.2.2 Current Revenues

The revenues utilized in the RSA reflect an evaluation of multiple years of historical results. Revenues consist of rate revenue, interest income, and other minor revenue from miscellaneous service charges. FY 2018 rate revenue is based upon FY 2017 actual results, adjusted with the 4.5% increase in water and sewer rates adopted for FY 2018. To evaluate the sufficiency of current revenues to meet the funding requirements of the water and sewer systems, the revenues are forecasted at current rates with no growth in customers and the annual reductions in demand mentioned in the previous section of this report.

Projected revenues at current rates and miscellaneous revenues are shown below in Table 4-1 for the water system and Table 4-2 for the sewer system. The charges for service reflect the assumed annual decline in metered water and sewer service on per account basis.

**Table 4-1 Water Projected Revenues at Current Rates (millions)**

	FY 19	FY 20	FY 21	FY 22	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28
Charges for Services - Water	\$7.70	\$7.66	\$7.63	\$7.60	\$7.56	\$7.53	\$7.50	\$7.47	\$7.43	\$7.40
Other Miscellaneous Revenue	\$0.86	\$0.85	\$0.85	\$0.85	\$0.84	\$0.84	\$0.83	\$0.83	\$0.83	\$0.82
<b>Total Water Gross Revenues</b>	<b>\$8.56</b>	<b>\$8.52</b>	<b>\$8.48</b>	<b>\$8.44</b>	<b>\$8.41</b>	<b>\$8.37</b>	<b>\$8.33</b>	<b>\$8.30</b>	<b>\$8.26</b>	<b>\$8.22</b>

**Table 4-2 Sewer Projected Revenues at Current Rates (millions)**

	FY 19	FY 20	FY 21	FY 22	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28
Charges for Services - Sewer	\$7.86	\$7.83	\$7.79	\$7.76	\$7.73	\$7.69	\$7.66	\$7.62	\$7.59	\$7.56
Other Miscellaneous Revenue	\$0.50	\$0.50	\$0.50	\$0.49	\$0.49	\$0.49	\$0.49	\$0.48	\$0.48	\$0.48
<b>Total Sewer Gross Revenues</b>	<b>\$8.36</b>	<b>\$8.33</b>	<b>\$8.29</b>	<b>\$8.25</b>	<b>\$8.22</b>	<b>\$8.18</b>	<b>\$8.14</b>	<b>\$8.11</b>	<b>\$8.07</b>	<b>\$8.04</b>

### 4.2.3 Operating Expenditures

The Utility's operating expenditures include all operating and maintenance expenses, transfers, debt service requirements, and minor capital outlay. The RSA based operating expenditure projections on the individual expense categories and expense amounts within the FY 2017 Actuals, the FY 2018 Adopted Budget and the FY 2019 Proposed Budget, adjusted annually thereafter based upon assumed cost escalation factors that were reviewed with City staff (with the exception of annual debt service expenses which reflect the repayment schedules of each outstanding bond/loan). Based on a historical review of the City's budget to actual spending, no adjustment was made within the forecast as the Utility has historically not over-budgeted.

### 4.2.4 Existing Debt Service

The City currently has two outstanding debt service issuances within the water and sewer fund. The annual debt service amortization schedules for all existing obligations were provided by City staff and included in the RSA.

### 4.2.5 Capital Improvement Program

City staff provided the multi-year Capital Improvement Program (CIP) in project level detail from FY 2019 through FY 2024. Once the capital plan was updated into the model, the annual funding sources for the capital projects were discussed in great detail with City staff during the work session. Recent capital projects have been funded by the issuance of debt. While the City will continue to utilize bond funding in future years, many of the projects that the City has identified in its capital improvement program are recurring replacement type projects. It is common to fund at least a portion of these projects with current revenues ("Pay-As-You-Go"). This approach reduces the annual interest expenses borne by the City, and recognizes that existing users of the system are benefiting from the improvements to the system.

Based on the available cash within the Water and Sewer Fund and the minimum reserve requirements, we recommend that the City begin using current revenues to fund a portion of the CIP. Specifically, our financial plan assumes that beginning in Fiscal Year 2019, the City starts using cash to fund approximately 40% of the annual capital projects over the projection period. This level will allow the Utility to maintain its minimum reserve balances, while limiting the impacts on water and sewer customers. We estimate that the transition to the use of cash funding for capital projects beginning in FY19 will save the City over \$40 million in interest expense over the next nine years. Additionally in each subsequent year we recommend that the City reduce the amount of capital projects that are funded with debt gradually over the next ten years. Our financial projection assumes a 3% reduction in the portion of the capital projects that are funded with debt (i.e. FY 20 would be 37% funded with debt and FY 21 would be 34%, etc.).

The City's five-year (FY19 - FY24) CIP includes approximately \$16.7 million of water related capital projects and \$9.5 million of sewer related capital projects. To facilitate a ten-year projection period, our

analysis assumes that the City will continue to invest at the same level as the current CIP plan over the subsequent five-years (FY25 - FY28).

A summary of the water system operating and capital expenses (or system revenue requirements) are illustrated in Table 4-3, along with the anticipated water revenues at the current water rates.

**Table 4-3 Projected Water Operating and Capital Expenses (millions)**

	FY 19	FY 20	FY 21	FY 22	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28
<b>Total Operating Expenses</b>	\$4.29	\$4.36	\$4.49	\$4.63	\$4.76	\$4.91	\$5.05	\$5.20	\$5.36	\$5.51
<b>Capital Expenses</b>										
Cash Funded Capital	\$1.08	\$1.16	\$1.31	\$1.40	\$1.48	\$1.57	\$1.65	\$1.74	\$1.82	\$1.91
Existing Debt Service	\$2.72	\$2.74	\$2.72	\$2.74	\$2.74	\$2.74	\$2.74	\$2.73	\$2.74	\$2.74
Projected Debt Service	\$0.00	\$0.12	\$0.22	\$0.33	\$0.44	\$0.54	\$0.63	\$0.71	\$0.79	\$0.87
<b>Total Capital Expenses</b>	<b>\$3.80</b>	<b>\$4.01</b>	<b>\$4.26</b>	<b>\$4.47</b>	<b>\$4.66</b>	<b>\$4.84</b>	<b>\$5.02</b>	<b>\$5.19</b>	<b>\$5.36</b>	<b>\$5.52</b>
<b>Total Water Expenses</b>	<b>\$8.09</b>	<b>\$8.38</b>	<b>\$8.75</b>	<b>\$9.10</b>	<b>\$9.42</b>	<b>\$9.74</b>	<b>\$10.07</b>	<b>\$10.39</b>	<b>\$10.71</b>	<b>\$11.03</b>
<b>Current Water Revenues</b>	<b>\$8.56</b>	<b>\$8.52</b>	<b>\$8.48</b>	<b>\$8.44</b>	<b>\$8.41</b>	<b>\$8.37</b>	<b>\$8.33</b>	<b>\$8.30</b>	<b>\$8.26</b>	<b>\$8.22</b>

A summary of the sewer system operating and capital expenses (or system revenue requirements) are illustrated in Table 4-4 along with the anticipated sewer revenues at the current sewer rates.

**Table 4-4 Projected Sewer Operating and Capital Expenses (millions)**

	FY 19	FY 20	FY 21	FY 22	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28
<b>Total Operating Expenses</b>	\$6.35	\$6.57	\$6.80	\$7.05	\$7.30	\$7.56	\$7.83	\$8.11	\$8.40	\$8.68
<b>Capital Expenses</b>										
Cash Funded Capital	\$0.64	\$0.69	\$0.73	\$0.78	\$0.83	\$0.88	\$0.93	\$0.97	\$1.02	\$1.07
Existing Debt Service	\$0.73	\$0.72	\$0.73	\$0.71	\$0.71	\$0.71	\$0.71	\$0.72	\$0.71	\$0.72
Projected Debt Service	\$0.00	\$0.07	\$0.13	\$0.20	\$0.25	\$0.31	\$0.36	\$0.41	\$0.45	\$0.49
<b>Total Capital Expenses</b>	<b>\$1.37</b>	<b>\$1.48</b>	<b>\$1.60</b>	<b>\$1.69</b>	<b>\$1.80</b>	<b>\$1.90</b>	<b>\$2.00</b>	<b>\$2.10</b>	<b>\$2.19</b>	<b>\$2.28</b>
<b>Total Sewer Expenses</b>	<b>\$7.72</b>	<b>\$8.05</b>	<b>\$8.41</b>	<b>\$8.74</b>	<b>\$9.10</b>	<b>\$9.46</b>	<b>\$9.83</b>	<b>\$10.21</b>	<b>\$10.59</b>	<b>\$10.97</b>
<b>Current Sewer Revenues</b>	<b>\$8.36</b>	<b>\$8.33</b>	<b>\$8.29</b>	<b>\$8.25</b>	<b>\$8.22</b>	<b>\$8.18</b>	<b>\$8.14</b>	<b>\$8.11</b>	<b>\$8.07</b>	<b>\$8.04</b>

As demonstrated in Tables 4-3 and 4-4, the revenues from current water and sewer rates will not be sufficient to meet the total expenses of the water and sewer systems beginning in FY 21 or in any year after.

#### 4.2.6 Minimum Reserve Policy

Reserve balances for utility systems are funds set aside for a specific cash flow requirement, financial need, project, task, or legal covenant. These balances are maintained in order to meet short-term cash flow requirements, and at the same time, minimize the risk associated with meeting the financial obligations and continued operational and capital needs under adverse conditions. The level of reserves maintained by a utility is an important component and consideration of developing a utility system multi-year financial management plan.

Many utilities, rating agencies, and the investment community as a whole place a significant emphasis on having sufficient reserves available for potentially adverse conditions. The rationale related to the maintenance of adequate reserves is twofold. First, it helps to assure a utility that it will have adequate funds available to meet its financial obligations during unusual periods (i.e. when revenues are unusually low and/or expenditures are unusually high). Second, it provides funds that can be used for emergency repairs or replacements to the system that can occur because of unanticipated system failures or natural disasters.

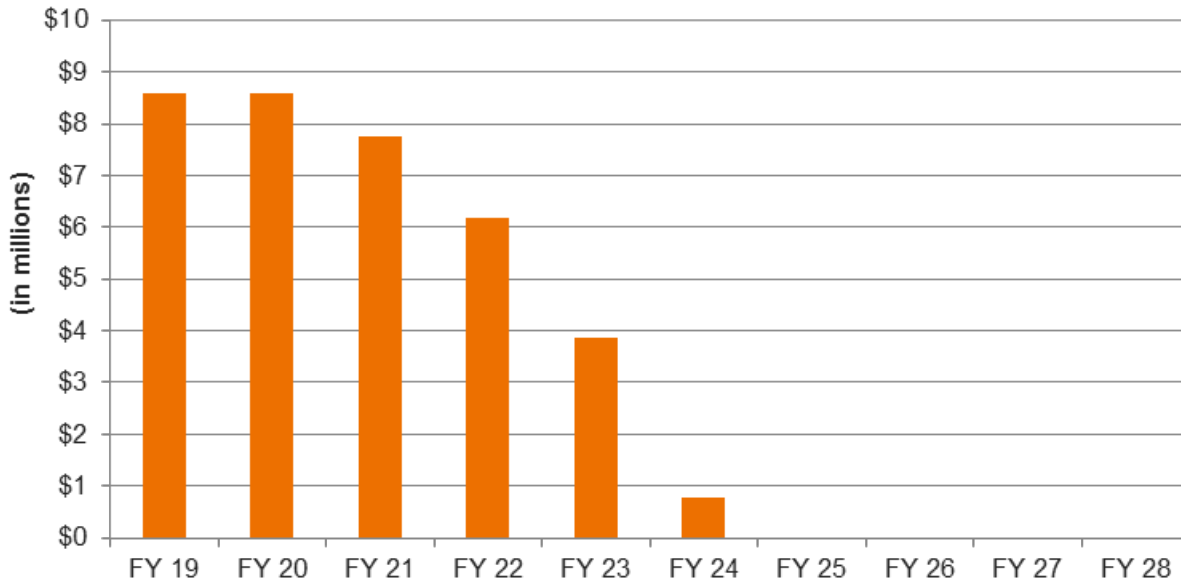
By policy, the City has specific fund reserves and restricts the use of fund balances each year. Operating reserves are set at 180 days of annual O&M expenses (120 days of annual O&M expenses in an unrestricted reserve, and 60 days of annual O&M expenses in a restricted reserve). Repair and replacement reserves are required for the water treatment plant. The debt service reserve is restricted as required by the City's bond covenants. The total combined cash balances, consisting of the restricted and unrestricted reserves, are shown for the entire planning period in Table 4-5. The table demonstrates that the water and sewer system would exhaust all reserve balances by FY25 based on the system revenue requirements and anticipated revenues at current rates (i.e. assuming the City does not adjust water and sewer rates in future years).

**Table 4-5 Water and Sewer System End of Year Cash Balances (millions)**

	FY 19	FY 20	FY 21	FY 22	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28
Water System	\$2.97	\$2.75	\$2.09	\$1.06	(\$0.33)	(\$2.07)	(\$4.18)	(\$6.64)	(\$9.46)	(\$12.63)
Sewer System	\$5.62	\$5.84	\$5.66	\$5.12	\$4.18	\$2.84	\$1.10	(\$1.07)	(\$3.65)	(\$6.64)
<b>Total Combined Cash Balance</b>	<b>\$8.59</b>	<b>\$8.59</b>	<b>\$7.76</b>	<b>\$6.18</b>	<b>\$3.85</b>	<b>\$0.77</b>	<b>(\$3.09)</b>	<b>(\$7.71)</b>	<b>(\$13.11)</b>	<b>(\$19.27)</b>

The projected combined cash balance for the Water and Sewer Fund based on current water and sewer rates is presented in Figure 4-1.



**Figure 4-1 Total End of Year Water and Sewer Cash Balance**

As demonstrated in Table 4-5 and Figure 4-1, with the current water and sewer rates in place, the City will not be able to maintain the necessary cash balances to operate the systems, with the total Water and Sewer Fund exhausting all cash reserves by FY25.

In addition to maintaining reserve funds, the annual revenues of the water and sewer system must be sufficient to meet the City debt service coverage requirements. The City's bond resolution requires that the revenue available for debt service must stay above 125% of senior lien debt service for the water and sewer utility combined. The City has taken an even more fiscally conservative approach above the resolution, and strives to achieve a debt service coverage ratio of 150%. The debt service coverage for the City's senior lien debt over the projection period based on current rates is presented in Table 4-6.

**Table 4-6 Senior Lien Debt Service Coverage**

	FY 19	FY 20	FY 21	FY 22	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28
Total Revenues Available for Coverage	\$16.6	\$16.5	\$16.4	\$16.4	\$16.3	\$16.2	\$16.2	\$16.1	\$16.0	\$15.9
Less Operating Expenses	(\$10.6)	(\$10.9)	(\$11.3)	(\$11.7)	(\$12.1)	(\$12.5)	(\$12.9)	(\$13.3)	(\$13.8)	(\$14.2)
Net Income Available for Debt Service	\$6.0	\$5.6	\$5.2	\$4.7	\$4.2	\$3.8	\$3.3	\$2.8	\$2.3	\$1.7
Annual Senior Lien Debt Service <sup>(1)</sup>	\$1.4	\$1.6	\$1.8	\$2.3	\$2.5	\$2.6	\$2.8	\$2.9	\$3.0	\$3.1
<b>Debt Service Coverage Ratio (Min 1.5)</b>	4.15	3.48	2.83	2.04	1.72	1.44	1.19	0.96	0.75	0.56

<sup>(1)</sup> Includes only senior lien debt which is subject to 1.5 debt service coverage requirement

As demonstrated in the Table 4-6, the Water and Sewer Fund revenue will not meet the debt service would violate the bond covenant by FY24. The annual debt service coverage for the Water and Sewer Fund total debt service is shown in table 4-7. The table shows similar results with coverage falling below 1.0 in FY24.

**Table 4-7 Total System Debt Service Coverage**

	FY 19	FY 20	FY 21	FY 22	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28
Total Revenues Available for Coverage	\$16.6	\$16.5	\$16.4	\$16.4	\$16.3	\$16.2	\$16.2	\$16.1	\$16.0	\$15.9
Less Operating Expenses	(\$10.6)	(\$10.9)	(\$11.3)	(\$11.7)	(\$12.1)	(\$12.5)	(\$12.9)	(\$13.3)	(\$13.8)	(\$14.2)
Net Income Available for Debt Service	\$6.0	\$5.6	\$5.2	\$4.7	\$4.2	\$3.8	\$3.3	\$2.8	\$2.3	\$1.7
Total Annual Debt Service	\$3.6	\$3.8	\$3.9	\$4.1	\$4.3	\$4.4	\$4.6	\$4.7	\$4.8	\$4.9
<b>Debt Service Coverage Ratio</b>	1.67	1.49	1.31	1.15	1.00	0.86	0.72	0.59	0.47	0.35

#### 4.2.7 US Naval Academy

As outlined earlier in this report, the City of Annapolis provides sewer treatment services to the US Naval Academy. The flows from the Academy are metered at two locations and the metered sewer quantities are used for determining the Academy's sewer bill. Given the unique nature of measuring sewer flows, the City incurs specific costs associated with the metering. These costs include annual metering costs and the one-time capital costs associated with replacing/constructing the flume/flow meter. Based on information provided by City staff, the City currently incurs annual operating costs of approximately \$16,000 which are primarily due to maintenance of temporary meters which will be replaced during FY19. Once the new flume is in place, the City estimates its annual costs associated with metering the Academy flows will be approximately \$5,200 per year. The construction of the new flume/flow meter at one of the metering locations will be constructed in FY19 and will cost approximately \$295,000. For purposes of our analysis we have assumed the City will finance the construction of the meter at an interest rate of 3.5% over a 20 year period, which equates to an annualized cost of \$21,000. The combination of the annual costs of metering the capital costs equates to a total annual metering cost for the Academy of \$26,000. Given the current billable volumes from the Academy, an additional \$0.14 per 1,000 gallons added to the Naval Academy sewer rate would cover the annual cost of metering.

## 5. RESULTS AND RECOMMENDATIONS

As demonstrated in the revenue sufficiency analysis, the City's current water and sewer rates are not sufficient to meet the funding requirements of each system. Without adjustments to rates, the City will exhaust all reserves within the Water and Sewer Fund and violate its bond covenant. While it appears that these negative outcomes would not occur for a number of years, should the City hesitate and wait to address them, significant (double digit) rate adjustments will be required, which will most certainly result in rate shock within the community. We recommend that the City gradually increase water and sewer rates over the next several years to ensure revenue sufficiency within the Water and Sewer Fund. This approach will minimize the one-time impact on customer bills, while meeting the requirements of the system.

Our recommended plan of water and sewer rate revenue increases is presented in Table 5-1.

**Table 5-1 Recommended Plan of Water and Sewer Rate Revenue Increases**

	FY 19	FY 20	FY 21	FY 22	FY 23
<b>Effective Date</b>	7/1/2019	7/1/2020	7/1/2021	7/1/2022	7/1/2023
<b>Water Rate Increase</b>	<b>2.50%</b>	2.50%	2.50%	2.50%	2.50%
<b>Sewer Rate Increase</b>	<b>2.50%</b>	2.50%	2.50%	2.50%	2.50%

It should be noted that the rate revenue adjustments identified in Table 5-1 for Fiscal Years 2019 to 2023 are estimates at this time based on projected needs of the system. We recommend that the City continue to evaluate the needs of the system on an annual basis consistent with its current policy. Tables 5-2 and 5-3 present the proposed water and sewer rates for FY 18. It should be noted that the sewer rate proposed for the US Naval Academy in FY19 includes an additional \$0.14 to recover the annual cost of metering the Academy's sewer flows.

**Table 5-2 Proposed Fiscal Year 2019 Water and Sewer Fixed Charges**

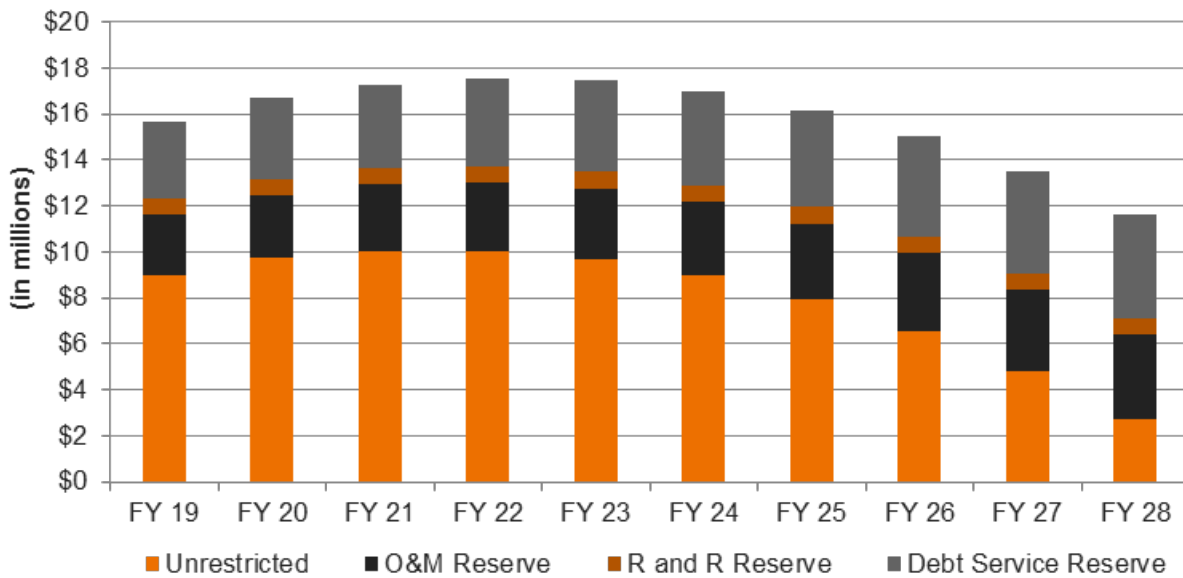
Meter Size	Water Fixed Charge	Sewer Fixed Charge
1" or Less	\$11.46	\$13.05
1 ½"	\$57.28	\$65.25
2"	\$91.62	\$104.42
3"	\$183.27	\$208.80
4"	\$286.35	\$326.27
6"	\$572.69	\$652.53

**Table 5-3 Proposed Fiscal Year 2019 Water and Sewer Usage Charges**

Type	Usage Charge (per 1,000 gallons)
<b>Residential Water</b>	
Tier 1: 0 - 7,000 gallons	\$3.61
Tier 2: 7,001 - 20,000 gallons	\$7.24
Tier 3: Over 20,000 gallons	\$10.85
<b>Non-Residential Water</b>	
	\$5.39
<b>Sewer Usage Rates</b>	
	\$5.74
<b>Naval Academy Usage Rates</b>	
	\$5.09

In addition to the recommended rate a, we recommend that the City begin cash funding a portion (approximately 40%) of the annual capital plan. We recommend that this transition begin in FY 2019, and continue during the planning period, with the City funding an increasing portion of their capital with cash. The use of cash funding will utilize some of the existing cash in the Water and Sewer Fund and will significantly reduce the interest expenses incurred by the City over the projection period. Figure 5-1 presents the estimated annual cash balance within the Water and Sewer Fund based on the recommended financial management plan for each of the reserves.

**Figure 5-1 End of Year Water and Sewer Cash Balances by Reserve Type**



The financial management plan will also ensure that the City continues to meet its debt service coverage requirements. Table 5-4 presents the annual coverage on senior lien debt over the projection period.

**Table 5-4 Senior Lien Debt Service Coverage**

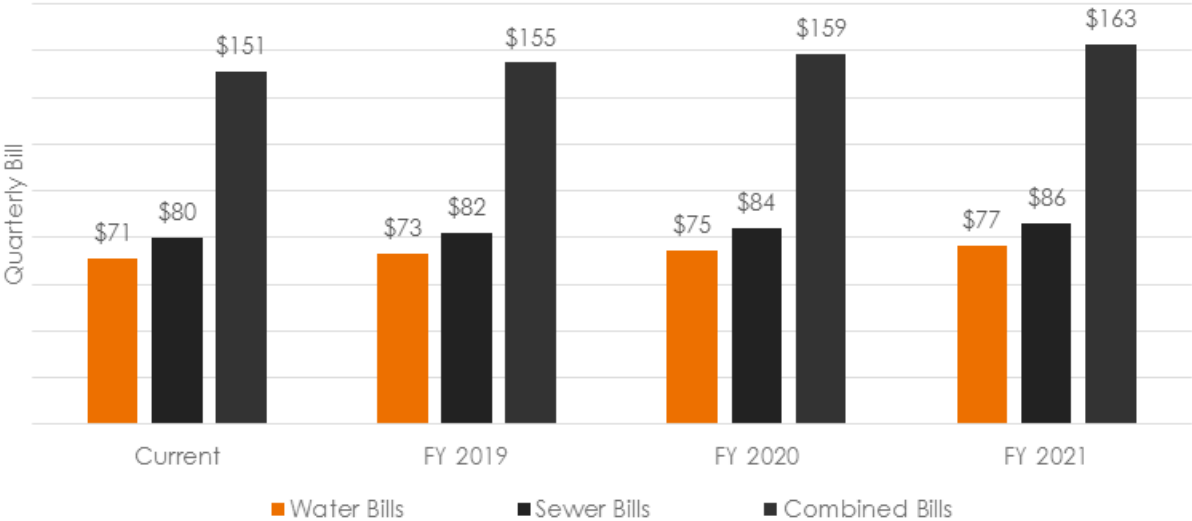
	FY 19	FY 20	FY 21	FY 22	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28
Total Revenues Available for Coverage	\$17.0	\$17.3	\$17.6	\$17.9	\$18.3	\$18.6	\$19.0	\$19.3	\$19.7	\$20.1
Less Operating Expenses	(\$10.6)	(\$10.9)	(\$11.3)	(\$11.7)	(\$12.1)	(\$12.5)	(\$12.9)	(\$13.3)	(\$13.8)	(\$14.2)
Net Income Available for Debt Service	\$6.3	\$6.4	\$6.3	\$6.3	\$6.2	\$6.1	\$6.1	\$6.0	\$5.9	\$5.9
Annual Senior Lien Debt Service <sup>(1)</sup>	\$1.4	\$1.6	\$1.8	\$2.3	\$2.5	\$2.6	\$2.8	\$2.9	\$3.0	\$3.1
<b>Debt Service Coverage Ratio (Min 1.5)</b>	4.42	3.96	3.46	2.72	2.52	2.35	2.20	2.07	1.96	1.87

<sup>(1)</sup> Includes only senior lien debt which is subject to 1.5 debt service coverage requirement

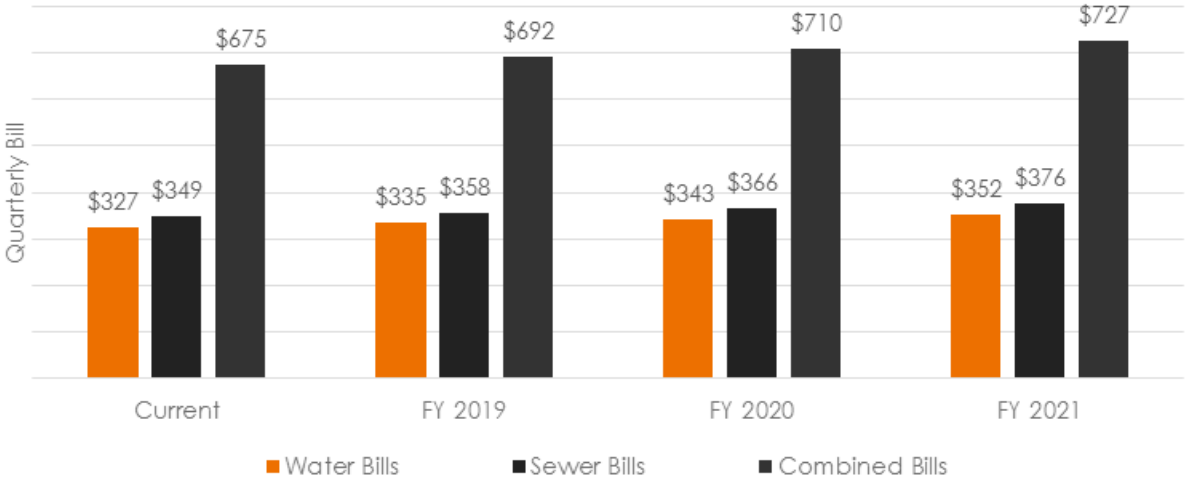
## 6. CUSTOMER IMPACTS AND COMPARISONS

The recommendations developed in this report will have an impact on the water and sewer bills for customers served with water and sewer service by the City. The following figures demonstrate the impacts to a typical residential and non-residential customer within the City over the next three years.

**Figure 6-1 Quarterly Water and Sewer Bill for Typical Residential Customers**



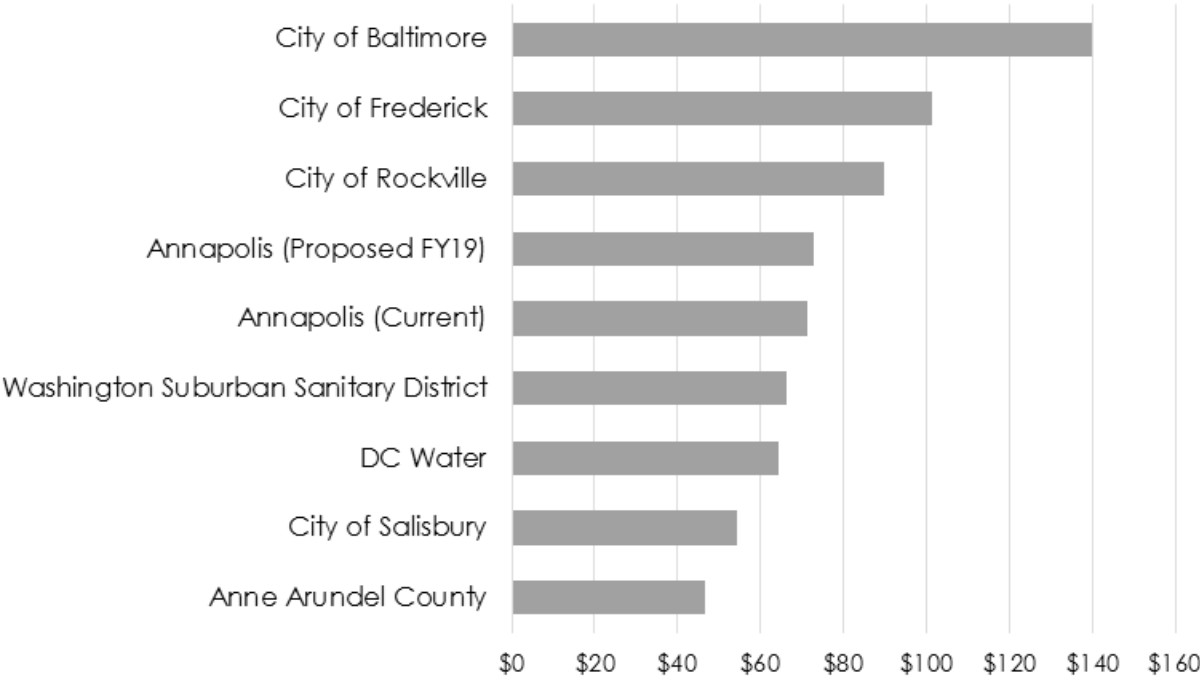
**Figure 6-2 Quarterly Water and Sewer Bill for Typical Non-Residential Customers (60,000 gallons per quarter)**



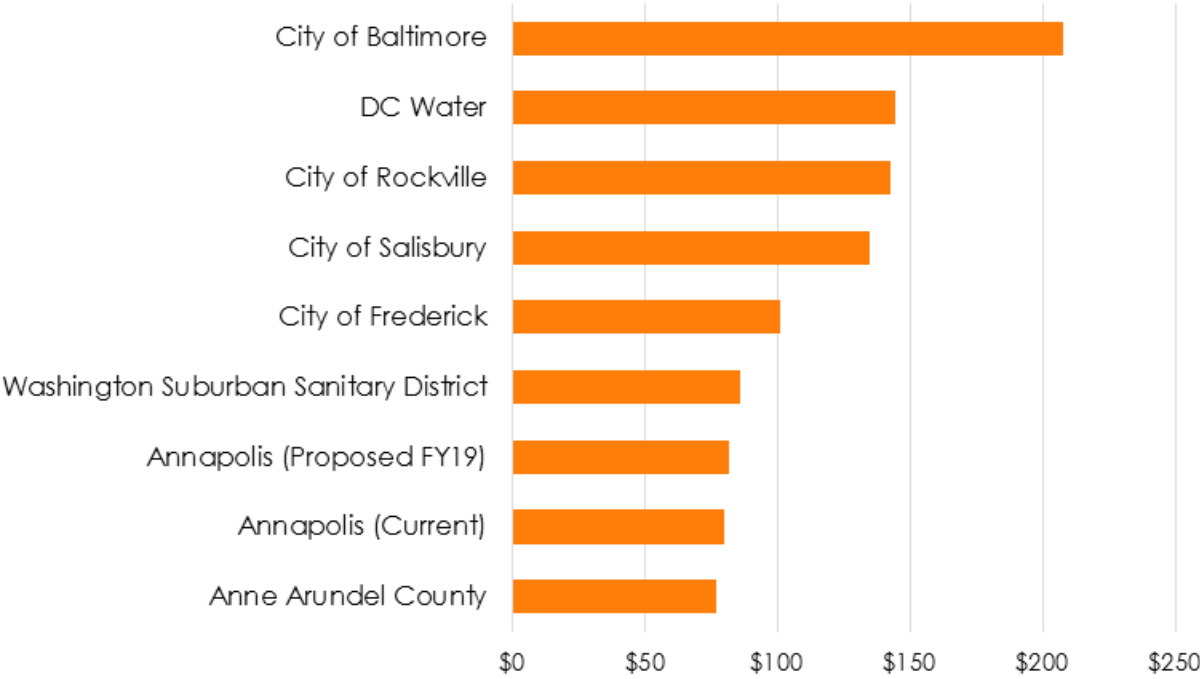
The comparison of current and proposed water and sewer rates with those assessed by surrounding jurisdictions can provide perspective on the level of bills paid by customers located within the City. The

following figures were developed to provide a comparison of what a typical residential customer pays for water and sewer service in surrounding jurisdictions.

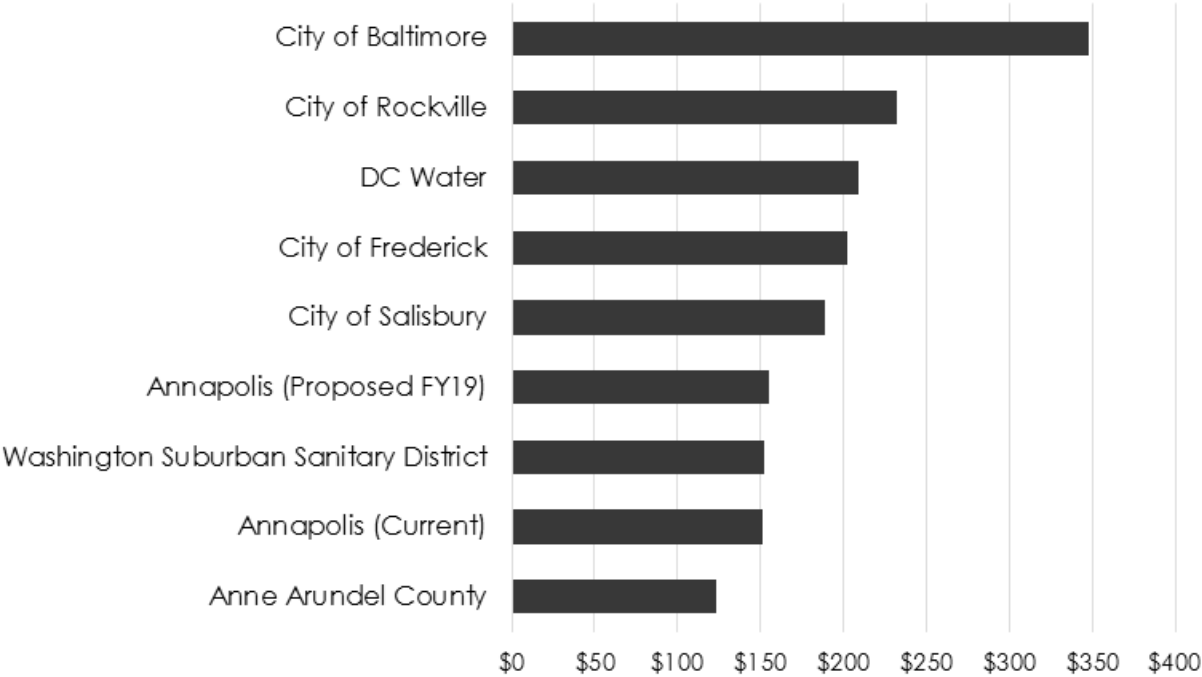
**Figure 6-3 Quarterly Water Bill Comparison (1” Meter, 12,000 gallons per quarter)**



**Figure 6-4 Quarterly Sewer Bill Comparison (1” Meter, 12,000 gallons per quarter)**



**Figure 6-5 Quarterly Combined Water and Sewer Bill Comparison**



As shown in the figures above, the water and sewer bills for a typical residential customer within the City of Annapolis will remain among the lowest in the region, even with the proposed adjustments to water and sewer rates in FY 19.



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